ENVIRONMENTAL EDUCATION: A STRATEGY FOR PRIMARY TEACHER EDUCATION

THESIS

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RAZEENA WAGIET

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ABSTRACT

Environmental Education: A Strategy for Primary Teacher Education

This research focuses on environmental education in initial teacher education, and is grounded in three interlinked and widely recognised assumptions. First, that education for sustainable living can assist in resolving some environmental problems that are contributing to the environmental crises of sustainability currently facing South Africa and the rest of the world. Second, that education for sustainable living can assist in the establishment of a new environmental ethic that will foster a sustainable way of living. Third, that teacher education is a vital process for the attainment of both. These assumptions inform the aim of this research, which is to explore the potential for the implementation of education for sustainable living, and to identify a strategy for this, for initial teacher education, for senior primary school student teachers in the Western Cape. The strategy is derived following the grounded theory approach, developed through the case study method.

In the process of identifying the strategy, this study establishes that there are challenges at macro, meso and micro levels that are obstructing the changes necessary for education for sustainable living. Change theory provides the basis for explaining these shortcomings, by helping to identify the barriers that might obstruct the realisation of the changes that are necessary for education for sustainable living. These challenges need to be perceived in the light of overcoming three sets of barriers in the way of the potential implementation of education for sustainable living in teacher education. First are those that can be ascribed to the formal education system that, while clinging to Western, Eurocentric values on the one hand, have also failed to secure a policy for environmental education on the other. Second are the barriers ascribed to the teacher educators themselves, with the whole notion of their powerlessness at its core. Finally, there are the logistical barriers, which encompass, for example, time and financial constraints.

With these barriers as a backdrop, to facilitate the incorporation of environmental education into initial teacher education, the study identifies a need for the development of a strategy to secure that education for sustainable living assumes its rightful place in the curriculum for initial teacher education. This framework emerges from the theory grounded in the interviewees' responses during the research, and from the theory grounded in the literature. Central to this framework is for education for sustainable living to contribute to the realisation of real change, change that would further the transformation of our conflict-riddled and inequitable society towards a more democratic and just one. This thesis demonstrates that the realisation of the changes necessary for education for sustainable living demand a reconstruction of current teacher education in order to secure and to sustain an appropriate and sound education ethic to form the basis of a transformative teacher education curriculum for sustainable living within initial teacher education. Except formal policy, but central to overcoming these barriers, is the need for professional development programmes for teacher educators. A strategy in this regard, is outlined.

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LIST OF ABBREVIATIONS

ACEID	Asia-Pacific Centre of Educational Innovation for Development
ANC	African National Congress
AZAPO	Azanian People's Organization
CEPD	Centre for Education Policy and Development
CNE	Christian National Education
COSAS	Congress of South African Students
COTEP	Committee on Teacher Education Policy
DE	Department of Education (national level)
DEA	Department of Environment Affairs
DEA and T	Department of Environment Affairs and Tourism
DET	Department of Education and Training
DP	Democratic Party
EEASA	Environmental Education Association of Southern Africa
EECI	Environmental Education Curriculum Initiative
EEPI	Environmental Education Policy Initiative
EIC	Education Information Centre
ESD	Ecological Sustainable Development
FAO	Food and Agricultural Organization of the United Nations
FP	Fundamental Pedagogics
GNU	Government of National Unity
HoA	House of Assembly
HoD	House of Delegates
HoR	House of Representatives
HSRC	Human Sciences Research Council
IDASA	Institute for Democratic Alternatives for South Africa
IDRC	International Development Research Centre
IEB	Independent Examinations Board
IEEP	International Environmental Education Programme
INSET	Inservice Teacher Education
IPET	Implementation Plan for Education and Training
IUCN	The World Conservation Union
NECC	National Education Co-ordinating Committee
NIER	National Institute for Educational Research Environmental
NETF	National Education and Training Forum
NEPI	National Education Policy Investigation
NQF	National Qualifications Framework
OBE	Outcomes-Based Education
QBTR	Queensland Board of Teacher Registration
QED	Queensland Education Department
RDP	Reconstruction and Development Programme
SACHED	South African Committee for Higher Education
TLSA	Teachers' League of South Africa
TSUD	Teacher Supply, Utilisation and Development
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCED	World Commission on Environment and Development
WCED	Western Cape Education Department
WWF	World Wide Fund for Nature

PREFACE

I would like to acknowledge the help and assistance given by several individuals during the course of this research. The first expression of gratitude must go to the interviewees, who willingly gave of their time, opinions and insights. I also thank most sincerely my promoter, Professor Pat Irwin, for his patience and valued comments throughout the research process.

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CHAPTER ONE

SUSTAINABLE LIVING AND EDUCATION: AN INTRODUCTION

> Sustainable living must be the new pattern for all levels: individuals, communities, nations and the world. To adopt the new pattern will require a significant change in the attitudes and practices of many people. We will need to ensure that education programmes reflect the importance of an ethic for living sustainably (IUCN, UNEP and WWF 1991: 5).

1.0 THE ENVIRONMENTAL CRISIS: A PROBLEM OF UNSUSTAINABILITY

Worldwide concern for the well-being of the environment is a relatively recent phenomenon (UNEP 1989), the intensity of which seems contingent on the severity of the environmental problems encountered (Lowe & Goyder 1983; Lahiry et al. 1988).

The contemporary environmental movement began in the early 1960s and evolved through the 1970s with the 'first crusaders'[1], amongst whom were scientists who evoked widespread attention to the centrality of human beings, through technology, to the degradation of the environment (Young 1991). Commoner (1971), as one these first crusaders, is especially important as he introduced a new set of ideas that critiqued the 'technological flaw' as the fundamental cause of environmental degradation. Instead, he advocated linking the level of social justice in a society as the yardstick to the extent of its environmental crises. Similarly, other writers, including Kahn and Bruce-Biggs (1972), have argued that environmental problems stem largely from socio-economic and political imbalances. The solutions to these environmental problems are therefore viewed as inextricable from fundamental social change. Wallace (1990) interprets the current environmental crisis in terms of unequal development, resource exploitation and unsustainable lifestyles, while Orr (1992) refers to the planetary crisis as 'the problem of sustainability' which he ascribes to several interrelated factors. Amongst these are:

- an unwillingness by people to acknowledge the interconnectedness between the well-being of the planet and the economy; and,
- a utilitarian view of the environment underpinned by the drive to dominate nature.

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[1] Included are Carson (1965) who wrote *Silent Spring*, Ehrlich (1968), author of *The Population Bomb* and Goldsmith et al. (1972), authors of *Blueprint for Survival.*

Several international reports have also illustrated the interconnectedness between the global economic system, unsustainable lifestyles and management, on the one hand, and the deterioration of the environment on the other. These include:

- World Conservation Strategy (IUCN, UNEP, WWF 1980);
- North-South: A Programme for Survival - The Brandt Report (Independent Commission on Development Issues 1980);
- Our Common Future: The Brundtland Report (World Commission on Environment and Development 1987);
- Caring for the Earth: A Strategy for Sustainable Living (IUCN, UNEP, WWF 1991); and,
- United Nations Conference on Environment and Development: Agenda 21 (UNESCO 1992a).

Cock's (1991) assertion that South Africa can be regarded as a microcosm of the environmental crises facing much of the rest of the world adds a further dimension to the genesis and perpetuation of these crises, which include, malnutrition, poverty, desertification, destruction of land and loss of biodiversity (Cock 1991; Wilson and Ramphele 1989). In outlining the situation in South Africa, Ramphele (1991: 201) articulates this dimension by situating the nature of the environmental crisis in a political context:

> South and Southern Africa experience many of the same environmental problems as other parts of the world...But apartheid has severely increased the damage. It has been a profoundly unnatural system; a system of removal and separation. It has alienated people from their traditional roles as guardians of the land. It has forced large numbers of people into unsuitable environments, putting disproportionate pressure on natural resources...it has wreaked ecological havoc by sponsoring wars and undermining economies.

The implication of this perception is that at the heart of environmental crises facing humanity lie political decisions that have entrenched these crises at a structural level. In this context, Archer's contention that most education systems are 'political products of power struggles' (1984: 2), dictates that the domain of environmentally-related education be broached. Acknowledging the environmental crisis facing the 21st century, many of the world's countries at the Earth Summit (UNESCO 1992c) pledged to conserve the environment for existing and future generations. Environmental education was proposed as a key strategy to accomplish this.

1.1 ENVIRONMENTAL EDUCATION: A RESPONSE TO THE CRISIS OF SUSTAINABILITY

Both the roots of problems manifested in society and their solutions are often ascribed to the education system (Beyer 1989; Brennan 1991). In this light, the discourse on environmental matters, likewise, calls for environmental education as a means to address the crisis of sustainability. The pivotal role of environmental education as a response to the environmental crisis, and in the possible prevention of future problems, is universally recognised (IUCN/ UNEP/WWF 1991; UNEP 1989; UNESCO 1978a; b; 1992a; 1993).

Environmental education has, amongst others, been described as a goal of education, a process, a way of life, a subject, a field of study, a medium for skills development and a style of education (Irwin 1993). Moreover, environmental education has received considerable acknowledgement over the years as a critical avenue through which a new environmental ethic and social change can be developed and promoted (Greenall 1987; Huckle 1991; 1995; Robottom 1987a; Vulliamy 1987; Gough 1987; 1989). Consequently, environmental education is viewed as an important process to address the problem of sustainability and the movement towards sustainable living, provided it assumes a socially critical perspective and a socially transformative role (Huckle 1993; 1995). From this position the political and economic systems are placed at the core of the environmental crisis (Huckle 1990). However, defining environmental education both in conceptual and practical terms along the lines outlined is rendered problematic by the historical, apolitical inheritance which informs current notions of its practise (Huckle 1991).

1.2 WHAT IS ENVIRONMENTAL EDUCATION?

Fundamental to formulating a definition of environmental education which can be implemented to address the structurally political nature of the environmental crises facing us, is the necessity of taking cognisance of the shift that has occurred in the interpretation of what constitutes the 'environment'.

1.2.1 Changing perceptions of the environment

Early interpretations of the environment were confined to the pristine, the natural world with its living and non-living organisms and ecosystems, and the interrelationships, interaction and the

interdependence among these (Di Chiro 1987). This perception has now shifted to encompass the total environment: the social, cultural, economic, political, bio and geophysical components of individual existence (Di Chiro 1987; O'Donoghue 1993a; QBTR 1993; Weston 1986). The well-being of the environment depends on the interconnectedness and the sound interrelationships among the natural world, the individual's own inner world and the socially constructed world (QED 1993).

This change in perception of the environment has added another dimension to the debate on the environment, one rather significant for South Africa, in that it highlights the severity of the urban environmental crisis (Cock 1991; Lawson 1991; Ramphele 1991), exacerbated by the estimation that by the end of this century more than half of the population will be urban dwellers (Huntley et al. 1989). Thus, South Africa, with its legacy of the Group Areas Act, functions as a useful microcosm of the environmental outcomes in contexts where profound socio-economic imbalances exist at a structural level due to political agendas. The Group Areas Act, a major piece of legislation of Apartheid ideology, was central to the 'separate development' agenda of Afrikaner nationalism. Ramphele (1991: 5) contends that this Act is directly responsible for the "squalor and sterility of the black segments of the urban areas". Wynberg (1993: 30) outlines the scenario thus:

> The central objective of separate development was to prevent black urbanisation rather than to create healthy, viable urban environments. The result is manifested in overcrowded, severely degraded, low income urban areas and a chronic housing shortage...Over seven million people have consequently established independent informal settlements, mostly without access to safe water or sanitation.

Having established that there has been a shift in the perception of the environment, to include the socially constructed dimensions, it is important now to turn to an overview of the evolution of the concept of environmental education.

1.2.2 Changing perceptions of the concept of environmental education

Over the past twenty-five years many definitions of environmental education have evolved. A widely referred to definition, developed by the IUCN in 1971, describes environmental education as

> ...the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his [sic] culture and his biophysical surroundings. Environmental education also entails practice in decision-making and the self-formulation of a code

> of behaviour about issues concerning environmental quality (cited in Greenall 1987: 14).

Typical of the popular debate of the 1970s, this definition did not provide a workable statement on environmental education; it focused on the nature of environmental education rather than define environmental education in a practical way. Environmental education was largely associated with science teaching, usually in the framework of conservation education (Greenall 1987). This conservation orientation focused on issues related to the preservation of species and natural areas through appropriate management procedures (Stevenson 1987).

However, the detrimental effects of unsustainable practices on the environment began to highlight the importance of linking sustainability to the concept of environmental education. This recognition, a profound landmark in the evolution of environmental education which signalled a change in focus, was registered at the Tbilisi Conference where the holistic and interdisciplinary nature of environmental education was stressed:

> Environmental education is not to be added to educational programmes as a separate discipline or a subject for special study, but as a dimension to be integrated into them. Environmental education is the result of a re-orientation and re-articulation of the various disciplines and of various educational experiments (natural sciences, social sciences, arts and letters, etc.) providing an integrated perception of the environment...(UNESCO 1978b: 1).

Subsequently, environmental education has become much more complex, and aspires to involve learners in a participatory, problem-solving process. For many writers, intrinsic to this process is the socio-political dimension that needs to be linked to environmental education curricular practices (Fien 1992; Huckle 1991; 1995; Stevenson 1987; 1993; Robottom 1987a). For example, Huckle (1990; 1991) argues that the practice of environmental education needs to focus on political literacy, while Greenall (1987) adds that both social and political literacy need to be developed in environmental education practices, and argues in favour of curricular practices which foster active involvement of the learner in real and relevant issues.

1.2.2.1 Taking up the challenges for education for sustainable living

The evolution of the concept of environmental education demonstrates a change away from defining environmental education in terms of the general problem solving of conservation-related issues, to encompassing strategies which will result in fundamental political and social change at a structural level in order to achieve sustainability (Huckle 1991; O'Donoghue 1993a). Along with this shift,

environmental education is now perceived in terms of education for sustainable living (Fien 1993; Huckle 1995; Smyth 1995)[2]. The challenge for education for sustainable living has been accepted by several environmental educators locally (Chlacherty 1993; O'Donoghue 1993a; Quinlan 1992-1993), and in other countries, including Australia, New Zealand, Japan and some of the other Asia-Pacific Regions (NIER 1993).

As a result, attempts have been made to analyse and outline the philosophical underpinnings, nature, and the rationale of education for sustainable living (Fien and Trainer 1993; Huckle 1991; Martin 1990; Orr 1992; Smyth 1995). In this respect, Fien (1993) and Huckle (1991; 1993) suggest that education for sustainable living should be grounded in socially critical theory and pedagogy. Martin (1990; 1993) deliberates on how school curricula may by organised to enable society to move towards sustainability. Orr (1992), by contrast, argues that since education in the modern world was planned to control nature, promote industrialization of the planet and conform to the modern economy, postmodern education proposes alternate environmental programmes that are relevant and realistic. These programmes, proposed by (Orr 1992: 148) are, amongst others, concerned with:

- ecological sustainability;
- cultural and ecological diversity;
- re-evaluation of the goals and directions of industrial society; and,
- justice, peace and participation.

However, education for sustainable living, grounded in socially critical theory and pedagogy (Fien 1993; Huckle 1991; 1995), shares certain common concerns with Orr's alternate environmental education programmes. These include the issues of sustainability, democracy and social justice, with the overall goal of education for sustainable living being to make all learners aware of their involvement in, and consequent responsibility for, living a sustainable life (Huckle 1995; UNESCO 1993). This overall goal is underpinned by the development of a critical environmental consciousness, critical thinking and problem-solving skills, a critical eco-socialist environmental ethic, political literacy and critical praxis in the learner (Fien 1992; Huckle 1995 see section 3.1.4). However, this is in conflict with the goals of education systems, since, it is argued (Beyer 1993; Iredale 1993; Van den Berg 1994; Verma 1993) that these are in place to maintain the social order.

[2] In this thesis reference is made to education for sustainable living, which embraces the principles for sustainable living as outlined in *Caring for the Earth: A Strategy for Sustainable Living* (IUCN/ UNEP/ WWF 1991), and, which closely corresponds to education for sustainability (Fien and Trainer 1993; Huckle 1993; 1995 see section 3.1.4).

To realise the challenges posed for education for sustainable living, is complex, in that it is underpinned by the necessity for changes at all levels of the education system (and the broader society) in order to secure, and to sustain, an appropriate and sound education ethic for sustainable living within education. In short, it demands changes that will further transformation.

To work towards the transformation necessary for education for sustainable living, a theory of change is employed in this thesis (see chapter two for further deliberation) to explore the changes that are needed at different levels. While these changes are interrelated, a distinction, however, is made between *real* and *superficial* change. In this regard Sparkes (1990), makes a distinction in terms of a continuum of levels one (which depicts superficial change) to three (depicting real change). Following this typification, whilst not denying that change is a multidimensional and interrelated process (Dalin 1978), this study makes a distinction between the challenges to realise and sustain change at:

- macro level, which includes, for example, a critique of the dominant ideology, which is essential to address the environmental crisis (see sections 3.1 and 3.2);
- meso level, which include the employment of alternative approaches that will advance critical praxis (see section 3.3); and,
- micro level, which relates to curricular matters, and includes, amongst others, to develop those specific outcomes (competences in the broad construct see section 3.4) in the learners that will empower them to become transformed critical citizens.

Change from micro to macro level becomes harder to attain (Sparkes 1990), yet, only when macro level changes occur, real change is likely to be realised and sustained (Dalin 1978; Sparkes 1990; House 1974; Jacklin and Kruss 1995 - see section 2.4).

In the light of the changes that are necessary for realising education for sustainable living, profound challenges, which could easily function as constraints to the implementation of environmental education practices, emerge. These constraints are reinforced and multiplied due to the tensions that arise between the socially critical direction of education for sustainable living, and the role that education plays as a medium for economic and cultural reproduction (Aronowitz and Giroux 1986: 79-96 see section 3.4.1) This poses significant problems in terms of the philosophical underpinnings and practices of environmental education. Several impediments to realise the changes necessary to secure education for sustainable living need to be considered, amongst these, the traditional approaches to environmental education.

1.3 APPROACHES TO ENVIRONMENTAL EDUCATION

Environmental education approaches may, following (Fien 1988; Greenall-Gough; 1991; Linke 1980; Maher 1986; Tilbury 1993) be broadly described in terms of education *about*, education *in*, and education *for* the environment. While education for sustainable living shares many of the aspirations of education *for* the environment, this approach can best be comprehended when compared to those of education *about* and *in* the environment.

1.3.1 Education *about* the environment

This approach to environmental education focuses on the provision of knowledge, often factual information of the environment (Huckle 1985; Fien 1992; Robottom 1987a). It is also aimed at increasing concern for and awareness of the environment. Education about the environment is the most common approach to environmental education that is currently practised (Fien 1992; Huckle 1983a; Greenall 1987; Robottom 1991), frequently as part of the Science and Geography curricula. It is thus referred to as the 'science perspective' or 'technocratic rationality' (Robottom 1991). The thrust of this approach, outside of supplying information, concepts and theories about the environment, is to promote the development of intellectual and technical skills that include observation, measurement and classification (Robottom 1987c).

However, while not denying the value of knowledge needed to address the environmental crises of sustainability, the nature and type of knowledge to achieve this ought to equip learners to develop a perspective of the totality of the environment, and also highlight the interaction and interrelatedness between all facets, including the natural, social, political, economic, etc.(Fien 1990; Robottom 1987a; Huckle 1983a). Yet, many education *about* the environment programmes dismiss the interrelatedness of these other facets, which unfortunately deteriorate into learners being subjected to a depoliticized (Huckle 1983a) and modernist (Orr 1992) view of the world because of this one-dimensional and uncritical form of pedagogy. Despite the critique levelled against this approach to environmental education, it is still the most popular approach, since where environmental education is implemented, very often it happens to be a science-based, content-driven programme (Greenall-Gough 1990). Thus, notwithstanding the constraints imposed by the curriculum (see sections 3.4.1; 3.4.3.1), those environmental educators who confine themselves only to the dissemination of knowledge *about* the environment, fail to take up the challenges embedded within the macro, meso and micro levels of change.

1.3.2 Education *in* the environment

Education *in* the environment, also referred to as education *from* the environment (Huckle 1983a) and *through* the environment (Fien 1988), includes the incorporation of the environment as a teaching medium, where learners, for example, participate in excursions or 'fieldtrips'. These fieldtrips may include a variety of activities. For example, it may incorporate exercises on the institution premises or in the immediate neighbourhood, or visits to places afar, like farms or nature reserves. The direct contact with the environment involved in this approach may result in an experiential encounter, which, in turn, has the potential to foster a respect for the environment (Huckle 1983a; Van Matre 1979). In addition, the type of engagement with the environment called for by this approach may also further the development of a vast array of skills, for example the handling of apparatus, and those related to data gathering (observation, sorting, classifying, interpreting, analysing, interviewing). Furthermore, the interactive nature of this approach could facilitate the nurturing of social skills, including co-operation and team work (Fien 1988; Huckle 1983a), and, could generate a type of education which is relevant and practical.

However, while this approach may take up some of the challenges grounded within the micro level of change, it falls short in relation to the overall goals of furthering a critical environmental consciousness, critical thinking, political literacy and critical praxis in the learner. Huckle (1983a; 1986) contends that education *in* the environment fails to consider the political-economy, thereby ignoring the true causes of the environmental crises. The consequent effect is the perpetuation of the current status quo. While this may be true, the rationale that underpins such activities, for example the nature[3] of the programme and also the frequency[4] (amongst other factors) of such activities that learners are engaged in needs to be clarified .

Nevertheless, like education *about* the environment, education *in* the environment is frequently mistaken as the only approach to environmental education. Not surprisingly, therefore, many educators believe that when they take learners on the rare fieldtrip or excursion, that they are actually involved in environmental education; yet this involves only a single aspect of environmental education.

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[3] The odd 'show-and-tell' trip to the local botanical garden, factory, aquarium, or the like, may very well verify Huckle's (1983a) contention.

[4] Whether it is the occasional, 'one-off- trip', or, instead, whether learners are active in ongoing, sustained, *in* the environment programmes that may, for example, lead to the furthering of critical thinking skills.

1.3.3 Education *for* the environment

In contrast, education *for* the environment is concerned with social and political change (Fien 1992; Greenall-Gough 1991; Robertson 1991). It involves values education as the catalyst for the emergence of learners who adopt lifestyles appropriate to a sustainable way of living (Fien 1992; Greenall-Gough 1991). Education *for* the environment is therefore devoted to the transformation of learners' patterns of behaviour and attitudes through fostering active involvement and participation in real and relevant environmental decision-making and active problem-solving (Di Chiro 1987; Greenall-Gough and Robottom 1993; Robottom 1987a; Stevenson 1987), all of which are central to education for sustainable living.

However, Robottom (1987b) contends that despite the support given to this approach at seminars and workshops, he questions the prospects for it to become prominent in the classroom. Regarding the latter, Greenall-Gough (1991) and Huckle (1991) report that education for the environment (in a socially critical sense) is not widely practised in Australia and Britain respectively, which strengthens Robottom's argument regarding the prominence of this approach at schools in these countries. This is not surprising, since to engage within a socially critical orientation (see section 3.1.2), demands macro-shifts in the thinking and practice of practitioners. These macro-shifts call for practitioners to take up the challenges grounded within the meso and macro levels of change, in order to become critically reflective (Beyer 1991), and to further critical praxis (Beyer 1991; Fien 1992 see sections 3.1.4; 3.3.1), which may be in conflict with the goals of the education system.

Nevertheless, as has been argued (see sections 1.1 and 1.2 above), current environmental problems are linked to issues of sustainability. Education for sustainable living, with its clear leanings towards socially critical education *for* the environment (Fien 1993; Huckle 1995) is eminently positioned to take a major transformative role towards sustainable living (ANC 1994; EEPI 1994; Fien 1993; IUCN, UNEP, WWF 1991; Sterling 1992; 1993; Smyth 1995; UNESCO 1990; 1993).

Outside of the overt focus on the roots, nature and causes of unsustainable practices, there seems to be no clear-cut difference between environmental education for sustainable living and socially critical education *for* the environment. Tilbury (1993: 158) claims that the difference between education *for* the environment, and what she refers to as Environmental Education For Sustainability (EEFS) differs in that EEFS focuses more on the "political threads" which underpin the quality of the environment, the ecology and the socio-economics. This point is contested here, since political literacy is perceived as one of the five fundamental components of the former

position (Fien 1992). Additionally, the roots of environmental crisis cannot be perceived in isolation of the political-economy, a perspective endorsed for education *for* the environment by Huckle (1983a; 1986). However, in terms of their various ideological underpinnings, there appear to be no differences in the agendas of either. Whatever further differences exist, is beyond the scope of this research study.

It is, nevertheless, contended that for effective environmental education to take place, the integration of all three approaches to environmental education is required (Fien 1990; Maher 1986; Tilbury 1993). The term 'integrated', as employed in this study, concurs with Tilbury's (1993) "three-fold approach", and refer to the combination of all three approaches to environmental education: education *about*, education *in* and education *for* the environment. Also, the latter approach refers specifically, to socially critical education *for* the environment. In this thesis, the facet of sustainability is implicit where referral is made to socially critical education *for* the environment. In summary, the integrated approach, together with the focus on social and ecological sustainability, democracy and social justice, are some of the key features to consider in order to secure and to sustain, the changes that will further transformation of an appropriate and sound education ethic for sustainable living within education.

1.4 AN OVERVIEW OF ENVIRONMENTAL EDUCATION IN SOUTH AFRICA

The development of environmental education in South Africa (further deliberated on in sections 3.2.2; 3.5.2) has been neither even nor uncontested, and cannot be separated from the fragmented education system or from the broader social, economic and political domains (see section 3.1.1). Many inequalities in education (provision of resources, gender, authoritative management practices etc.) may be partly assigned to the structures created by the ideological underpinnings of apartheid (ANC 1994; Ramphele 1991). In formal education, outside of the *White Paper on Environmental Education* (DEA 1989 see section 3.2.2 for further discussion and critique of this document) the lack of formulation, adoption and implementation of a policy for environmental education, is central to the exclusion of environmental education, for most South Africans. This was compounded by the segregated education for the different race groups, that were governed by different education departments (NEPI 1992a), which functioned in isolation from each other (see sections 3.1.1; 3.3.2). Furthermore, there was limited communication and co-operation between these different education departments regarding curricular, and other matters. Consequently,

environmental education has been restricted to the in- and non-formal[5] spheres of education, and where it has been incorporated into the formal education system, this was carried out on an ad-hoc basis, mostly concentrated within the realm of the natural and earth sciences.

The social engineering of apartheid is evident in establishments such as the 'Veld Schools' in the former Transvaal Education Department[6]. While the ostensible motivation behind the establishment of these schools was to bring children into close contact with nature, these camps focused on furthering the aims of Christian National Education (CNE), under the disguise of 'nature' (Christie 1991). This social engineering of apartheid is also evident in the political, social, economic and environmental disempowerment of most South Africans, reflected in the appalling environmental and social conditions visible in the townships and informal settlements. Lawson (1991: 47), concurring with Klugman (1991) and Ramphele (1991), assigns the appalling environmental conditions exacerbated by high health hazards to the previous government's apartheid policy:

> ...a central concern of the ruling white government has been to prevent black urbanisation. The legacy of this policy - segregated, degraded, overcrowded black urban areas - is the core of the urban environmental crisis in South Africa today.

Some of the visible health hazards, which prevent the majority of people in South Africa from leading a decent quality of life, may result, among others, from:

- high pollution levels (water, air, land);
- refuse dumps (causing refuse-related diseases);
- inadequate sanitation (causing excreta-related infections);
- inadequate drainage that results in stagnant water;
- inadequate safe drinking water (resulting in diarrhoea and infections, which, when it becomes severe leads to poliomyelitis and typhoid); and,
- overcrowding, some of the consequences of which include tuberculosis, pneumonia and measles.

Resembling the international scenario (Huckle 1983a; Greenall 1987) many of the early approaches to environmental education in South Africa were centred around education *about* the environment.

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[5] These activities were planned and conducted by, for example, non-government environmental organisations, the Parks Boards (O'Donoghue et al. 1994), etc.

[6] One of the seventeen Education Departments, that was governed by the House of Assembly, now referred to as the ex-HoA, of the previous government. This Education Department governed white schools in the Transvaal (now referred to as Gauteng Province), and the other three provinces.

The focus was primarily on 'conservation education', with the political, social and economic aspects of the environment as a human construct largely ignored (O'Donoghue 1993a; b). Despite the numerous international and national conferences and workshops which have contested this position, conservation education and outdoor education continue, in the experience of the researcher, to constitute a significant component of current environmental education. In certain instances, environmental education is perceived only in terms of conservation and outdoor education (see chapters five and six regarding the interviewees' perceptions and understanding of environmental education). This one-dimensional view of environmental education may be ascribed to the failure of the previous government to incorporate environmental education into the formal education system. In the absence of environmental education in the formal education system, the training of Nature Conservation Officers, that focused on outdoor and conservation education, continued. Considering the nature of their training, these practitioners, particularly at some of the environmental education centres[7], contributed significantly to the advancement and retention of these perceptions of environmental education.

The way environmental education in South Africa functioned in the past, has come under scrutiny (EEPI 1994; O'Donoghue 1993a; b; Schreuder 1995). O'Donoghue (1993a; b) argues that environmental education has been characterised by conservation and environmental activities that involved extension programmes, values-clarification activities, awareness campaigns and intentions for altering the behaviour of the learner. Environmental education was aimed to 'get the conservation message across', to pre-specified 'target groups', as specified in the *White Paper on Environmental Education* (DEA 1989). This, it was generally assumed, would then enhance the environmental awareness of the learner, and would lead to changes in the actions of people.

Attempts, however, have been made to change this technicist approach to environmental education, for informal, non-formal and formal education. The action research projects in the Dusi Valley and Project WATER in KwaZulu-Natal (O'Donoghue 1993b: 31), as well as the Environmental Education Policy Initiative (EEPI see sections 3.2.2; 3.5.2), and the Environmental Education Curriculum Initiative (EECI see sections 3.2.2; 3.5.2) illustrate some such alternatives which have a process-driven approach to policy development. These examples portray a change of focus from nature-experiences, the conservation of nature and natural resources as well as top-down styles of management procedures, towards an emphasis on wider experiential and action learning, issues of

[7] In the experience of the researcher's participation in some of these programmes with students at centres in the Western Cape.

sustainability, social justice and participatory action (O'Donoghue 1993a). This shift towards defining environmental education more overtly in terms of education for sustainable living has found increasing resonance in various recent policy guidelines emanating from, for example, the Environmental Education Policy Initiative (EEPI 1994), the *Reconstruction and Development Programme* (RDP) of the ANC (1994) and the *White Paper on Education and Training* (DE 1995)[8]. Additionally, widespread concern about the exploitation of dwindling natural resources has resulted in a situation where educational reconstruction, development and transformation have become imperative (ANC 1994).

The process of transformation, following the release of Nelson Mandela in 1990, has been founded on a belief that the collaboration and participation of all people are fundamental if environmental problems are to be confronted and acted upon. This forms the nub of the *Reconstruction and Development Programme* (RDP) relating to the environment:

> The democratic government must ensure that all South African citizens, present and future, have the right to a decent quality of life through sustainable uses of resources. To achieve this, the government must work towards: equitable access to natural resources, safe and healthy working environments, and a participatory decision-making process around environmental issues, empowering communities to manage their natural environment (ANC 1994: 38-41).

However, environmental problems cannot be solved if people do not have the knowledge, necessary skills, and the appropriate attitudes and values to empower them to heal their world. Education for sustainable living has been identified as an important avenue to address the problem of sustainability by numerous authors whose focus is on transforming the environmental attitudes values and behaviours of individuals and groups through education in order to address the root causes of environmental problems (Fien and Trainer 1993; Huckle 1995; O'Donoghue 1993a; b), Tilbury 1993). Within education, the area of teacher education is recognised both internationally (NIER 1993; Tilbury 1992; UNESCO 1993; UNESCO-ACEID 1994; Williams 1985; 1988) and nationally (Clacherty 1988; Hurry 1982; Irwin 1988; 1993; Leketi 1992; Loubser 1991; Naidoo 1992; Richards 1985; Shongwe 1992a; Wagiet 1996) as a vital area to achieve these, as well as to accomplish the aims and objectives of environmental education.

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[8] Notwithstanding the positive facets, there are shortcomings associated with these documents. See section 3.1.4 for critique on the *White Paper on Education and Training*, and on the RDP.

1.5 ENVIRONMENTAL EDUCATION: A PRIORITY FOR TEACHER EDUCATION

Teacher education is both crucial and pivotal to the informed preparation of future generations to seek solutions to the environmental and educational crises through education for sustainable living (see sections 3.2.1; 3.2.2; 3.5.1; 3.5.2). The appropriate and adequate preparation of teachers in environmental education has been recognised at many international conferences (see sections 3.2.1; 3.5.1 for further deliberation). Included are the Belgrade Workshop (1975), the Tbilisi Conference (1977), the Moscow Congress (1987) and the Earth Summit (1992). To illustrate this point, it is argued that:

> The role of environmental education in the care of the environment is crucial. What of the role of the teacher in environmental education - rather the environmentally educated teacher in the vital process of education, before and after, in and out of school? Is it not arguably, the priority of educational and, certainly, environmental priorities, as experience increasingly instructs us? (UNESCO 1990: 1).

Similarly, in South Africa, all the Environmental Education Association of Southern Africa (EEASA) conferences and the Environmental Education Policy Initiative (1994) stressed this point as a matter of urgency for promoting environmental education.

According to these conferences and workshops, environmentally literate and educated teachers are fundamental to ensuring that environmental education is introduced and taught effectively in the school curriculum (Neal 1985; Mishra et al. 1985; Williams 1988). Williams describes teacher education as a "vital force" to ensure that suitable environmental education practices are secured (1988: 42); similarly, UNESCO refers to environmental education within teacher education as the "priority of priorities" (1990: 1). Thus, teacher education is widely recognised as central to developing environmental education, a fundamental assumption of this thesis (see section 1.6 for further clarification of the underlying assumptions of this thesis).

Much attention has been assigned to the importance of and the need for environmental education at both initial and continuing levels of teacher education, the nature and scope of which has been well documented (Irwin 1993; NIER 1993; Robottom 1987a; Tilbury 1992; UNESCO 1992a; 1993). Effective, process-driven environmental education programmes are viewed as central to teacher education (Huckle 1995; NIER 1993; UNESCO-ACEID 1994). However, carefully devised strategies, demanding a new vision, are required to move beyond the currently compartmentalised curricula. Simpson et al. (1988: 17) argue that:

> Intensive teacher education, not merely orientation, is essential if the recent fragmented approaches of traditional education is to be transcended in favour of a holistic, global approach, and inter-disciplinary and multi-disciplinary treatment of issues. It would require a thorough change in both the outlook and preparation of teachers and educators...The task is more complex than putting environmental content into existing curricula.

To achieve this, it is argued that environmental education in teacher education adopts a process-driven, critical and reflective approach (Hart 1990a; b; Tilbury 1993) through which teachers are enabled to develop all the necessary essential, learning and specific outcomes/ competencies[9] (see section 3.4.3.2) required to respond to the environmental crisis in an informed manner. Thereby, enabling future generations to practise education for sustainable living which aspires to foster democracy and social justice. This type of empowerment may be feasible if environmental education is underpinned by socially critical theory and pedagogy in teacher education programmes (Huckle 1991; 1993 see section 3.4.3.3). Education for sustainable living poses profound curriculum and teaching challenges, amongst which are the confrontation with and transformation of irrelevant and uncritical curricula (see sections 3.4.1; 3.4.3.1) and approaches to initial teacher education programmes (see section 3.3.1), the notion of schooling (3.4.2), issues of governance and policy (3.2), all of which could easily function as constraints to the implementation of environmental education practices (Robottom 1987b). Education for sustainable living demands a reconstruction of current teacher education (see section 3.3.3). This reconstruction is underpinned by the necessity for the realisation of changes at macro (see sections 3.1; 3.2), meso (see section 3.3) and micro levels (see section 3.4) in order to secure, and to sustain, an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education.

1.6 THE RESEARCH STUDY

The focus of this research study is environmental education in teacher education. Three closely-related assumptions underlie the study:

- education for sustainable living can assist in solving some of the environmental problems that are contributing to the environmental crises of sustainability currently facing South

[9] The COTEP (1996) document prescribes an outcomes-based framework for teacher education, where the specific outcomes are perceived in terms of competencies (see sections 3.3.2; 3.4.3.2 for critique). However, the latter are not viewed as narrow behaviourist constructs, but rather in the light of a more encompassing perception - cognitive constructs (Norris 1991).

Africa and the rest of the world;

- education for sustainable living can assist in establishing a new environmental ethic that will foster a sustainable way of living; and,
- teacher education is widely recognised as central to developing environmental education, and is essential for both of the above.

These assumptions inform the aim of this research, which is to explore the potential for the implementation of education for sustainable living, and to identify a strategy for this, for initial teacher education, for senior primary school student teachers in the Western Cape. The strategy is derived following the grounded theory approach, developed through the case study method.

This study has its roots in a failed innovation to introduce environmental education into the initial teacher education curriculum for senior primary student teachers at a College of Education in the Western Cape. A committee drawn from the staff was appointed to facilitate the proposed process. The parameters of this committee were formulated in terms of its envisaged function, namely to:

- orientate staff and students to the goals of environmental education;
- formulate a set of aims and objectives for a college programme;
- co-ordinate departmental projects where necessary;
- collect, collate and distribute resource material;
- plan ways to encourage staff and students to confer within the departments and across the subject barriers;
- devise ways to encourage maximum active participation by students;
- liaise with individuals and groups who uphold the principles of environmental education; and,
- regularly monitor, evaluate, and revise progress made.

Despite a period of sound staff development and INSET programmes in environmental education, the process was not successful. The failure of this innovation may be ascribed to the impediments in the way of realising change (see chapter two). Some staff members expressed a lack of necessary expertise and insight to embark upon this project. The majority, however, articulated a central logistical barrier to the implementation of environmental education, namely a lack of time as a major constraint to their participation.

In an educational system[10] where centralised syllabuses and externally set examinations prevail, very few lecturers could fit this project into their normal lecturing time. Furthermore, due to the powerlessness[11] of the teacher educators, the idea that the various subject departments should provide expertise in their different specialist interests could simply not be implemented. Notwithstanding the significance of the logistical barriers (lack of time and finances), a significant contributory impediment to the success of the programme can be ascribed to this powerlessness of the teacher educators. Further barriers identified include conceptual, attitudinal and educational barriers. These impediments mirror the interrelatedness of the different levels necessary to realise real change, or, as Sparkes (1990: 6) argues, to satisfy "innovation with change", and "change with innovation".

In summary, due to these constraints[12], the proposed project collapsed. Thus, this study was formulated as an attempt to explore more fully the reasons for this collapse as a way to understanding the neglect of environmental education in teacher education, to identify a framework for an appropriate curriculum for environmental education for teacher education and to develop working guidelines for the implementation of environmental education at initial teacher education level in the Western Cape.

The study therefore seeks to address the following five objectives:

1. To explore the status of environmental education (underpinned by four key factors)[13] at tertiary institutions in South Africa where it is formally implemented for senior primary student teachers.
2. To identify those aspects of each key factor that might facilitate the incorporation of education for sustainable living into the curriculum for initial teacher education in the

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[10] The formal education system has been identified in sections 5.5 and 6.5 as one of the barriers that may hamper the incorporation of environmental education into initial teacher education. Included within the formal education system are the centralised curriculum, externally controlled examinations, etc.

[11] A host of causes that contribute to the disempowerment of teachers (including teacher educators) has been identified by researchers and critical theorists. Facets that contribute to their disempowerment include intensification of their work, privatisation, technologizing, deskilling, etc. See chapters four and five for further information in this regard, particularly sections 5.5 and 6.5.

[12] These were the major impediments identified by the interviewees for both multisited case study one (section 5.5) and multisited case study two (section 6.5).

[13] The standing of environmental education is underpinned by four key factors which influence the environmental education programmes. See section 4.5.3 (for how these key factors were derived), and chapter four for further deliberation on these key factors.

Western Cape.

3. To explore the major influences[14] at the colleges of education in the Western Cape which have a bearing on the possibility of incorporating education for sustainable living into the curriculum at these institutions.
4. To identify and deliberate on the barriers that might impede the incorporation of education for sustainable living into the initial teacher education curriculum for senior primary student teachers in the Western Cape.
5. To suggest a strategy for the incorporation of education for sustainable living into initial teacher education for senior primary student teachers at teacher education institutions in the Western Cape, as well as to suggest a working framework for the nature of such a programme, its implementation and its governance.

The complexity and the enormity of the current environmental crises, placed in the context of the realisation that environmental education is pivotal in addressing them (Fien 1992; 1993; Irwin 1993; Huckle 1983a; 1995), sheds light on the significance of this study. For it is through the development of appropriate teacher educator programmes in the domain of environmental education that education itself can become empowered to confront environmental problems in a transformative manner. And it is this challenge, to make a contribution to the development of appropriate teacher educator programmes in the domain of environmental education, which lies at the heart of this research.

1.7 METHODOLOGICAL APPROACH TO THE STUDY

In this research, the grounded theory approach (Glaser and Strauss 1971 see section 4.1.4), developed through the case study method (see section 4.2), is employed. The research process is in line with the grounded theory approach, since, firstly, the data gathering commenced without any priori theory or hypothesis that was to be tested (see sections 4.1.4; 4.4). Secondly, the data analysis employed, which involves a system of coding, and the constant comparative method (Kirby and McKenna 1989), facilitates the identification of concepts, which are the building blocks of theory (Burgess et al. 1994). The emergence of these theoretical building blocks, from the data (see sections 4.1.4; 4.5), is congruent with the grounded theory approach.

[14]The major influence that has a bearing on the incorporation of environmental education at Colleges of Education in the Western Cape is underpinned by four key factors. See section 4.5.3 (for how these key factors were derived) and chapter five for further deliberation on these.

Theory, however, emerges at three, closely related levels.

- Level one includes the theory that emerges from the research data (chapters five and six):
  - that explains the status of environmental education at tertiary institutions in South Africa where it is formally implemented for senior primary student teachers (objective one);
  - pertaining to the status, which highlights those aspects that might facilitate the incorporation of education for sustainable living into the curriculum for initial teacher education in the Western Cape (objective two);
  - that sheds light on what the major influences are at the colleges of education in the Western Cape that have a bearing on the possibility of incorporating education for sustainable living into the curriculum at these institutions (objective three); and,
  - that highlights what the barriers are that might impede the incorporation of education for sustainable living into the initial teacher education curriculum (objective four).

- Level two pertains to the theory, in the light of education for sustainable living, that emerges from a review of the terrain, pertinent to the parameters of the research (see chapter three), and which is applied at two interrelated levels:
  - first, to develop a theoretical framework to guide the analysis of the data; and,
  - second, to outline the challenges that stand in the way of securing and sustaining, an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education.
- Level three includes a synthesis of the theory that emerged at both levels one and two. The synthesis of the theory is considered in relation to the changes demanded for realising education for sustainable living at initial teacher education, and the theory that emerges from the data. This theory is employed:
  - to suggest a strategy for the incorporation of education for sustainable living into initial teacher education for senior primary student teachers at teacher education institutions in the Western Cape, which includes suggestions on the nature of such a programme, its implementation and its governance (objective five).

The methodology, as stated at the beginning of this section, is in line with the grounded theory approach, which is developed through the case study method. In the current research, a case study is interpreted as an in-depth investigation of a single case, which is perceived as an instance in action (MacDonald and Walker 1977). This is similar to the interpretation of Stake (1985 in

McKernan 1991) who views a case study as the investigation of a bounded system. Glatthorn (1985) describes a case study as:

> ...a study of a bounded system, in which the unity of that system is retained as the focus, and in which the researcher uses a variety of data-gathering methods to identify and record the particular features and characteristics of that system and employ a conceptual framework to assist in the identification and explication of significant patterns and recurrences (in McKernan 1991: 75).

The research is based on two multisited case studies (Stenhouse 1988). The term 'multisite' refers to a case study that considers the situation at various sites (the different teacher education institutions see sections 4.7.1; 4.7.2) where the researcher examined the position of environmental education in teacher education. The research encompasses the following two mulitisited cases:

- Multisited case study one was concerned with the thirteen tertiary institutions, which included both colleges of education and universities throughout South Africa where environmental education has been formally incorporated into the curriculum for initial teacher education of senior primary student teachers.
- Multisited case study two pertained to the six colleges in the Western Cape where environmental education has not been formally incorporated into the curriculum for initial teacher education of senior primary student teachers.

Each of the two 'multisited cases' was considered as a bounded system, referring to the imposition of the various institutions (sites) upon the analysis of the data (Burgess et al. 1994). The investigation of these two multisited cases coincided with the two phases in which the research was conducted, the analysis of the one informing the direction and execution of the other (ibid).

The researcher visited Australia (Victoria and Queensland) and Scotland during 1992, where interviews were conducted with environmental educators at various tertiary institutions. Although the data obtained from these interviews are not included in the study, relevant aspects are used for the development of guidelines for environmental education in teacher education in the Western Cape.

1.9 THESIS OUTLINE

Chapter two delineates a theoretical framework for a theory of change. Chapter three comprises a critical literature review of which the parameters include two major themes, (environmental education and teacher education), with the central focus, environmental education within initial

teacher education. A theory of change, that underpins the process of transformation towards education for sustainable living, explores the challenges to realise and sustain the changes at macro, meso and micro levels, in the area of education broadly, also, specifically, teacher education. The proposed changes at macro level (in terms of policy and governance on the one hand, and ideology on the other) is viewed in conjunction with the challenges that face the success for education for sustainable living at the meso level. Encompassed at this level for change are the realities, shortcomings and possibilities for the reconstruction of teacher education. The micro level changes on the other hand, have to contend with the facets and aspects pertaining to a curricular framework, and the challenges towards the reconstruction thereof, for education for sustainable living. This broad review of environmental and teacher education is followed by a review of literature dealing with environmental education within teacher education, both internationally as well as nationally. In this regard, the necessity, realities, barriers, prospects and aspirations of environmental education within teacher education are reviewed. From this review a theoretical framework emerges that guide the analysis of the theory that emerges from the two multisited case studies, and that informs the guidelines for a strategy for education for sustainable living.

Chapter four provides a descriptive outline of the research design of this study. Four principal elements are discussed here. Firstly, the area of the research study undertaken and the philosophical underpinnings which steer it are examined. Secondly, a description and explanation of the various research paradigms manifest in contemporary educational research are considered. The third component explores the employment of grounded theory, developed through the multisite case study method of research utilised in this investigation, while the fourth component relates to the specific techniques (the various data gathering and analysis procedures) employed in this study.

Chapter five reports on the multisite case study of the situation at thirteen institutions (nine colleges of education and four universities) in South Africa where environmental education is operating at initial teacher education, senior primary level for student teachers. In chapter six, the second multisite case study, which relates to the provision for environmental education at initial teacher education for senior primary student teachers at the six colleges of education in the Western Cape, is presented. The theory that emerges from these two multisited case studies, is analysed against the theoretical framework for education for sustainable living that emerges from the literature review.

Drawing on the information discussed in chapters five and six, the aim of the research is addressed in chapter seven, where the potential for the implementation of environmental education, at initial teacher education level for senior primary student teachers in the Western Cape, is explored. The

thesis concludes with a strategy pertaining to curriculum suggestions for the potential implementation of education for sustainable living at initial teacher educator level.

CHAPTER TWO: EDUCATION FOR SUSTAINABLE LIVING: DELINEATING A THEORETICAL FRAMEWORK: A THEORY OF CHANGE

2.0 INTRODUCTION

The theoretical parameters of this research are determined by two major themes, environmental education and teacher education, as well as by its central focus, environmental education within initial teacher education. Environmental education for the 1990's, conceptualised in terms of education for sustainable living (Fien and Trainer 1993; Huckle 1995; Smyth 1995), has various ramifications for the central focus of this research. At the core, education for sustainable living demands a reconstruction of current teacher education. This reconstruction, in turn, is underpinned by the necessity for changes in order to secure, and to sustain, an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education.

2.1 SETTING THE SCENE

To bring about the changes necessary for education for sustainable living, is highly complex. This complexity includes the changes that demand redress at all levels of the education system, which, in turn, cannot be separated from the dynamics of the broader society. In this regard, many writers argue that numerous facets of education transcend the boundaries of the education system itself and are interrelated with the social, economic and political structures of society (Dalin 1978; 1993; Freer 1993; House 1974; Iredale 1993; Verma 1993). The acknowledgement of the interrelatedness and interplay of factors between the education system and society are crucial (Dalin 1978) for educational change in the light of transformation (Freer 1993; Parker 1995).

While the focus regarding educational institutions in this thesis relates to tertiary institutions involved with initial teacher education, specifically the colleges of education, the educational institutions for which these students are prepared to operate in, are the schools. It is, however, widely accepted that schools are not conducive to change (Davidoff 1993; 1994; Robinson 1994; Schofield 1995; Wagiet 1996). The significance of the impediments that obstruct change in schools for this thesis are twofold. First, colleges prepare students for their functioning within a school situation, and in this regard, teacher education programmes need to equip students for the realities and challenges that they will experience once they qualify as teachers. Second, many of the barriers to change and innovation

experienced in the schools are important for colleges of education, since, in South Africa, these institutions were largely governed and controlled by the same education departments that controlled the schools (NEPI 1992a; Van den Berg 1994). Colleges of education, by and large, are structured, and function along the same lines as schools (Davidoff and Robinson 1992), thereby being subjected to most of the impediments that obstruct change which are entrenched within the notion of schooling. In this regard some of the constraints embedded within the notion of schooling are portrayed by the hierarchical top-down, bureaucratic structures that are firmly entrenched due to, amongst others, formalised power relations, authority and tight control (see section 3.4.2).

2.2 INNOVATIONS VERSUS REAL CHANGE

The concept of change itself is a complex and often controversial one, with varied definitions, perspectives and typologies. While many writers, for example, Huberman (1973); Jacklin and Kruss (1995); Miles (1964); Sparkes (1990); and Westley (1969), argue that there is clearly a distinction between innovations and real change, others (Dalin 1978; Elliott et al. 1993) often use the two processes synonymously. Change, in contrast to innovations, may be viewed as a process, (Dalin 1993; Sparkes 1990; Jacklin and Kruss 1995) either, to improve on, or reform, what is in existence (Elton and Cryer 1994), or to transform the existing order (Chisholm and Motala 1995; House 1974; Meerkotter and Van den Berg 1994; Parker 1995).

Innovations, on the other hand, may be viewed as something novel, and different (House 1974) which, for example, may be introduced into the curriculum (a curricular innovation), implemented to bring about change (Elliott et al. 1993; Hargreaves 1982; Kirk 1990). Sparkes (1990) distinguishes between "change without innovation", which, in effect, relates to surface changes, and, "innovations with change", depicting real change. The latter, he argues, is not easily attainable due to superficial reforms that fail to unpack the ideological underpinnings of practitioners' ways of doing. In this regard he perceives innovations as "surface changes" which include alternative introductions into the curriculum. This is also the view of Jacklin and Kruss (1995), and it concurs with that of Ling and Ling (1994), who relate their distinction to innovations within the sphere of management.

In this study, innovations are distinguished as micro level changes, while real change is matched with the deeper seated macro level changes (see.section 2.4 for further deliberation). In the view of the researcher, which finds support in the sentiments expressed by Sparkes (1990), change that leads to transformation, in contrast to change that results in reform strategies, is matched with macro level

changes since it involves an altering of practitioners' ways of thinking and doing. Change that leads to reform is viewed as micro level change.

2.3 A PERSPECTIVE ON EDUCATIONAL CHANGE: MANAGEMENT

Outside of interrelatedness of the education system with societal influences at large, when viewing changes in education, specifically teacher education, (for realising education for sustainable living) there are different areas that need to be changed in this country. Included, for example, are changes that are necessary in the areas of governance; policy; management and administration; the approaches in the lecture rooms; finance; professional development and the curriculum, notwithstanding that all of these spheres are interlinked. Hoyle (1990), as an illustration of a perspective of change theory, focuses on change theory in the sphere of management ("administration" - Ling and Ling 1994: 221) of educational institutions. Such institutions are organised in a bureaucratic manner to maintain tight control (Bates 1988; Codd 1988). This perception is rooted in the work of Weber (1968)[1], who was largely concerned with the understanding of the bureaucratic functioning of organisations. Drawing on the work of Weber in order to understand the functioning of bureaucracy of educational institutions, Hoyle (1990) argues that change in the sphere of management cannot be perceived in isolation of the broader political structures responsible for the governance of education. In South Africa, governance of education, and more specifically, teacher education, is an important area for change, an assumption that finds resonance in the Department Of Education's discussion document, *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development:*

> The governance of teacher supply, utilisation and development has been problematic since the establishment of South Africa in 1910 and it will be a critical element of a new policy framework because governance is concerned with distribution of powers and functions in these areas (DE 1996b: 50).

Considering that the changes in the sphere of management and administration cannot be separated from the broader political issues related to governance and policy, these changes are restricted by the nature of the management. The latter is perceived in terms of the maintenance, action, and the radical change paradigms (Hoyle 1990), notwithstanding that this characterisation is an oversimplification. Changes

[1]Weber's theory of bureaucracy, (centred within organisational theory, while focusing largely on government), is drawn upon in management, not only to understand the bureaucratic nature of organisations, but moreover, to transform management.

centred within the maintenance paradigm are largely removed from the political dimensions of its origin. This may be ascribed to top-down management strategies (Hoyle 1990: 59), and as a result of a structural functionalist view of the social world (Ling and Ling 1994: 222). In effect, changes that take place in this paradigm do not bring about real change. Characterised by unequal power relations, authority and tight control, this paradigm depicts the bureaucratic nature of management that was (and still is, to a large extent) operative at many of the educational institutions in this country (see section 3.4.2). Consequently, while changes within this paradigm of management may result in the alteration of certain aspects of management, in effect, these will be of such a nature as to maintain the status quo. Closely resembling change within the maintenance paradigm, the changes viewed in terms of the action paradigm are viewed as neutral (Hoyle 1990: 59), underscoring the political dimensions, with the social world being subjectively viewed (Ling and Ling 1994: 222). Management strategies operative within this paradigm differ from the maintenance paradigm in that there is a greater degree of participation by stakeholders. While changes within this paradigm might lead to superficial reformist strategies, it is unlikely that these will be sustained. In short, innovations without change may be perceived in this light.

In contrast, change in the light of the radical change paradigm of management is perceived in terms of the political transformation of the educational institution, as a necessary step towards the transformation of society (Hoyle 1990: 59-60). In the opinion of the researcher, change within this paradigm acknowledges the broader socio-economic and political struggles. This finds support in the sentiments echoed by, for example Ling and Ling (1994) and Newton and Tarrant (1992) and is fundamental for the realisation of real change in terms of the transformation of society. While changes within the radical change paradigm are complex, these are the very changes demanded for education for sustainable living (Huckle 1995), which is in conflict with the goals of education systems (see section 1.2.2.1) that are in place to maintain the social order.

The radical change paradigm is appropriate for change within management (and governance), and it concurs with the rhetoric regarding the perception of change as outlined by the Department of Education's discussion document, *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development*. To illustrate this point, one of the recommended principles for the area of teacher education (point 3.2.4), calls for a "pragmatic approach to change", and argues, that due to the "inherited problems of the past, [there] is [a] need for negotiation with stakeholders, sufficient time for implementing change, and the need for stimulus and support for change" (DE 1996b: 12). Yet, despite the recognition that change is a long-term process, and the recommendation for an "integrated, systemic approach to changing teacher policy (ibid: 12), there seems to be a contradiction between the

rhetoric and the reality in actual practice. An example in this regard is the introduction of a competence/ outcomes-based curriculum framework, into colleges of education nationally (including the college of education where the researcher works).

This initiative necessitated the submission of a new curriculum document for accreditation by the Committee on Teacher Education Policy (COTEP 1996 see sections 3.3.2; 3.4.3.2; 3.6 for further critique of this document). For this, teacher educators at a particular college of education were requested to submit their 'new' course outlines. While this move is positive, since it signalled a change from the prescriptive curricula of the past, and paved the way for the introduction of some innovation, the positive features of this initiative were undercut for a number of reasons, including:

- many of the teacher educators lacked the experience in the area of curriculum development;
- this exercise was rushed[2] through without teacher educators having sufficient insight on the competences/ outcomes around which these curricula had to be structured; and,
- this exercise took place without any support from the education department.

The result was that a 'new curriculum' was submitted from the college, but, by and large, it deviated very little from the past irrelevant form, and demonstrated just 'more of the same'. Yet, on this very issue (the implementation the new 'Norms and Standards' COTEP 1996), the Department of Education's discussion document, *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development* (DE 1996b: 35) claims that this process is "well under way with extensive capacity building exercises being facilitated by the national Department of Education". Questions that need to be addressed include: when, where and for whom did these "capacity building exercises" materialise? Certainly not at the institution where the researcher operates, granting that this particular college might have been an oversight.

Notwithstanding the positive vision perceived for change[3] in teacher education in discussion documents of this nature (ibid), the danger is that this might remain at the level of rhetoric, without securing broad-based consultation, participation of all stakeholders, and, moreover, without the establishment of the infrastructure to manage, support and sustain the changes that it aspires to address. In short, it undermines the prospects for change that might further transformation.

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[2]Resembling the hasty manner in which the interim curricula for schools have been developed.

[3]Outlined in the priorities for action, which include policy development, curriculum, governance, finance, quality assurance and capacity building (ibid 78-81).

2.4 WHAT IS EDUCATIONAL CHANGE?: FURTHER DELIBERATION

Common perceptions on the concept of change theory arising from the literature is that change is a process (Dalin 1978; House 1974; Iredale 1993; Ling and Ling 1994; Sparkes 1990), which is multi-dimensional (Dalin 1993; Elton and Cryer 1994; Freer 1993; House 1974; Sparkes 1990). Upon further clarification, the change process is perceived in the light of the nature thereof (Dalin 1978; House 1974; Jacklin and Kruss 1995; Sparkes 1990), and the strategies to realise change (Elliott et al. 1993; Fullan 1990; Fullan 1994; Jones and Lewis 1991; Westley 1969).

Regarding the nature of educational change, Dalin (1978) distinguishes change in terms of four dimensions: technological, behavioural, organisational and social change. This characterisation closely resembles the clarification that emanates from Sparkes, (1990: 4) who separates "real" change, from "surface/ superficial" change, along a continuum of three levels one to three (see section 1.2.2.1). In this thesis, following Sparkes (1990), a theory of change, operative at three levels, is identified to take up the challenges demanded for realising education for sustainable living. While it is reductionist to view these levels of change in isolation from each other (Dalin 1978), it should also not be perceived in such a manner that changes at the one level automatically guarantee the changes at the other levels (Sparkes 1990). Rather, it is a combination of all three levels which might realise real change, and sustain it.

Changes at the first level, on the surface, which concurs with Dalin's (1978) technological change, are referred to in this thesis as micro level changes. The nature of this dimension of change, may, as an example, involve the introduction of new knowledge, or the employment of new resource materials. Changes at the second level (Sparkes 1990), which concur with the collapse of the behavioural and organisational changes of Dalin (1978) into one, are referred to in this thesis as meso level changes. The nature of changes in this dimension are more complex, and include, for example, the altering of teaching approaches and practice. Third level changes (Sparkes 1990) resemble Dalin's (1978) social change, and are referred to in this thesis as the macro level changes. The nature of the changes within this dimension are the most complex, and involves the macro shifts, which includes an altering in the values and ideologies on the one hand, and addressing the impact of policy on the other. These three levels of change concur with that of Jacklin and Kruss (1995) who view change in terms of the broader, macro structures[4] which includes policy and governance, the meso level which includes the changes

[4]Chisholm and Motala (1995) argue that current educational policy is failing to realise substantive change, for various reasons, one which includes the prevailing ethos of the old bureaucratic structures and decision makers

regarding the pedagogical approaches[5], and the micro level which relates to changes in the curriculum content and curricular material.

2.5 WHY CHANGE?: SOME CONSIDERATIONS

In essence, the changes at all three levels are necessary to bridge the gap between policy and practice on the one hand, and, to further a type of practice, which, according to McTaggart (1991: 49) distinguishes technical actions from social practices, to foster a kind of practice that is underpinned by theory, which he refers to as praxis (see sections 3.1.4; 3.3.1). Praxis draws on the ideology and the historical baggage of the practitioner, and is socially and politically aware (ibid: 51). Beyer (1991), adds another dimension, and states that praxis also demands an understanding of the dynamics of power, and the social, political, economic and ideological dimensions of the constraints grounded within the notion of schooling. Regarding the latter, he (ibid: 121) calls for teacher education to address these impediments in their teacher education programmes, since, he argues, to foster a commitment to praxis is to assist students to understand the realities which they will be facing in the schools.

In the new dispensation in South Africa, despite the seemingly fundamental political reforms, it is possible that these are insufficient to guarantee the changes necessary to secure education for sustainable living. Several impediments to realise this transformation need to be considered. At the macro level, the shortcomings in the broader structures, for example, that of educational governance and a lack of policy formulation for environmental education within the formal education, warrants attention (see sections 3.1; 3.2). Furthermore, a shift away from the maintenance paradigm (Hoyle 1990 see section 2.3) towards the radical change paradigm needs to be considered. Also, the specific socio-economic and political contexts pertaining to the South African society, which are manifested in the education system (Archer 1984; Chisholm and Motala 1995; Freer 1993; Parker 1995; Saunders 1992), which impacts on the personal philosophies, and the ideologies of practitioners (Christie 1991; Davidoff et al. 1995; Freer 1993 see section 3.1.1; 3.3.2), have to be taken into consideration.

At the meso level of change, the competence and confidence of the practitioner in the practice of education for sustainable living is of fundamental importance (QBTR 1993; Tilbury 1993; UNESCO-

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who are still occupying strategic portfolios in the new dispensation.

[5]Ensor (1995) argues for the furthering of critical theory in teacher education.

ACEID 1994). The approaches to the preparation of student teachers (Beyer 1989; Skilbeck 1992; Zeichner 1983; see section 3.3.1) are of significance in this context. While it is argued that the teaching approaches to secure education for sustainable living require reflective practitioners (Hart 1990a), the changes necessary at the meso level are, in turn, dependent on the micro changes required, to further critical reflective educational practice. These changes (micro level see sections 3.4) relate to the curriculum for education for sustainable living at initial teacher education level (Huckle 1995; NIER 1993; Tilbury 1993; UNESCO-ACEID 1994), which encompasses the knowledge base and the necessary skills in the area of education for sustainable living.

Pressure is mounting for educational change (DE 1995; DE 1996a; b; c; Freer 1993; Meerkotter and Van den Berg 1994; Parker 1995; TLSA 1996a; b; Schofield 1995), exacerbated by the acknowledgement that the philosophy which underpinned past formal education policy and practice was essentially flawed (Jacklin and Kruss 1995; Motala 1993; Tickly 1995; Wolpe 1995 see section 3.1.1 for further deliberation).The overtly ideological agenda of education for sustainable living (see sections 1.2.2.1; 3.1.4) as an alternative to redress some of the historical inequalities[6] grounded within the inherited apartheid education system, may offer "new theoretical tools" (Aronowitz and Giroux 1991: 81) to reconceptualise and reconstruct educational practice. Considering the argument put forward by Parker (1995: 153-154) that "we cannot deny our apartheid heritage, our enlightenment values, our modern institutions and instrumental reason without losing the capacity to reconstruct them", the idea is for education, in the light of education for sustainable living to relocate and shift the boundaries to, (ibid 1995: 154)

> affirm our African traditions, institutions and values, to **balance** our Western influences [my emphasis].

In this regard, some solutions to "the Western values of racial superiority, exclusionism, and exploitation... narrow, narcissistic self interest" (Sparks 1990: 399) lies in "Africa's ancestral past and its spirit of communalism[7]... [which] affirms the spirit of *ubuntu* [translates into humaness], non-racialism, collectivism and humanism" (ibid). Arguing along similar lines, Singh (1992: 11) suggests that Western education is not in a position to develop

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[6] Included here is the education ideology of Christian National Education, underpinned by the philosophy of Fundamental Pedagogics, which was socially engineered during the Apartheid era to maintain the power of the Nationalist Party.

[7]Communalism concurs to Frankel's (1990) ecosocialism, which is the environmental ideological orientation that underpins education for sustainable living (see section 3.1.3).

a new consciousness of nature based on a sense of harmony and caring, and not of conquest and depredation

This calls into question the position of Western education, which, by promoting self interest, individualism and competition, has led not only to structural imbalances in our society along the lines of race, gender and class, but also to severe environmental degradation. Affirming our African values in order to **balance** our Western influences implies, for example, to rekindle some of those values associated with cooperation and communalism inherent to African civilisation. An example in this regard, is to uphold the value of *umtu ngumtu ngabanya abantu* (which translates as 'a person is a person by means of other people'). There is much to be learned from our African civilisation to bring about the changes demanded for education for sustainable living.

2.6 CONSIDERATIONS FOR A STRATEGY FOR CHANGE

Education for sustainable living demands dramatic changes at various levels of the education system, including the broader societal structures. To realise these changes calls for a renewed, transformative vision for education, and more specifically, for teacher education. A central facet for this renewed transformative vision for teacher education is the need for teacher educators to become active agents for change. A strategy to realise the changes necessary for education for sustainable living (see chapter seven) needs to contend with the challenges:

- at macro level which include the issue of policy (see section 3.2), in addition to the need for teacher educators to change their ways of thinking and doing, which underpins their ideology (see section 3.1);
- at meso and micro levels, which encompass the pedagogical approaches, in order to attain critical praxis (see section 3.3). Implicit is that teacher educators are competent to engage with confidence, in order to address the challenges at micro level (see section 3.4).

However, since environmental education has not been included within formal education for many South Africans (see section 1.4), a strategy for change has to contend with:

- creating the enabling infrastructures for capacity building and ongoing support (Dalin 1978; Fullan 1990), to further the quality and growth (DE 1996a; b; TLSA 1996d) of teacher educators.

Such infrastructures, however, need to:

- secure the democratic participation of all stakeholders (Dalin 1978; 1993; Robinson 1994; Watkins 1995); which, it is argued, will foster a sense of ownership (Elliot et al. 1993; Elton

and Cryer 1994; Jones and Lewis 1991); and,

- operate in a collaborative and critical manner (Fien 1993; Greenall-Gough 1993; Huckle 1995; Robottom 1987a).

2.7 CONCLUSION

Evident from the literature is that change is a process, which is multi-dimensional, and, to realise real change, it is in fact a combination of all three levels of change (Sparkes 1990) that are required to realise the changes necessary to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living. Micro level changes alone cannot guarantee the realisation of real change. Only when practitioners challenge their own ways of thinking and doing, and the ideologies that underpins these, then they are 'opening up' to realise the real changes (Apple 1979; Beyer 1993) necessary for the realisation of education for sustainable living. The proviso, however, is that the necessary infrastructures are created to support, sustain and to further the capacity building of the practitioners. For this, policy needs to be developed.

To work towards the transformation necessary for education for sustainable living, change theory is employed to explore the different levels necessary for, and, to sustain, the changes at macro, meso and micro levels in the area of education, more specifically, teacher education in a review of this terrain, in chapter three.

CHAPTER THREE: EDUCATIONAL CHANGE FOR SUSTAINABLE LIVING: REVIEWING THE TERRAIN

3.0 INTRODUCTION

The various aspects and factors of significance to the theoretical parameters, (education for sustainable living and teacher education), and the cental focus (education for sustainable living within initial teacher education) of the research, are discussed in a review of this terrain, in this chapter. Established from chapter two is that education for sustainable living, in the light of transformation, demands changes at macro (see sections 3.1 and 3.2), meso (see section 3.3) and micro (see section 3.4) levels. Implicit within the challenges for education for sustainable living is the need for the reconstruction of teacher education (see section 3.3.3). The terrain is reviewed in the light of the changes that are necessary for the realisation of education for sustainable living.

From this review, first, a theoretical framework (see section 3.1.4), to guide the analysis of the theory that emerges from the two multisited case studies (chapters five and six) is identified. Second, the challenges that stand in the way of securing and sustaining education for sustainable living within initial teacher education are sketched (see section 3.6).

3.1 EXPLORING THE REQUIREMENTS FOR CHANGE AT MACRO LEVEL: EDUCATIONAL AND ENVIRONMENTAL IDEOLOGICAL POSITIONS

3.1.1 Historical overview of ideology in the South African context

The international and national trend is to view environmental education in terms of education for sustainable living. However, the overtly ideological nature of education for sustainable living, (see section 1.2.2.1), necessitates, first, a contextualisation of ideology, in the South African setting. Thereafter, ideology is deliberated on, in terms of the various educational (see section 3.1.2) and environmental (see sections 3.1.3; 3.1.4) ideological positions that underpin the realisation of the macro level changes to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living.

Ideology, considered as a worldview, enables one to explain, evaluate and justify one's actions in relation to their cohesion with the patterns of ideas and values in their social environment (Bates 1988). In a critical sense, ideology can be viewed in terms of inequalities in the economic (wealth) and political (power and control) relations in society (Burbules 1986; Leatt et al. 1986). Ideology becomes a distorted view of reality for 'subordinate groups' who uncritically accept, for example, the values and beliefs of those who are in power (Burbules 1986; Leatt et al. 1986; Reagan 1990). The degree of this distorted, uncritically accepted beliefs, is referred to as the 'false consciousness' of the dominant ideology, that exercises hegemony (cultural and intellectual control) over the less powerful. A typical example is the ideology of the previous ruling class in South Africa, which will be briefly outlined, since, as Smyth (1987: 2) argues:

> If there is to be any chance of changing the present arrangements in education, it is important to have an understanding of how it came to be.

The racist, social engineering has left South Africa in a distortion of human dignity and social justice. At the root of this social division, along unequal relations of race, class and gender, were the various mechanisms comprising the practices of Apartheid education. When the Nationalist government assumed power in South Africa in 1948, they devised an educational policy that resulted in the segregated education for the different race groups in this country (Ashley 1989; Samuel et al. 1992). Included in their policy documentation was the:

- Eiselen Commission's Report in 1949 that recommended a separate education system for "Blacks";
- Bantu Education Act of 1953 which constitutionally established separate education (Tickly 1993);
- Coloured Person's Act of 1963, where control over "Coloured" education was placed under the Department of Coloured Affairs;
- Indian Education Act of 1965, where control over "Indian" education was placed under the Department of Indian Affairs; and,
- National Education Policy Act 1967, which Malherbe (1977: 142) refers to as the "White Persons' Education Act", since this act placed "White" education under the education departments in the four provinces (Cape, Transvaal, Orange Free State and Natal).

These separate Acts ensured that the different race groups ("Black, White, Coloured and Indian") were governed by separate education departments. Although separately and unequally funded, these different education departments were subject to central control by the government (Christie 1991). Subsequent

to 1983, "Black" education was placed under the control of the ex-Department of Education and Training (ex-DET), and the various education departments in the Homelands, (NEPIa 1992). "Coloured" education was placed under the jurisdiction of the ex- House of Representatives (ex-HoR) and "Indian" education, under the ex-House of Delegates (ex-HoD). "White" education was governed by the four provincial education departments, under the jurisdiction of the ex-House of Assembly (ex-HoA). These circumstances have engineered a distinctive form of educational policy development, and relate to the emergence of an alternative educational discourse, in the form of Christian National Education (CNE). The Nationalist Government's education policy[1] was underpinned by the ideology of Christian National Education, with Fundamental Pedagogics (FP) as its central expression.

Hofmeyr (1982) argues that the ideology of Christian National Education (CNE) is rooted within Calvinism and Afrikaner Nationalism, a point illustrated by Van den Berg and Meerkotter (1994: 299):

> CNE reflected the belief that the Afrikaner were the chosen people of God placed in South Africa to civilize and to Christianize the indigenous inhabitants; that this God-bestowed right and responsibility of trusteeship required the trustees that they educate the indigenous peoples in the life and world view of the Afrikaner; and that the outworking of this trusteeship would be the recognition by the various groups within the country of their own separate nationhood, resulting in the transformation of the land area into a variety of separate states, for each nation.

Fundamental Pedagogics, however, is subjected to diverse interpretations. Kallaway (1990) equates FP with the contemporary perceptions of CNE, while Higgs (1994) argues that FP is a human science (as opposed to a social science). This view of Higgs (ibid) is in contrast to that of Taylor (1993), who claims that FP is concerned with socialisation, rather than philosophy. In contrast, Reagan (1990: 64 - 65), argues that FP is a philosophy, more specifically, the Afrikaans philosophy of education, that can best be understood to be "a rather odd assortment of concepts, claims and technical language drawn from traditional Calvinist theology, continental phenomenology and a variety of other sources...". At colleges of education, and at some universities (in the experience of the researcher), FP is incorporated into the Education Course, and forms an aspect of philosophy of education, which concurs with Reagan's (ibid) assertion. Nevertheless, notwithstanding the diverse interpretations of FP, an important

[1] All education systems are not neutral, and are shaped by the world views of those who are in power (Burbules 1986; Leatt et al. 1986; Reagan 1990). Thus CNE expresses the ideas of the Nationalist Government, based on an Apartheid education system. The Nationalist Government had a particular, exclusive, connotation to the manner in which "Christian" was abused to justify their segregation policy, in terms of the Bible. Furthermore, Nationalism was imprinted in a way to reflect a specific 'nation/ Volk' - the white people, as the true, superior South Africans.

aspect in the light of change theory, is to focus on the affects thereof, and to identify what needs to be changed in order to realise education for sustainable living.

A common perception is that the central tenet of Fundamental Pedagogics is for the different cultural groups to receive a distinctive education that was segregated along racial lines (Christie 1991; Higgs 1994; Reagan 1990; Taylor 1993; Van den Berg 1994; Wagiet 1996). Some of the consequences of this fracturing is that FP, to a large extent, 'succeeded', to:

- depoliticize educational discourse (Morrow 1989; NEPIa 1992);
- promote a type of authoritative education (Parker 1995; Taylor 1993);
- render educational discourse as uncritical (Chisholm and Motala 1995; Van den Berg 1994);
- neutralise education (Reagan 1990; Taylor 1993; Van den Berg 1994); and, in summary,
- 'create' an education system that is ridden with inequalities (Nel 1980; Reagan 1990; Meerkotter and Van den Berg 1994). These inequalities are numerous, and include, amongst others, that of gender (Wolpe 1995), opportunity (Christie 1991), access to education (Malherbe 1977), and funding (NEPIa 1992). Moreover, it has "intellectually stunted" (Van den Berg (1994) many of South Africans.

Finally, on the extent of FP, Kallaway (1990: 230) argues that:

> The vast majority of educationalists and teachers trained from the fifties were required to master the labyrinthine functionalist discourse and convoluted terminology of FP whether they were white or black, and whether they studied at Colleges of Education, the Afrikaans Universities, or the black universities (the so-called 'bush colleges' for the African, Coloured, and Indian students, created by the Nationalists in the 1960's).

Despite the unitary education system that has now come into being, a challenge for the realisation of real change at macro level is to dismantle the remnants of CNE and FP, in order to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living (see section 3.3.3 for further deliberation specifically in the context of teacher education).

In this light, Giroux (1984) argues that:

> ...ideology is a sense of doctrines as well a medium through which teachers and educators make sense of their own experiences and those of the world in which they find themselves. As a pedagogical tool, ideology becomes useful for understanding not only how schools sustain and produce meanings, but also how individuals and groups produce, negotiate, modify, or resist them as well (in Angus 1986: 73-74).

To shift the boundaries in an attempt to realise education for sustainable living, it is imperative for practitioners to employ ideology as a "pedagogical tool" to make sense of past (and present) injustices and inequalities so that these can be resisted, in an attempt to secure education for sustainable living.

Having established a broad overview of ideology in the South African context, a review of various educational ideological positions follows.

3.1.2 Educational Ideologies

Kemmis, Cole and Sugget (1983) identify the vocational/neoclassical, liberal/progressive and the socially critical orientations in education. Their typification is valuable in identifying the nature of various approaches to environmental education, and to match the classifications of approaches to epistemology and science as outlined by Habermas (1972), who asserts that humans have three categories of needs and interests, namely the technical, the practical and the emancipatory. The technical interest embraces the need to control the physical world. Knowledge is viewed as instrumental and value free, and it accepts society and social reality without question. This technical interest underlies the vocational/neo-classical (Kemmis, Cole and Sugget 1983) orientation in education. The practical interest underlies the liberal/progressive (Kemmis, Cole and Sugget 1983) orientation to education, and the latter is pursued by understanding and communicative interaction. Reality is viewed via inter-subjectively constituted meaning (created via communications between people), and depends on, and contributes to historical, political and social contexts. Here, education is pursued by understanding and by communicative interaction. Reality is viewed via inter-subjectively constituted meaning (created via communications between people), and depends on and contributes to historical, political and social contexts. The third interest, the emancipatory interest, is derived from a need to be liberated from the restrictions that hamper emancipation, and this underlies the socially critical (Kemmis, Cole and Sugget 1983) orientation to education.

Kemmis et al. (1983) outlines that the underlying rationale of the vocational/neoclassical orientation in education is for schools (and other educational institutions) to reproduce and maintain the social, political and economic structures within society, and that it is grounded within strict control, authoritative practices and power relations[2]. The liberal-progressive orientation, on the other hand, they argue, is centred within a reformist position, that strives to further individualism. These two orientations in education are in conflict with the socially critical orientation in education, which

[2] This position finds expression in FP.

emanates from emancipatory interests, and is based on the conviction that there is a need for education to enhance (along with other social institutions and agencies) the transformation towards just and democratic societies (Huckle 1993). While both the liberal and the socially critical orientation to education call for change, the liberal-progressive orientation perspective on change is reformist, and proposes to adapt, yet still maintain the status quo. In contrast, the socially critical orientation perspective on change calls for transformation, (Huckle 1993), and proposes to shift the boundaries, and to "create new forms of knowledge, by breaking down disciplinary boundaries" (Giroux 1991: 50).

Smyth (1988: 46), describes the "socially critical" as:

> ...go[ing] beyond the obvious and the taken for granted in the social world...it is an attempt to find wider historical, cultural and social explanations for what is manifest in our teaching...things...in our teaching do not just happen. They have wider social causes...

Greenall-Gough and Robottom link the socially critical orientation with environmental education, and argue that both are concerned with a critical understanding, as well as a commitment to the well-being and improvement of society (1993: 301). Both environmental education and socially critical pedagogy aspire to empower learners to participate in the democratic transformation of society (Fien 1992; Greenall-Gough and Robottom 1993). The socially critical orientation is thus identified as an appropriate educational ideological position to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living.

3.1.3 Environmental Ideologies

Having viewed the educational ideological position of education for sustainable living, the environmental ideological positions do need clarification. Milbraith (1984: 113) proposes a "value structure", which he argues is fundamental in the transformation of a society to become sustainable, since what people value governs their beliefs, which, in turn, largely determine their actions, expectations and aspirations. This value and belief system forms the core of a paradigm, which Milbraith (1984: 117) defines as:

> "a dominant belief and value structure that organizes the way that people think with respect to some human endeavour, [while] a social paradigm ...is a set of widely shared beliefs about how the world works physically... and socially".

This view of a paradigm, concurs with that of Burbules (1986), Leatt et al. (1986) and several other

writers' (Angus 1986; Giroux 1984; Cotgrove 1982; Dunlap and Van Liere 1978), perceptions of ideology, thus establishing a conception of environmental ideology, in relationship to paradigms. In this regard Milbraith (1984; 1989) distinguishes the Dominant Social Paradigm from the New Environmental Paradigm. The Dominant Social Paradigm, places a lower valuation on nature, which is perceived only in terms of its benefit to people, and exists to be dominated by them. As far as the economy is concerned, an open market system, driven by economic growth at all costs is supported, even at the sacrifice of nature and natural systems (Milbraith 1984; 1989). Growth has no restrictions, with no limitations placed on production and consumption. Conservation and resource management are seen as low priorities. There is a lack of compassion shown towards other living organisms, nature and future generations and, generally, environmental risks are often overlooked (Beck 1992; Marshall 1992). An emphasis is placed on science and technological advancement, to the detriment of nature (Milbraith 1984; 1989; Beck 1992; Orr 1992). A hierarchically structured society is prevalent, where complex life-styles dominate, and where there is little collaboration and participation in broader community concerns (Milbraith 1984; 1989).

The New Environmental Paradigm, in contrast, places a high premium on nature. Restrictions are placed on economic expansion, and environmental protection is proposed in this regard. There are also limits placed on growth in other areas[3], with the needs of growing populations receiving careful attention. Conservation and resource protection are closely monitored and advanced. Much compassion is shown towards other living organisms and future generations. Careful plans are outlined to avoid environmental risks. Politically, a new structure is proposed, where consultation and participation of all stakeholders are greatly encouraged (Pepper 1986). An open, participatory society, with simple sustainable lifestyles is proposed.

Another typification of environmental ideologies emanates from O'Riordan (1981; 1987; 1989; 1990) who distinguishes two fundamental strands in western environmentalist beliefs, namely, technocentric and ecocentric. Technocentrism concurs to anthropocentrism (Pepper 1984), and resembles the underpinnings of the dominant social paradigm (Milbraith 1984; 1989). Technocentrism has been the dominant paradigm for some centuries, and is characterised by environmental regulation, reformist (rather than transformative), a belief in scientific and economic rationality, and environmental management strategies which are underpinned by technical means and economic incentives (Jackson 1993). These characteristics are located within two subdivisions. Firstly, the interventionist

[3] i.e. resource shortages, production and consumption.

"cornucopian" (Fien 1992) position[4] which is located within the belief that environmental problems will be solved by science and technological quick-fixes (O'Riordan 1989). The second position, is held by people with a more accommodating conviction, also referred to as the "light-green" reformists (Fien 1992).

Ecocentric environmental ideology, on the contrary, is underpinned by a belief in the inherent significance of nature for defining and sustaining people. There is a rejection of materialism, and economic growth is viewed in the light of providing for everyone's basic needs. The technocentric approach to education, politics, economics and science is repudiated as being individualistic and reductionist in nature. There is lack of trust in technological advancement. Ecocentrism concurs with the underpinnings of the New Environmental Paradigm. Included within an ecocentric environmental ideological perspective is ecofeminism[5], a social movement which is derived from many routes (Jackson 1993).

Merchant (1990) deliberates on ecofeminism as an enterprise to induce an ecological revolution that will bring about transformed gender relations as well as interrelationships between people and nature in order to guarantee the survival of the planet. Radical, liberal and socialist[6] ecofeminists have all striven to improve the relationship between humans and nature, and each contributes to the perspective of ecofeminism (Spretnak 1990; Diamond and Orenstein 1990). In this regard, Merchant (1990: 104) argues that irrespective of the differences in the long term goals of liberal, radical and socialist feminists, there are overlapping short term goals. Included in the latter is the common goal of improving the natural environment and quality of life for humans, other living organisms and the non-living components of the earth. For environmental education, Di Chiro (1987: 40), argues that:

> A feminist viewpoint of environmental education proposes a more detailed examination of environmental problems. This provides a greater understanding of the nature of the problems, as well as the resolution thereof. Such an analysis includes the political facets, since it explores how the power relations shape the world. It asserts that the socially constructed world determines and controls how this social world has been historically constructed and organised.

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[4] Cornucopians are of the opinion that nature, along with science and technology, will provide for human needs indefinitely. A strong emphasis is placed on economic growth, with active participation and collaboration (vital elements for social change) having a low worth (Stevenson 1987). In their book *The Resourceful Earth*, Simon and Khan (1984) portray the typically cornucopian mind set.

[5] The term 'ecofeminisme' was coined by Francoise d'Eaubonne in 1974.

[6] The radical ecofeminists align themselves with the deep ecologists. Liberal ecofeminists tend to adhere to the light green environmental ideology. Socialist feminists are advocates of the eco-socialist environmental ideology.

Irrespective of its derivation, ecofeminism provides an informed perspective on the notion of change, whether political or other. In addition to the feminist critique on environmental education by, for example, Di Chiro (1987) and Beneira (1982), an ecofeminist critique has been levelled against the role of science and technology (Birch 1990; Caldecott and Leland 1983; Shiva 1989), while Brown and Switzer (1991) focused on environmental education underpinned by ecologically sustainable development[7]. Positions of power in all spheres of society, it has been pointed out, are primarily occupied by males, and this has excluded women from making a greater contribution towards society as a whole (Abzug 1991; Harding 1986; Weedon 1987)[8]. A feminist viewpoint of education - and more specifically, environmental education - highlights the political realities of gender inequality and insensitivity that are frequently ignored in such instances. This position aims, therefore, to reconstruct education, in order to address the macro level changes, in an attempt to redress all inequalities, including gender inequalities, and to develop sound practices (meso level and micro level changes) that will enhance the striving towards democracy, justice and equality .

Furthermore, ecocentrism comprises the Gaianist (O'Riordan 1989) or "dark green"[9] (Fien 1992) position, and the Communalist (O'Riordan 1989), ecosocialist (Frankel 1990) or "red green"[10] (Fien 1992) positions. Ecosocialism depicts alternative environmental ideological positions, which stress the interactions and interrelationships between all facets of the total environment. Huckle (1990: 152) elaborates on this environmental ideological perspective:

> [P]eople environment relations cannot be disconnected from social relations. More

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[7] They criticised the conspicuous absence of women from areas related to environmental science and economics.

[8]This void, however, was acknowledged at the Earth Summit (UNESCO 1992a).

[9]The 'dark green' position (also interpreted as the 'Gaianist' or the Utopian position), is based on the work of Lovelock (1979), and shares many of the views and aspirations of the Deep Ecology movement (Callenbach 1978; Devall and Sessions 1985), notwithstanding that there are distinct differences between the Gaianist position and the Deep ecology movement. Gaianists believe that nature and natural laws should be the dictating force behind human morality, and that there should be 'biorights' for all species. Politically, the aspects of participation of citizens and greater social justice are entrenched within their beliefs. However, it is in their criticism of modernity entrenched within the Dominant Social Paradigm that the central drawback to their aspirations - tending to strive back towards pre-modernity, rather than becoming reflexive - becomes apparent. Reflexivity would be an option that would take the modernist position, and transform it to address the environmental crisis (Beck 1992).

[10]The 'red green' position lies between 'dark green' and 'light green' environmentalism. O'Riordan (1990) calls it communalism, while Frankel (1990) refers to it as eco-socialism. The social constructedness of the environment is viewed in such a way to maintain natural systems, economic development and just human societies. The pre-requisites for this is that the conditions of production and consumption are underpinned by greater democratic processes. This group argues that the environmental crisis stems from an unequal distribution of resources, encompassed within unjust capitalist economic practices (Capra 1982; Pepper 1987; Schumacher 1972).

> harmonious relations with nature can only result from more harmonious relations between people. Power should therefore be redistributed towards a decentralised, federal political economy based on the 'interlinkage' of environmental and social justice.

In summary, the search for outlining the environmental ideology that underpins education for sustainable living, has pointed to a worldview of the New Environmental paradigm (Milbraith 1984), that embraces the goals of ecocentrism (O'Riordan 1989). Such a position draws on the contribution from ecofeminism (Di Chiro 1987; Jackson 1993).

3.1.4 Sustainable development, vis-a-vis, Sustainable living: Towards a framework

Having briefly sketched the ecocentric environmental ideological position, there is some confusion regarding the environmental ideological position of sustainable development (see EEPI 1994; Fien 1993; Fien and Trainer 1993; Huckle 1991; 1993; 1995; IUCN, UNEP, WWF 1991; Smyth 1995; Sterling 1992; 1993; UNESCO 1990; 1993; UNESCO ACEID 1994), which, over the past ten years, has been emphasised in some of the leading international reports, inter alia:

- The Brundtland Report (WCED 1987);
- Caring for the Earth: A Strategy for Sustainable Living (IUCN, UNEP, WWF 1991), the document that was developed to supersede the World Conservation Strategy of the 1980s; and,
- Agenda 21, the strategy accepted at the United Nations Conference on the Environment and Development (UNESCO 1992a).

Consequently, there has been an increasing shift in environmental education to educate for sustainable development. Numerous definitions as to what sustainable development entails have been put forward. According to the Brundtland Report, sustainable development:

> is a process in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony, and enhance both current and future potential to meet human needs and aspirations (WCED 1987: 46).

Sustainable development is therefore development that satisfies the requirements of existing generations without risking the ability of future generations to fulfil and meet their own needs.

However, many environmental educators and environmentalists (Huckle 1991; Meadows 1989; Orr 1992) have reservations about the varied interpretations of sustainable development. They point out that

the word 'sustainable' appeases environmentalists, while 'development' pacifies confederates of capitalist economy (Orr 1992: 23). Thus, the fundamental critique of this perspective[11] is that it promotes a social democratic or welfare interpretation of capitalism, instead of social transformation (Fien and Trainer 1993; Huckle 1991; 1993). At bottom, it is pointed out that supporters of this position hold a technocentric environmental ideological position (O'Riordan 1989; Rees 1990), rooted within the Dominant Social Paradigm (Fien and Trainer 1993). Hence, they place very few restrictions on growth. Thus, when sustainability is coupled closely with the ideals of social transformation, a distinction has to be made between sustainable development (in the growth mode) and that of ecologically sustainable development.

Ecologically sustainable development, with sustainable living as its focus, as argued by Fien and Trainer (1993: 34-35)

> ...represents a commonwealth of social, economic and environmental goals...in which environmental, economic and justice imperatives equally define the parameters of sustainable development...All three dimensions of development, ecological, social and economic, must be closely linked for ecological sustainability.

Partly incorporated within the above definition is the argument of Meadows (1989) that sustainable development should be both ecologically and socially sustainable. Implicit to the integration of ecological, economic and social sustainable development lies the democratisation of society at all levels. The educational implications for the furthering of sustainable development therefore involves a basic re-conceptualisation of underlying educational assumptions.

One of the aspects that needs to be considered is the integration of, for example, the interactions of ecological processes, market forces, cultural values, government actions and environmental impacts of human activities (QBTR 1993). Sustainable living, however, might only be attainable when people acknowledge that there needs to be a limit to growth, and that they have to embrace a new world ethic for living sustainably, as outlined in, *Caring for the Earth: A Strategy for Sustainable Living* (IUCN UNEP WWF 1991), that is briefly deliberated on.

In an attempt to address the environmental crisis, *Caring for the Earth: A Strategy for Sustainable*

[11]A perspective epitomised by the Brundtland Report.

Living (IUCN, UNEP, WWF 1991) outlines[12] nine principles to guide the way towards the realisation of a sustainable society. The nine principles include to:

- respect and care for the community of life;
- improve the quality of life;
- conserve the earth's vitality and diversity;
- minimise the depletion of non-renewable resources;
- keep within the earth's carrying capacity;
- change personal attitudes and practices;
- enable communities to care for their own environments;
- provide a national framework for integrating development and conservation; and,
- create a global alliance.

The first principle can be viewed as the foundational, ethical base for the other eight principles. At the core of this principle lies the respect for the rights of humans and nature. The respect for, and the commitment to protect human rights, are, in effect, the cornerstones of democracy and social justice. While the rights of all South Africans are now enshrined in the new constitution, these rights should be interlinked to responsibility and accountability. People need to become responsible and accountable for their actions, and their interactions with other people ought to promote democratic and just procedures. The interactions between people and nature need to be underpinned by an ethic that ought to further the conservation of the Earth's vitality and biodiversity (encompassed in principle four). In effect, what is required, is for people to change their unsustainable attitudes and practices (principle six), in order to adopt an ethic for sustainable living, which is more likely to come into fruition if they are properly informed. One important area that can further the development of the necessary knowledge and skills in this regard is the education system. Unfortunately the formal education system in South Africa has yet not taken up the challenge to incorporate education for sustainable living into the curriculum (see sections 3.2.2; 3.3.2).

Implicit in the second principle (to improve the quality of life for all South Africans), is the necessity to secure basic human needs. In this regard, most South Africans do not have adequate access to, for example, clean water to drink and wash in, primary health care, education and shelter. The budgetary cuts in the areas of health care and education, reduce the likelihood that this will be forthcoming in the near future, thereby further disadvantaging the previously disadvantaged. A large responsibility rests

[12] This document also describes further actions that need to be considered in relation to the primary areas of human activity and some of the vital components of the biosphere; in addition to a strategy that could be followed to implement and evaluate strategies for sustainable living.

on the government to redress past imbalances in order to secure a more equitable redistribution of resources, and to create the opportunities for all South Africans to take control of their own environments (principle seven).

Central to principle seven is the need for all citizens to become critical, active, participants in all areas that affect their lives. In short, it demands a participatory democracy. However, to make informed decisions necessitates that communities should have access to all relevant information, thus demanding the need for transparency. Moreover, the necessity for education for sustainable living, to equip citizens with the critical thinking, problem-solving and inquiry skills to make informed decisions, (the political nature of these demanding political literacy) becomes imperative. Furthermore, implicit within this principle is for all stakeholders to consult and collaborate with each other. However, the South African history of colonialism and Apartheid resulted in, for example, suspicion and mistrust between the various sectors of the population which might adversely affect collaboration. It is not easy to change this situation, and may require a long-term, nation building process.

Ironically, *Caring for the Earth: A Strategy for Sustainable Living* (IUCN; UNEP, WWF 1991), that aims to address the environmental crisis, stems from the industrialised North, (with a Western, European and British endorsement); a territory that have been indicted for having contributed significantly to the environmental crisis (Huckle 1995; Mistry 1993; Orr 1992; Watkins 1995). The origin of this document is a factor that might bring about suspicion and mistrust. A clarification of the negative connotations towards this document can be illustrated by focusing on the consumption patterns of the North, which impose a high risk on developing countries, an opinion that is endorsed by Watkins (1995). In this regard, for example, valuable land in some developing countries is devastated in the process of providing food for the people and animals of the North, a view shared by Ross and Hildyard (1992). This brings into question principle five, the recommendation to keep within the earth's carrying capacity. The latter refers to an area's ability to support life, by providing resources (and energy) and absorbing wastes on a sustainable basis. In effect it is underpinned by the impact that people have on the Earth. This impact, in turn, is influenced, amongst numerous other factors, by consumption and production patterns (which also encompass principles three: to conserve the earth's vitality and diversity; and four: to minimise the depletion of non-renewable resources). A solution to the questionable practises of the industrialised countries in keeping with the Earth's carrying capacity concurs with the argument of Watkins (1995: 161):

> Industrialised countries must take the lead, both in making dramatic changes in their own production and consumption patterns, and in enabling Southern countries to

> experience the kind of growth they need to combat poverty, without destroying the[ir] environment..

This, however, calls for a reappraisal of the current economic policies pertaining to the debt crisis and the role of organisations like, for example, the World Bank and the International Monetary Fund, that have been 'accused' of draining resources from developing countries (Mistry 1993; TLSA 1996a; b) under the disguise of supplying aid. Furthermore, it is claimed (TLSA 1996b: 2) that the World Bank and International Monetary Fund are:

> dictating the economic and political policies of countries like South Africa...Thus the Macro-economic Framework ... is in fact, the economic structural adjustment programme (ESAP) set out for South Africa by the World Bank-IMF. But the State Officials, including the responsible ministers (those in Education, Finance and Trade and Industry and others) have kept a deadly silence on these matters.

The inclusion of organisations like the World Bank, listed as one of the "collaborators" in the development of *Caring for the Earth: A Strategy for Sustainable living* (IUCN, UNEP, WWF 1991: ii), is in conflict with the widely accepted argument, that the roots of the environmental crisis lie in the social and economic systems (Cock 1991; Fien and Trainer 1993; Huckle 1995; Lawson 1991; Orr 1992; Ramphele 1991). Giving prominence to some of the organisations who allegedly contribute to the environmental crisis might add further suspicion and mistrust to the proposed guidelines to further the goals of sustainable living.

Finally, principle eight calls for the provision of a national framework for integrating development and conservation, which, in effect, suggests that central government needs to adopt an ethic for sustainable living. Implicit is the demand for the development, formulation and implementation of all policies, (economic, and other) to focus on the impact thereof, in terms of a sustainable environment (built and natural). Securing the well-being of the environment as a priority for South Africa will further the recommendation to create a global alliance (principle nine), since, the sustainability of the ecosystems of the world stretches beyond artificial, national boundaries.

In South Africa, the issue of sustainability and its importance have been stressed by the EEPI (1994), the *Reconstruction and Development Programme* (ANC 1994) and the *White Paper on Education and Training* (DE 1995). However, very important to achieving social transformation towards sustainable living is the need to interrogate, from a socially critical perspective, the technicist discourses and trends that tend to characterise these two blueprint policy documents, especially in the light of the emergence of environmental education in teacher education which can address the issues at stake. The Western

models of industrial progress, that link to the hegemonic forms of culture, identity and consumption which are manifested in the *White Paper on Education and Training* (DE 1995) and the RDP (ANC 1994), highlight some of the modernistic leanings of these policy documents, thus, as argued by Giroux (1991: 25) relegating "all non-Western cultures to the periphery of civilisation, outposts of insignificant histories, cultures and narratives". While considerable emphasis is placed in both these documents on the aspects of sustainability, given their emphasis on economic advancement and production, their bias seems to be in line with sustainable development (growth) mode rather than on ecologically sustainable development, due to the emphasis placed on "economic advancement" (DE 1995: 22), and the continuous reference of South Africa, vis-a-vis other industrial countries. The RDP (ANC 1994: 32-33) outlines that

> It is well known that widely spread education and training are important causes of economic growth. Countries with already well developed education systems grew faster in the 20 th century than those with delayed educational development. More recently it has been shown that the rapid growth of the Asian newly industrialising countries has been centrally influenced by their large stocks of relatively well educated labour. Thus a strategy which emphasises the acquisition of a good quality basic education and training by all South Africans is needed to underpin medium-term growth, diversification of the economy, and exporting success.

Education for sustainable living, in the light of change theory (see section 2.5), is in conflict with the vision and rationale expressed for education as outlined above. This calls into question the appropriateness of Western education, and necessitates that a balance be established to reaffirm some of the values inherent to African civilisation where a sustainable living is cherished.

In summary, while the search for an outline of the environmental ideology underpinning education for sustainable living, has, in section 3.1.3 pointed to:

- a worldview of the New Environmental paradigm;
- the goals of ecocentrism; and,
- the contribution from ecofeminism.

In this section (3.1.4), further insight into an environmental ideological position for education for sustainable living drew on the theory embedded within the:

- ecological sustainable development perspective (Fien and Trainer 1993).

Furthermore, Fien (1992) argues that since education for sustainable living[13] seeks to contribute to the processes of social change via educational activities which foster personal and structural transformation, it is based upon the:

[13] Referred to by Fien (1992) as socially critical education for the environment.

- ecosocialist, (rather than Gaianist) environmental ideology. Additionally, ecosocialism is regarded in this thesis as an appropriate environmental ideological position, in that it aspires to foster those values associated with communalism and cooperation inherent to African civilisation (Mbuyi in Altbach and Kelly 1988: chapter 8).

Finally, education for sustainable living draws from the principles that underpin sustainable living, as outlined in *Caring for the Earth: A Strategy for Sustainable living* (IUCN, UNEP, WWF 1991), notwithstanding the critique levelled against this document. Implicit from the nine principles is:

- the recognition for an ethic that respects and protects human rights;
- an ethic that aspires to further democracy and social justice;
- the commitment to promote biodiversity;
- the need for an equitable redistribution of resources;
- the necessity to satisfy basic human needs;
- the need to further collaboration and participation of all stakeholders;
- furthering the development of critical active citizens;
- the need for a politically literate South African population;
- the need for South Africans to develop the necessary inquiry skills (critical, inquiry and problem-solving) that will enable citizens critically to evaluate economic policy decisions.

The education system is partly charged with this task, but, unfortunately in South Africa, this challenge is yet to materialise.

While the above summary identifies an appropriate environmental ideological[14] orientation for education for sustainable living, and the principles that underpin this orientation, a valuable contribution that sheds further light on a philosophical framework for education for sustainable living, comes from the research of Fien (1992). The critique levelled against the origin of this framework, in terms of *Caring for the Earth: A Strategy for Sustainable living* (IUCN, UNEP, WWF 1991), is also applicable in this regard. This framework (Fien 1992) gives greater coherence in the light of the analyses of the data that emerge in chapters five and six. Important points to consider, however, is that further critique of such a framework lies in the actual practice of education for sustainable living, and the recognition that practice is contextually bound. It is in the practice where the strengths and weaknesses can be identified, since, at bottom, it aspires to further critical praxis, which, according to Mc Taggart (1991: 49) refers to theoretically informed practice. Nevertheless, the integration of socially critical orientation in education with ecosocialist environmental ideology, provides the

[14]The educational ideological position for education for sustainable living, the socially critical orientation, has been outlined in section 3.1.2.

philosophical framewor, which forms the foundation that underpins the theoretical parameters of this research for education for sustainable living, that is employed in this thesis.

Fien (1992: 52) asserts that socially critical education *for* the environment can be identified and analysed in terms of five defining characteristics:

- A critical environmental consciousness based on eco-socialist environmental ideology that is underpinned by the following four principal areas:
  - the socially constructed nature of the environment;
  - the roots of the environmental crisis are centred within the social and economic systems;
  - environmental problem-solving needs to be accompanied by challenging the hegemonic influences of the dominant ideology of those who are in power; and
  - participation within matters concerning environmental politics for all stakeholders is vital.
- Critical thinking and problem-solving skills, which include skills for:
  - inquiry (observing and perceiving, defining and describing, analysing and explaining, predicting and evaluating, decision-making, personal evaluation and judgement); and
  - ideology critique (to critically analyse the ideological manifestations of the dominant social paradigm, and to identify opportunities for change, reconstruction and transformation).
- A critical eco-socialist environmental ethic, based on the values of:
  - people-people relationships (for social justice), which includes satisfying basic human needs, striving for inter-generational equity and human rights and, participation in matters to foster democracy and social justice; and
  - people-nature relationships (for ecological sustainability), where humans are seen as part of and interdependent with the environment, conservation practices that would promote biodiversity are ventured into, all living organisms are treated equally (interspecies equity), and everyone should become accountable for their impact on nature (living lightly on the earth).
- Political literacy, by focusing on the:
  - understanding of environmental politics;
  - democratic procedural value; and
  - action skills.
- Critical praxis, that informs a wide range of teaching strategies, for example, enquiry-based learning, values exercises, ideology critique, community involvement as well as social action.

Central to this characteristic, which is encompassed in all four above-mentioned areas, is the empowerment of the learners who critically reflect on their actions.

To work towards the transformation necessary for education for sustainable living, definite changes at macro, meso and micro levels (see chapter two), are necessary. However, in terms of the employment of this philosophical framework to guide the analysis of the data in chapters five and six, the changes required for the realisation of education for sustainable living at macro level, need to be considered in the light of the ecosocialist environmental and socially critical educational ideological positions. Consequently, notwithstanding that it is reductionist[15] to view the three levels of change in isolation, a critical environmental consciousness, and a critical eco-socialist environmental ethic (based on the values of people-people and people-nature interrelationships) might advance change at macro level. While critical praxis might be an important dimension to bring about change at all levels, it forms a fundamental facet to bring about change at meso level, since, as a pedagogical approach, (Fien 1992: 63), it furthers the integration of critical reflective teaching and moral action (Beyer 1991). Political literacy and critical thinking and problem solving skills, are necessary to secure the micro level changes.

This framework is employed in chapters five and six to analyse and interpret the interviewees'

- environmental education ideological positions, and the broader policy matters in terms of the macro level challenges;
- pedagogical approaches and practice in terms of the meso level challenges; and,
- curricular matters, in terms of the micro level challenges,

to explore a suggested framework for an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living at initial teacher education level in the Western Cape.

3.2 FURTHER EXPLORATION OF THE CHANGES AT MACRO LEVEL: A HISTORICAL PERSPECTIVE OF A POLICY FOR ENVIRONMENTAL EDUCATION

3.2.1 International developmental perspective on environmental education

The evolution of environmental education on the international front can be traced through many

[15]Also acknowledging that there are definite areas of overlapping, and that some (or all) of these five characteristics could be employed at all three levels of change.

conferences and the policy documentation emanating from these over the last two to three decades (Fensham 1978; Greenall 1987; Tilbury 1993; 1994; Williams 1985; 1988; Ballantyne and Tooth-Aston 1988; 1990; Irwin 1991; O'Donoghue 1993a; b). The major formative events span from the Stockholm Conference in 1972, through to the Earth Summit in 1992.

- The Stockholm Conference through to the Tbilisi Intergovernmental Conference

The United Nations Conference on the Human Environment held in Stockholm, Sweden, in June 1972 saw the development of environmental education as a vital strategy to solve the environmental crisis (Greenall and Womersley 1977; Williams 1988: 16). This conference was significant in that for the first time there was international consensus about the global nature of the environmental crisis. In addition, education was recognised as a key area to address the environmental crisis (Williams 1985; 1988), reflected in recommendation 96 of the Stockholm Conference (UNESCO 1972). This resulted in the establishment of the United Nations Environment Programme (UNEP) commissioned to carry out a vast array of projects concerned with environmental problems experienced globally. Together with UNEP, the United Nations Scientific and Cultural Organisation (UNESCO) was invited to promote environmental education worldwide. This UNESCO-UNEP collaboration resulted in the formation of the International Environmental Education Programme (IEEP).

The first international meeting convened under the IEEP, and attended by sixty-four countries, was the Belgrade International Workshop on Environmental Education in 1975, which is regarded as the starting point for the establishment of appropriate principles to govern the design and the development of curricula for environmental education. These are outlined in the *Belgrade Charter* of 1975, subtitled "A Global Framework for Environmental Education" (Fensham 1976; Tilbury 1992; 1994; Robottom 1987a; UNESCO 1976a; b; Williams 1985; 1988). The Charter also provides the first international account that describes the aims, objectives, concepts and guiding principles for environmental education. A major aim of environmental education according to this Charter is to

> ...develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards the solutions of its current problems and prevention of new ones (UNESCO 1976a: 2).

The objectives outlined for environmental education cover a vast number of areas, including making learners aware of the total environment and its problems, fostering in the learner the acquisition of

appropriate knowledge, skills, attitudes and developing evaluation abilities to solve environmental problems and prevent future ones. The eight guiding principles augmented the interdisciplinary nature of environmental education, as was outlined at Stockholm. It also placed a great emphasis on the political facet (Fensham 1976; Robottom 1987a) as well as on the global, holistic and future dimensions of environmental education (Williams 1985). While the second meeting of the IEEP comprised a number of regional conferences in UNESCO member countries, it was the third IEEP meeting that had the greatest international impact in the history of environmental education (Greenall and Womersley, 1977).

This third meeting was the first Intergovernmental Conference on environmental education, held at Tbilisi in the USSR from 14 - 26 October 1977 (UNESCO 1977a; 1978a). This Tbilisi Conference was one of the most important milestones in the development of environmental education, since seventy government and thirty non-government agencies were represented. Here the most authoritative statements, which included the Tbilisi Declaration on Environmental Education, were accepted (Irwin, 1991). This Declaration[16] provided a general set of goals, objectives and principles for environmental education. Tbilisi reaffirmed many principles adopted by the Belgrade charter in that it highlighted the task of environmental education as a major agency for solving the environmental crisis facing the world, while also accentuating the holistic and interdisciplinary nature of environmental education (Tilbury 1993; UNESCO 1977a). This conference, however, went beyond that of Stockholm and Belgrade in many ways.

Firstly, forty-one comprehensive recommendations on the nature, objectives and guiding principles on environmental education were adopted. Secondly, the ethical, values-dimension, cultural and socio-economic facets received serious consideration. Thirdly, more community, participatory and contextual approaches to environmental education were stressed, in that it recommended that environmental education should

> ...look outward to the community. It should involve the individual in an active problem-solving process within the context of specific realities, and it should encourage initiative, a sense of responsibility and commitment to build a better tomorrow (UNESCO, 1977a: 24).

[16]This came under scrutiny at the UNESCO Asia-Pacific Regional Experts' meeting on 'Overcoming the Barriers to Environmental Education through Teacher Education', at Griffith University, Australia 5-9 August 1993. It was suggested at the meeting that the goals, objectives and principles of environmental education should be revised to include the aspects of sustainable development (UNESCO 1993).

This position highlights a critique of the traditional approaches which were underpinned by awareness campaigns and conservation, and signifies a greater emphasis on the adoption of approaches that focus on active involvement to overcome unsustainable lifestyles.

- The World Conservation Strategy to the Earth Summit

Further developments in environmental education included the launching of the World Conservation Strategy (IUCN, UNEP, WWF 1980) in thirty-two countries. This strategy accentuated the area of sustainable development, focusing the aims of environmental education in this direction. The goals, objectives and principles for environmental education at Tbilisi were subsequently reaffirmed at the International Congress on Environmental Education and Training in Moscow in 1987 (Irwin 1991; UNESCO 1988). Four years later, *Caring for the Earth: A Strategy for Sustainable Living* (IUCN, UNEP, WWF 1991) was published as a follow up to the World Conservation Strategy. Informed by the World Conservation Strategy (IUCN, UNEP, WWF 1980) and by the Brundtland Report (WCED 1987), this document (*Caring for the Earth: A Strategy for Sustainable Living*) underlined sustainability as the central tenet for environmental education. Fifteen years after Tbilisi, in 1992, at the United Nations Conference on Environment and Development (the Earth Summit in Rio de Janeiro), the importance of environmental education was reiterated. Once again, the focus on environmental education was placed in the light of sustainability and sustainable development (UNESCO 1992a; b).

An evaluation of the IEEP's achievements and shortcomings during its first three years indicate that this programme had a catalytic effect on the development of environmental education (Fensham 1978: 454). Advances in this field included the development of curricular materials for schools, the establishment of national plans, legislation and programmes for environmental education, increased recognition for the contribution from the non-government organisations (NGOs) and expanded non-formal environmental education of many kinds (UNESCO 1977b; c; d). Despite the contribution of these conferences and reports to the development of environmental education, allegations have been made that these conferences/reports contributed little to the alleviation of the severity of the environmental crisis. This point of view is summarised in the *State of the Environment Report 1972-1992*:

> Virtually no environmental problem addressed in 1972 has yet been solved. Today there is no single area of this planet, no matter how remote, that is untouched by pollution...Underdevelopment and crippling poverty...have in many cases worsened (UNESCO 1992b: 2).

There are a number of inter-connected reasons for this failure, over two decades, to solve any significant environmental problems. At the core of these lies the hegemony of Western capitalist ideology which prevents governments from taking action at a political level, which would translate into structural changes in the means of production and in the relationship between capital, development, labour/ people and the environment. A case in point is the Economic Structural Adjustment Programmes (ESAP) imposed by the World Bank and the International Monetary Fund on typically 'Third World' economies (Grootaert 1994). Additionally, while these conferences (and associated documentation) succeeded in outlining the nature, scope and guiding principles for environmental education, this success had a limited impact in formal education, including teacher education, which many writers argue, (Irwin 1988; Mishra et al. 1985; Simpson et al. 1988; Tilbury 1993; Williams 1985; 1988) is fundamental to foster an environmental ethic, yet, remains at an unsatisfactory level (Tilbury 1992; 1993). The 'unsatisfactory' state of affairs (in terms of South Africa- subsequently discussed) is linked, to a large extent, to a lack of formal policy for environmental education.

3.2.2 Historical developmental perspective on environmental education in South Africa

The historical development of environmental education in South Africa has been well documented (Ballantyne and Aston 1990; Hurry 1984; Irwin 1984; 1990; 1993; O'Donoghue 1993a; b). Similar to the international situation, notable events[17], for example, conferences and the policy documentation emanating from these, can also be traced back over the past twenty-five years.

- Establishment of the Environmental Association of Southern Africa (EEASA)

Of prominence in the development of environmental education in South Africa was the first International Conference that took place in 1982 at Treverton College at Mooi River in Natal (Irwin 1994: personal communication). One important outcome of this conference was that it paved the way for the establishment of the Environmental Education Association of Southern Africa (EEASA). Under the convenorship of this association, activities such as conferences, workshops and seminars have grown in strength over the years.

[17] These are discussed in terms of initiatives that stem from the non-formal and government structures, rather than in chronological order.

- Government formal policy initiatives in environmental education

  - The first formal initiatives

Regarding government policy on environmental education, Ballantyne and Oelofse (1989) and Ballantyne and Aston (1990) write that the first government body to promote the need for environmental education and conservation was the South African Committee on Environmental Conservation, directed by the Minister of Planning, in 1972. In their *National Policy on Environmental Conservation*, published in 1980, this Committee pointed out the importance of environmental education (Ballantyne and Oelofse 1989: 7-8). Their recommendations were published in a *White Paper* in 1980 that was incorporated into the Environmental Conservation Act of 1982. The need for environmental education was also expressed in the *White Paper on the Provision of Education in South Africa* in 1983 (Department of Environmental Affairs 1989: 5).

Subsequently, the Council for the Environment was established in 1984 (replacing the South African Committee on Environmental Conservation), its function being to inform the government on all aspects concerning environmental management (Ballantyne and Aston 1990). It was largely the work of the Council for the Environment that was responsible for the formulation of a *White Paper on a National Policy for Environmental Education* in 1986, and also in 1989, when the *White Paper on Environmental Education* was published by the Department of Environmental Affairs (DEA 1989).

In August 1993, a rather shortsighted initiative pertaining to environmental education programmes at tertiary level in South Africa emerged from the Committee for Environmental Education of the Council for the Environment. The Council for the Environment claimed that their document, *The development of a core syllabus for environmental education in South Africa*, (DEA - Council for the Environment 1993) had been produced after discussions and consultations between Council members. They further claimed that this document was put forward for discussion at a national conference convened by the Department of Environmental Affairs and the Environmental Association of Southern Africa at Dikhololo during August 1993. The latter claim has been widely disputed, and critique in this regard has been levelled by Taylor, O'Donoghue and Clacherty (1993) and Schreuder (1993), underscoring the need for a broadly-based, participative and collaborative formulation of an environmental education programme within teacher education which is in line with the whole notion of reconstruction and development, underpinned by the concept of sustainable living.

- The White Paper on Environmental Education (DEA 1989)

The White Paper on Environmental Education was developed by a committee of the Department of Environmental Affairs, the Council for the Environment, that was appointed by the State President. This Committee operated (consulted) only within apartheid structures (in a non-participatory manner), which was typical of the modus operandi of the previous government. It therefore lacked credibility as far as the majority of the population was concerned, since it had been undemocratically elected. Consequently, there were mixed reactions to the *White Paper on Environmental Education* (Ballantyne and Aston 1990; Taylor 1989; Viljoen 1990), the essence of which is succinctly articulated by Irwin:

> Notwithstanding some scepticism and the limited acceptance of this document among sections of our society who had no say in its compilation it is important to note that it unequivocally embraces the 'Tbilisi Principles' and the internationally accepted concept of Environmental Education (1991: 9).

This 'ambivalence' in the *White Paper* highlights the need for consultation, participation and active involvement by all the stakeholders before a policy document is developed to guide the process of environmental education. This need for wide consultation and involvement of all concerned constituencies is further underscored by additional criticisms of the *White Paper*. Amongst these is the fact that the document is ridden with gender insensitive terminology (for example, "survival of mankind, man-made...etc."), and is overtly technicist in nature, reflected not only in its terminology (frequent mention of, for example, "target groups") but also in its perceptions of resource development[18] and research. Regarding research, the document states that

> The DEA will, after consultation with the Council for the Environment, formulate guidelines and advise on priorities regarding research in environmental education (DEA 1989: 8).

This top-down approach disregards the assumption that the key to successful environmental education lies partly with the teachers in the formal education sector (UNESCO 1990; Williams 1985; 1988) since the Council for the Environment is certainly not very active in the teaching community. Furthermore, the relevance of "awareness campaigns" (DEA 1989: 8) as a strategy to develop an environmentally literate population is questionable, since literature reveals that there needs to be a move towards active involvement in environmental problem-solving strategies (Di Chiro 1987; Huckle 1991; Robottom 1987b; Stevenson 1987; UNESCO 1977b; 1977c; 1978a; 1978b).

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[18]The education authorities are viewed as the experts on the development of resources, largely ignoring participation of the practitioners, which is in line with the RDDA approach (see sections 3.4.1 and 3.4.3.1).

- Environmental Education Policy Initiative (EEPI) to Environmental Education Curriculum Initiative (EECI)

A recent environmental education initiative in South Africa which heeds the prerequisites of consultation, participation and active involvement by all the stakeholders is the Environmental Education Policy Initiative (EEPI). The origins of this initiative are twofold (Clacherty 1993: 3). Firstly, it stems from EEASA's 'policies and procedures' survey that emanated from the members' 1991 call for the organisation to become more proactive. This survey was expanded via workshops at the 1992 annual workshop in Howick, where participants felt that the organisation ought to become more:

- proactive in the emerging processes of change in the country;
- involved in the area of curriculum development; and,
- proactive in lobbying practices.

The second origin of this initiative stems from Tinus Joubert from the Department of Environmental Affairs (DEA) who felt that environmental education had to be included in the agenda of the new education policy for a reconstructed South Africa, especially since the DEA lacked credibility at grassroots level. Therefore, Joubert, who is also a member of EEASA, approached EEASA Council at its annual EEASA meeting at Howick, Natal in 1992. A request was made for EEASA and the DEA to combine forces, and to venture into a collaborative partnership on the environmental policy initiative. Hence, the joint initiative between the DEA and EEASA was formed. A Steering Committee was established, and regional workshops were held to discuss and contribute to the initiative, the major purpose being to influence emerging education policy (Clacherty 1993-1994). A combined attendance list of participants in workshops held in the various regions included representatives from various political parties, organisations, non-government organisations, government organisations, trade unions, various educational forums, universities, colleges, teachers and technicons. Reports were compiled after each regional workshop. These reports were separated into their various themes (teacher education, curriculum, resource materials, teaching, learning, etc.), and served as a starting point for debate at the National Workshop, held at Dikhololo in the Mpumalanga Province, from 2 - 4 August 1993.

At this National Workshop, international guest speakers as well as representatives from various educational departments, the DEA, EEASA, other environmental organisations and various political organisations and parties attended. Included were members of the Azanian People's Organisation (AZAPO), the National Education Coordinating Committee (NECC), the Congress of South African

Students (COSAS), the African National Congress (ANC) and the Democratic Party (DP). The name Environmental Education Policy Initiative (EEPI) was adopted, and a steering committee was elected. This National Steering Committee included members from EEASA, the DEA, other environmental organisations, the ANC Education Desk, COSAS, teacher educators, representatives from three universities and representatives from the Education Department (EEPI 1994). Seven commissions were convened at the National Workshop at Dikhololo to reassess seven important areas in environmental education:

- redefining environmental education;
- teacher education (initial and in-service);
- education resource materials;
- curriculum;
- learning and teaching methodologies;
- change and implementation issues; and,
- the non-formal sector.

At the National Workshop at Dikhololo (EEPI 1994) the commission on redefining environmental education reviewed the twelve Tbilisi Principles and, in line with the international developments (UNESCO 1993), added two new principles, namely that environmental education should also:

- take place within the context of programmes for sustainable living;
- create practical opportunities for individuals and institutions to find the capacity to manage primary environmental issues, including the management of primary health care, natural resources and environmental quality.

The primary task of the EEPI, which emerged from Dikhololo, was to promote policy change with respect to environmental education in formal education. Throughout the evolution of the EEPI process, culminating in the achievement of representation on a committee of the NETF (National Education and Training Forum) concerned with curricular issues, the principles of participation and collaboration have been adopted. The two closely-related key strengths of the EEPI, according to Clacherty (1993-1994: 62) include:

- the commitment to a process rather than a product; and,
- a commitment to participation, inclusiveness, consultation and collaboration[19].

[19] Further developments have been left up to the regions to address their specific needs, which has resulted in a temporary lapse of the process.

The Environmental Education Policy Initiative reflects a policy-development process different from the traditional top-down approaches like, for example, the manner in which the *White Paper on Environmental Education* (DEA 1989) was developed. One of the most visible effects of this EEPI process is the acknowledgement of the importance of environmental education in the *White Paper on Education and Training* (Department of Education 1995). This is significant since it:

- signifies a shift away from centring environmental education under the auspices of the Department of Environmental Affairs; and,
- places the responsibility for environmental education under the Department of Education.

A positive outcome of this shift, is the approval of a National Environmental Education Research Project by the Department of Education (national level) to commence in 1996 (see below). Notwithstanding these positive outcomes, the critique levelled against the *White Paper on Education and Training* (Parker 1995) for being entrenched within modernistic, Western traditions, institutions and values, and for failing to balance these with a unique African perspective, is significant in terms of the ideological underpinnings of environmental education.

The Environmental Education Research Project[20] which emanates from the Department of Education (national level), aims to

> establish by means of a national and participative project the optimally effective variety of ways, methods and techniques of incorporating environmental education experimentally into the formal curriculum with a view to developing national policy (Department of Education: Curriculum Development 1995: 1).

Regarding environmental education within initial teacher education, certain guidelines were proposed, including the concepts that environmental education:

- ought to become a compulsory component of all teacher education, and that it should be part of all National Curriculum Policy documents;
- could be a separate subject in colleges and universities, possibly with a compulsory short introductory course followed by an optional specialist course of substantial length and credit value;
- should also be incorporated into other subjects areas;
- in colleges and university teacher development programmes it needs to consider a number of

[20] This proposed project, together with two other projects (economic and science and technology education) has been identified and approved by the Department of Education (national level) as three areas in formal education to receive priority over the next four years.

aspects, namely:

- Skills:
  - critical thinking;
  - problem-solving;
  - evaluation;
  - value positions clarification; and,
  - action and advocacy skills.
- Further aspects to be included are:
  - the process of community involvement;
  - action research;
  - local contextual studies;
  - appropriate learning and curriculum theory and practice;
  - resource production;
  - appropriate knowledge of environmental issues and processes (broad view of the environment);
  - the necessary skills to manage the above in a school context; and,
  - to promote personal qualities such as enthusiasm, care and commitment.

Specific recommendations (in addition to these mentioned for initial teacher education) have also been made for in-service education for environmental education. Included here are the recommendations that:

- there should be partnerships between the Department of Education, colleges, NGOs and all other interested parties for in-service in environmental education; and that staff and financial resources should be made available for the development of materials and programmes in a consultative manner;
- in-service support for teacher educators should also be considered a fundamental requirement;
- suitable teaching strategies need to be explored to foster learner-centred teaching;
- a support base system is necessary for newly qualified teachers.

The concomitant objectives of this project therefore include developing:

- national environmental education policy as part of the national education policy;
- teacher education programmes on environmental education for initial and in-service teacher education levels;
- provincially negotiated guidelines for environmental education;

- resource materials for environmental education for all stakeholders in the formal education system; and,
- a strategy involving pilot schools to trial all research that is fed into the data bank of the project (ibid: 1-2).

An important goal of the project is also to support the development of teacher education programmes on environmental education at tertiary institution. It is envisaged that this process will commence in 1996 (Botha 1995 personal communication)[21]. The thrust which, in a sense, can be viewed as an extension of the agenda of EEPI process, is not to influence policy for environmental education for formal education, but rather to develop it in a participative manner. True grassroots participation (as was the situation for the EEPI process), rather than representative participation, however, needs to be safeguarded. In this regard, Parker (1995) distinguishes between representative and participatory democracy. He voices the fear, given the modernist agenda of education (as articulated in current education policy documents), that the inclination is distinctly in the direction of the former.

Nevertheless, the most recent developments in terms of the project, which has been included in discussions pertaining to the establishment of the Environmental Education Curriculum Initiative - EECI, at a meeting held in Johannesburg in January 1996, is that the project has been put on hold, and negotiations will be furthered at the annual EEASA Conference in July 1996 (EECI 1996).

Notwithstanding the valuable contributions from the EEPI and EECI processes, and organisations such as EEASA, this country has not yet succeeded to secure a policy for environmental education within the formal education. Without the necessary policy for environmental education within formal education, the one facet of the changes required at macro level, places the realisation for education for sustainable living in jeopardy. Regarding teacher education, while the Committee on Teacher Education Policy (COTEP 1996) acknowledges the importance of environmental education within teacher education, without the necessary policy to ensure that environmental education also becomes part of the other areas of education (primary and secondary), the future of environmental education within formal education remains uncertain and unlikely. Teacher education largely prepares teachers for their roles and function within the schools. Therefore policy needs to be secured at all levels of education - formal (tertiary, secondary, primary and pre-primary), as well as in-and non-formal levels to realise

[21] A meeting was held on 17 October 1995 in Stellenbosch, Cape, between the researcher, other environmental educators from the Western Cape Province, representatives from the Department of Environmental Affairs and Tourism, the National Director of Curriculum Development (Dr Botha) and members of the EEPI steering committee.

the real changes that education for sustainable living compels.

The impediments inherent to the changes required to secure education for sustainable living at macro level, are twofold (multifaceted and interrelated).

- First, there is a need for the development of a policy for environmental education.
- Second, practitioners (and prospective teachers) of environmental education need to unpack, and free themselves from the pervasive hegemonic ideology of CNE, which can be facilitated by a socially critical educational ideological orientation, and an ecosocialist environmental ideology.

The education of teachers, the focus of this thesis, has a vital role to play to overcome these barriers, provided that there is support from the education authorities, which, in turn, require the necessary policy, to secure and to sustain this. The approaches that are employed in teacher education may redress the macro level changes on the one hand, while also laying the foundation to redress the changes that are required at meso level, in order to secure, and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living at initial teacher education level.

3.3 MESO LEVEL CHANGES: TEACHER EDUCATION; CURRENT APPROACHES, CRITIQUE AND POSSIBILITIES FOR RECONSTRUCTION

Since the commencement of formal programmes for the preparation of teachers in the early part of the nineteenth century, there has been a great deal of contention relating to the methodology and content of teacher education (Zeichner 1983). Given the pivotal nature of teacher education, the culture of teacher preparation plays an important role in the shaping of the context and practices of teaching. However, teacher education is complex, underpinned by many facets. These facets include all aspects and spheres of initial (also continuing) teacher education, for example, the approaches to the preparation of student teachers, and the curriculum for teacher education. Central to this thesis are the teacher educators who 'bring into teacher education' all those aspects that shapes their practice, for example, their education, with its historical baggage (Freer 1993), professional development (Homeyr 1991), professionalism (Grundy 1987; NEPIa 1992), research (Kincheloe 1991), etc. Also, there are the realities that students have to face when they are out in the schools (and once they qualify as teachers), which includes the notion of schooling (Beyer 1993; Verma 1993) and the constraints of the curriculum (Iredale 1993). These facets (which underpin teacher education) mentioned, (and many

others not mentioned) should not be seen in isolation of the broader structures, for example, that of governance and policy. To work towards the transformation necessary for education for sustainable living, changes at all levels, are necessary in the area of teacher education. While this section addresses the changes required at the meso level[22], it needs to be viewed in conjunction with the changes required at macro level (sections 3.1 and 3.2) and those necessary at micro level (see section 3.4).

3.3.1 Initial teacher education: Approaches

In general, there appears to be some form of consensus that the approach to teacher preparation is characterised by a vocational training type orientation in which a definite schism exists between theory and practice. This view is supported by writers at both international (Beyer 1987; 1989; Grundy 1987; Verma 1993; Watson 1985) and national levels (Salmon and Woods 1991; Siebörger and Kenyon 1992; Meerkotter and Van den Berg 1994; Van den Berg 1994), and is considered to be restrictive in terms of praxis (Beyer 1991; Grundy 1987). The question whether the aims of teacher education are compatible with the goals of professional preparation is consequently debatable (Grundy 1987; Salmon and Woods 1991; Siebörger and Kenyon 1992; Van den Berg and Meerkotter 1994).

Very often, in these teacher education programmes the 'training' facet is emphasised at many teacher education institutions. Student teachers are thrust into demanding and often challenging situations in their practice teaching. For many students these challenging situations arise from a lack of opportunities granted to them to pose questions which require critical thinking, about why they are teaching and what should be taught. Consequently their demand is frequently for quick-fix answers to immediate problems instead (Grundy 1987). Many teacher education institutions in South Africa, particularly the colleges of education, emphasise this orientation to classroom practise in their didactics and class teaching programmes (Salmon and Woods 1991; Siebörger and Kenyon 1992; Van den Berg 1994), which brings into question the nature of initial teacher education programmes.

Zeichner (1983) links initial teacher education programmes to four paradigms, the

- behaviouristic;
- personalistic;
- traditional-craft; and,
- inquiry-oriented.

[22]The approaches embarked on by the teacher educators are viewed as meso level challenges, but, in effect, these are shaped by by the macro level challenges, for example, the issue of the powerlessness of the teacher educators.

Each paradigm is diverse and distinct, and is characterised by a set of common assumptions that may differentiate the basic goals of one prevalent strategy from another. Beyer (1989; 1991) discusses the initial teacher education programmes in terms of four distinctive "approaches". These approaches described by Beyer (ibid), in the opinion of the researcher, shed further light on the ideological underpinnings of the four paradigms of initial teacher education programmes outlined by Zeichner (1983).

The first approach evident in the preparation of student teachers, according to Beyer (1989) includes, firstly, an emphasis on the 'training' of teachers to equip them to carry out necessary teaching strategies and methodologies. This approach can be viewed as being centred within the behaviouristic teacher education paradigm, underpinned by positivistic epistemology and behaviouristic psychology (Zeichner 1983). The student teacher is regarded as a passive recipient of predetermined knowledge, skills, attitudes and values, which makes teacher preparation technicist in nature. Student teachers are therefore 'trained' to develop, perform and perfect tasks which are pre-determined. This approach to teacher education is viewed as a metaphor of 'production' (Grundy 1987), a view of teaching as an 'applied science' with the teacher regarded primarily as an executor of the laws and rules of efficient teaching. The preparation of teachers from this position is directed at equipping learners with the skills, qualities, and proficiencies required for the reproduction of school practices in their existing form. This approach dominates many of the teacher education institutions in South Africa, specifically the colleges of education (Freer 1993; Salmon and Woods 1991; Siebörger and Kenyon 1992; Van den Berg 1994; Van den Berg and Meerkotter 1994) that were (and some still are, in 1997) subject to externally developed syllabuses, controlled and enforced via the externally set examination which is imposed on student teachers. Included here are all the colleges that were governed and by the ex-HoR, the ex-DET. The colleges governed by the ex-HoA, and, to a lesser extent, those governed by the ex-HoD enjoyed greater academic freedom regarding their approaches to initial teacher education (see also sections 3.1.1; 3.3.2). They had the freedom of curriculum design and development, without being subjected to externally controlled examinations.

A second approach to initial teacher education (Beyer 1989) emphasises the field-based experiences from an early stage, which enables students to spend more time in the teaching situation. Critique against this approach includes the notion that students in this situation tend to accept, uncritically, the practices they observe in the field. This perpetuates the technical orchestration of predetermined activities and results (Tabachnick, Popkewitz and Zeichner 1979-1980; Grundy 1987). This approach may be viewed as being centred within the traditional-craft teacher education paradigm (Zeichner 1983) that is based on an understanding of teaching as a craft and teachers as craftpersons. Inherently this

paradigm views teacher education as a type of apprenticeship. Tom (1980 in Zeichner 1983) asserts that although crafts include intricate sequences of skills which have to be mastered, the mastery of these skills alone is an essential but insufficient condition for becoming a good craftsperson. The whole is more important than the sum of the individual parts (Skilbeck 1992; Zeichner 1983). Consequently, to master certain predefined technical skills related to teaching will not ensure that the student teacher will be able to carry out the specific task effectively. Thus, the primary drawback of teacher education from this perspective is that it does not make learners aware of the philosophical nature of, and the type of knowledge that constitutes sound teaching practice. Rather a master-apprentice relationship is regarded as the appropriate procedure for conveying the 'cultural knowledge' that competent teachers have to pass on to the novice teacher (Giroux 1988a). Similar to the situation in the behaviouristic paradigm, student teachers are regarded as passive recipients of this knowledge and information, and have no real control in determining the nature of their preparation programmes (Zeichner 1983; Beyer 1989).

A third approach outlined by Beyer (1989) involves the 'more personalised' strategy which emphasises that the content of teacher education curricula needs to correlate with the students teachers' concerns at any given juncture (Katz 1974 in Beyer 1989). This approach may be perceived to be centred within the personalistic[23] paradigm (Zeichner 1983), which seeks to further the psychological maturity of student teachers. It stresses the reorganization of insights and convictions that pertain to the mastery of distinctive behaviours, skills and content knowledge. As a result, the knowledge and skills that student teachers are to grasp are seldom specified beforehand, as is the case in behaviouristic/training approaches to teacher education. This view embraces a teacher education as a type of adult development, a process of 'becoming' rather than focusing exclusively on the teaching facets. One of the central difficulties with this paradigm of teacher education, however, is its shortcomings in terms of a focus on the necessary development of appropriate shifts in perceptions and meanings, including, for example, aspects such as issues about oneself as a teacher. Like the other two approaches outlined, it too is overtly technical and behaviouristic in nature, and too geared towards specific competencies[24] which are to be inculcated.

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[23] This paradigm (Zeichner 1983) is based on the underpinnings of a phenomenological epistemology and perceptual and developmental psychologies. It includes approaches of 'humanistic teacher education', 'personalized teacher education' and several approaches to teacher education programmes which are based on the foundations of 'open education'. Commenting on these approaches, under the umbrella of 'personalistic teacher education', Zeichner argues that the contrast among these particular approaches is not insignificant. All of these approaches hold numerous assumptions in common about the proper focus for a teacher preparation programme. These relate to the task of teaching, and include the role of teacher educators (1983: 4).

[24] The COTEP (1996) document (see sections 3.3.2; 3.4.3.2 for further critique) is structured along these lines.

These three approaches to initial teacher education programmes share a common philosophical underpinning, which finds resonance in the claim made by Beyer (1989: 28), that "all tend to see teacher preparation as existing to help students take on currently dominant roles, expectations, and characteristics". In essence, these may be criticised largely for overlooking the political and social dimensions of education, hence, the uncritical acceptance of the status quo.

Central to the fourth approach to initial teacher education (Beyer 1989; 1991), is critical reflection and inquiry, which concurs with the inquiry-oriented paradigm of Zeichner (1983). The inquiry-oriented paradigm for initial teacher education programmes is concerned primarily with furthering and developing student teachers' capacities for reflective action. The latter, however, is widely recommended (Hart 1990a; Skilbeck 1992; Van den Berg 1994; Verma 1993; Zeichner and Liston 1990; Zeichner and Tabachnick 1991). It also proposes to assist student teachers to explore moral, political and ethical issues established in day-to-day practices and thinking, in addition to the instrumental issues involved (Grundy 1987). The focal point of departure from this perspective, for both teacher educators and student teachers, is to establish not only the appropriate educational goals and experiences which may facilitate social constructions that are mediated by justice and equality, but the institutional arrangements necessary to such an exercise as well (Berlak and Berlak 1981; Skilbeck 1992; Zeichner 1983).

While this paradigm regards the development of reflective practitioners as crucial (which is also identified as one of the challenges to realise education for sustainable living), the necessity for reflectivity in teacher education is widely acknowledged (Hart 1990a; Beyer 1989; 1991; Zeichner 1983; Zeichner and Tabachnick 1991), and will be briefly explored, with useful insight drawn from the research of Beyer (1991). He (ibid: 113-119) argues that a distinction needs to be made between different forms of reflectivity (for example escapist; therapeutic; commonsense; procedural/ technical; ameliorative and critical)[25]. Regarding critical reflection, vis-a-vis ameliorative reflection, Beyer (ibid:

[25] Escapist reflectivity can be illustrated by referring to the bureaucracy, and the routine of mediocre activities with which practitioners are confronted, and, to escape this, they occasionally reflect on matters unrelated to their practice, as a means of escaping from the "current drudgery" (Beyer 1991: 115).Closely resembling escapist reflectivity, therapeutic reflectivity is concerned with some form of introspection and self-analysis. Commonsense reflection, on the other hand, is linked to the lecture room, while being confined to reflecting on a particular, narrow problem. Closely resembling the afore-mentioned, procedural/ technical reflection is employed by practitioners to reflect on the apolitical, technical aspects of their practice, for example to devise and review strategies on how to improve students' marks. This perception of Beyer (1991) is endorsed by Smith and Hatton 1993). In contrast to the nature of the preceding four forms of reflection, practitioners who engage in ameliorative reflection, while recognising the broader constraints, for example those embedded within bureaucracy, this form of reflection does not include a vision for transformation. As an alternative, critical reflection has a transformative vision and is grounded within a an integrated vision of the educational institution, the education system, and society broadly. This concurs with the perceptions of other researchers (Schon 1987; Zeichner and Liston 1990).

119) argues in favour of the latter for teacher education:

> What is missing from ameliorative reflection...is a connection between school practice and the interrelated context in which it takes place and which provides a substantial part of its meaning... Critical reflection on the other hand, must begin with a more integrated, synthetic vision of education, one that is of a piece with some social, political and ideological set of commitments...Instead of conceptualising 'education' and 'society' as two distinct entities....we do better to see education and society as coextensive.

Teacher education is crucial to the entire education system. Consequently, an important assumption is that teacher education should be tasked with the development of competent, critical reflective teachers. To further the development of critical reflective teachers, teacher educators need to engage with students (Zeichner and Tabachnick 1991) to make collective meaning of their actions and interactions (Grundy 1987), and to place this into the broader social, political, economic context (Beyer 1991). Thus for the realisation of education for sustainable living, the furthering of critical reflectivity is necessary to redress the changes that are required at meso level, with the attainment of critical praxis as the focal point (see section 3.1.4), since, as Beyer 1991: 120 argues, "a commitment to critical reflectivity... is a commitment to [critical] praxis".

In summary, in the context of the different approaches to the initial education of teachers, the fourth approach (Beyer 1989; 1991), centred within the inquiry-oriented paradigm (Zeichner 1983) is an important paradigm to consider if teachers are to be transformative intellectuals, rather than mere agents of social reproduction (Giroux 1988a; Harris 1994). However, the realisation of this goal is daunting for South Africans, since teacher education is largely driven by a predetermined curriculum which has been shaped and steered by the broader formal socio-economic and political governance structures rooted in positivism and autocratic technicism (Ensor 1995; Freer 1993; Van den Berg 1994).

3.3.2 Teacher education in South Africa: Realities and challenges

In South Africa, teacher education has long been in a crisis of legitimacy, relevance and provision due to an absence of a coherent policy on teacher education (DE 1996a; b; Hofmeyr and Buckland 1992; Hofmeyr et al. - *IPET, TSUD Report* 1994; NEPI 1992a). Although isolated attempts have been initiated to redress this situation, this field remains characterised by separation, fragmentation and dissent (DE 1996b; Hofmeyr et al.- *IPET, TSUD Report* 1994; IPET, CEPD 1994). A brief historical

synopsis of the reasons underlying this state of affairs follows (see also section 3.1.1).

The policy of separate development ensured that teacher education was conducted along racially and ethnically segregated lines (Chisholm 1994; Christie 1991; Nasson 1990; NEPI 1992a). Within these separate systems, teacher education was further split among a number of authorities. It held an uncertain status, as the governance for teacher education was split between those authorities who controlled the schools, and the authorities who controlled tertiary education. This situation was as a result of an Act (No. 731) that was taken in 1969, which placed teacher education within tertiary education, whilst the *White Paper* of 1983 reclassified it as an 'own affair' within the schooling situation (Jaff 1992). This has harmed the status of teaching, and has perpetuated the problem of divided control.

Teacher education for so-called "Whites" was controlled by the former House of Assembly (referred to as ex-HoA) in the former four Provinces (Cape Province, Transvaal, Orange Free State, Natal) in South Africa. Teacher education for all other South Africans was controlled by different departments. These included:

- Department of Education and Culture - House of Representatives (ex-HoR, for so-called 'Coloureds');
- Department of Education and Culture - House of Delegates (ex-HoD, for so-called 'Indians');
- Education Departments for each of the Independent States (Bophuthatswana, Ciskei, Transkei and Venda);
- Education Departments for each of the Self-Governing territories (Qwa-Qwa, Gazankulu, KaNgwane, Kwandebele, KwaZulu and Lebowa); and,
- Department of Education and Training (DET) - for Blacks outside of the Independent and Self-Governing States (NEPI 1992a).

Like all the other aspects of the South African education system, teacher education has been characterised by the lack of a national development plan. The seventeen different ministries[26] (NEPI 1992a), organised and controlled along ethnic lines, were largely responsible for the lack of consensus relating to the number of teachers required, and contributed to the unequal distribution of resources, the unevenness of classroom delivery in terms of quality reflected in dropout rates and matriculation results and tight bureaucratic control. Furthermore, there has been no link between initial and continuous teacher education, with no or very little provision made for the latter (Ballantyne and Aston

[26]Hofmeyr and Buckland (1992: 26) refer to nineteen different Education Departments.

1990; Hofmeyr 1991; NEPI 1992a ; Van den Berg and Meerkotter 1994). These deficiencies in teacher education, which form the crux of the educational crisis in the country, all present great challenges which require urgent attention. However, they need to be addressed by all the stakeholders concerned.

Initial teacher education, in essence, has three major components. These are the academic, the professional and the practice teaching components (Salmon and Woods 1991; Siebörger and Kenyon 1992). These three components are often viewed as three mutually exclusive aspects, which has the effect of perpetuating the separation of theory from practice, thereby even further adding to an already fragmented, theoretical and uncritical discourse. At the colleges of education where students are prepared for teaching at primary school level, the academic component of training has often been associated with secondary school curricula. Consequently, to a great extent, it is irrelevant, and does not address the needs of primary schools. The professional component has been underpinned by fundamental pedagogics, which is employed to further the ideology of Christian Nationalism (Higgs 1994; Nel 1980; Schreuder 1995; Taylor 1993 see section 3.1.1). This factor, has had the effect of rendering initial teacher training completely uncritical in nature; primary educational discourse has consequently been neutralised and depoliticised (NEPI 1992a). The teaching practice component of initial primary teacher education is guided by didactics. Siebörger and Kenyon (1992: 151) assert that:

> Methodology (or didactics, the fundamental pedagogics variant) has often not fitted comfortably into the curriculum. It is neither direct classroom experience, nor a subject to be studied, but ought to be more than simply tips for teachers.

Within the context sketched above, the future teacher education policy for South Africa will have to contend with numerous problems. Significant policy proposals, which include the

- NEPI Reports (1992a; b);
- RDP (ANC 1994);
- *White Paper on Education and Training* (DE 1995);
- Committee for Teacher Education Policy - COTEP (1996); and,
- Department of Education's discussion document, *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development* (DE 1996b),

all stress not only the centrality of teacher education for the complete transformation of the education system, but also the importance of a coherent, national education policy for teacher education.
The *White Paper on Education and Training* (DE 1995) highlights the importance of teacher education thus:

> The Ministry regards teacher education (including the professional education of

trainers and educators) as one of the central pillars of national human resource development strategy...(DE 1995: 29).

The *White Paper on Education and Training* further outlines the move toward uniting the fragmented teacher education system through consultations with Heads of Education Departments Committee (HEDCOM) and with the Committee for Teacher Education Policy (COTEP) as a sub-committee. These two most important recent policy documents for teacher education, the *White Paper on Education and Training* (DE 1995) and the COTEP (1996) document both outline the importance of environmental education, and the need for it to be included on the agenda for teacher education. However, while this White Paper acknowledges the need for environmental education[27], the critique[28] (Parker 1995) levelled against this policy document is of immense importance in terms of its philosophical underpinnings, as they may relate to environmental education. This is reflected in the fact that although the White Paper proposes environmental education as a response to the crisis of sustainability, its agenda for education for sustainable living (see section 3.1.4) is not clarified. Cognisance, however, is taken that the White Paper is a broad education policy document rather than one related to environmental education specifically, and that the COTEP (1996) document may be a more appropriate avenue to discern the position of officialdom on envisaged environmental education practice. The structural and ideological underpinnings of both documents towards a diluted modernism in the progressive and enlightened liberal sense, can, however, scarcely be denied. A brief analysis of the COTEP (1996) document should suffice to shed light on this assertion.

The COTEP (1996) document serves as a guiding document for 'norms, standards and governance' for teacher education at present, but there are certain issues that cloud the functionality of this document. This document professes to set minimum standards for the education of teachers in South Africa, based on what is loosely referred to in the document as a " radical paradigm shift" (ibid: 1). This brings into question where, and how the alleged radical paradigm shift? While a paradigm shift implies a complete transformation in terms of thinking and doing, the COTEP (1996) document falls short, firstly, with regards to consultation, particularly relating to the ex-HoR colleges in the Western Cape. The marginalisation of these colleges is evident in the fact that many of the courses offered at these colleges, specifically the practical specialisation courses, does not form part of this document. This lack of consultation with teacher educators at certain colleges of education has resulted in a situation where no guidelines or support structures were available to teacher educators for the development of new

[27] This is largely ascribed to the endeavours of the EEPI (Clacherty 1994).

[28] Parker (1995) outlines the tensions between democracy and development evident in this policy document, and argues that it is still entrenched in modernist traditions.

curricula for initial teacher education. As a result, the curricula at the different colleges are diverse and incompatible, which, in the light of the closures that colleges are facing, have placed a strain on vertical and horizontal mobility of students between the different institutions. Also, the addenda to this document list a collection of subjects that could be incorporated within the new curricula, but there is no evidence of research that has been done as to the needs of the schools. In fact, many schools are not even aware of the existence of the COTEP (1996) document.

Additionally, the different fields of study enunciated in the COTEP (1996) document requires closer scrutiny. An example in this regard is the introduction of Professional studies (ibid: 48) as a mechanism to ensure that student teachers develop the necessary "professional attitudes". The wide array of proposed disciplines[29] in this field of study, (which include the development of environmental literacy), and the absence of clear directives as to the purpose and practicalities of this field, are ludicrous. It seems that Professional studies has been included as a stop gap to fulfil the requirements of the professional objective, but whether all these facets can be covered in one course (even over three years) is doubtful.

Furthermore, a controversial aspect inherent to this document is the fact that religious education is elevated to a compulsory field of study. Colleges of education who did not make this subject compulsory in their curricula were advised by the Committee that religious education be made compulsory (TLSA 1996d), which is contradictory to the suggestions from the Committee that colleges devise their own curricula. It seems that the old system of CNE has 'wormed' its way back into the new policy of teacher education, orchestrated by the COTEP architects, in cahoots with officials from the former government's apartheid departments to entrench their old ways of thinking within teacher education policy of the 'New South Africa'. This brings into question how officials that implemented apartheid education, and who are still functioning in key role playing positions, can be expected to play a central role in introducing an alternative education - which in certain instances is in direct conflict with their previous ways of thinking and doing. What is questioned here is not whether these officials have the necessary insight to bring about the proposed vision for a transformative education, but more important, do these officials have the will to change?

Regarding environmental education, while it is pleasing that this area is identified as an important

[29] General teaching methods; classroom management; content and teaching methods of subjects related to the particular school phase for which the student is "trained"; teaching media; economic literacy computer literacy and keyboard skills; educational technology; technology education; life and social skills; first aid; and, occupational safety.

component for teacher education curricula, there are problems associated with the philosophical and ideological orientation of environmental education as depicted in this document. The COTEP (1996) document is, in its conceptualisation of environmental education, essentially flawed and ambiguous. While the suggestion is made (in the broad aims) that knowledge about local and global environmental issues needs to be incorporated into the teacher education curriculum (ibid: 8), it outlines that teacher education programmes should enable student teachers to 'develop those values, attitudes and dispositions which advance environmental awareness and a knowledge of ecology and natural systems' (ibid: 12). By focusing on the external, natural environment, it slips insidiously into the apolitical, thereby circumventing a call for the analysis of the structural roots of the environmental crisis. A pedagogy of this ilk cannot infuse a consciousness for sustainable living and social transformation.

In addition, the COTEP (1996) document articulates a behaviourist notion of governance in its subscription to a 'top down' hierarchy of authority and accountability. In this respect, it largely ignores the proposals for more critical and active problem-solving approaches, fundamental to education for sustainable living, as a strategy to confront the environmental crisis (UNESCO 1992a; b; c). This brief overview of some of the fundamental conceptual shortcomings in one of the most influential documents for teacher education in current circulation highlights the need for greater clarity for the teacher educators for environmental education[30]. This is especially important in terms of education for sustainable living.

Notwithstanding the critique, moves are afoot to bring changes to teacher education (DE 1996a; b; c); however, it is vital to work strenuously towards the reconstruction and transformation thereof now, while the reconstruction and development of the country as a whole is being focused on.

3.3.3 Reconstructing teacher education in South Africa

A recent discussion document emanating from the Department of Education, *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development* (DE 1996b: 8), suggests that the reconstruction and development of teacher education need to be "driven by the vision of a flourishing **democracy**, [that is] able to provide quality education and training for all its citizens" [my emphasis]. Also, that teacher education be charged with the development of "committed, competent and **reflective**... professionals" [my emphasis]. However, if teacher education is to be reconstructed in line with the five "core values" that are proposed, which include "democracy, liberty, equality,

[30]This factor forms part of the strategy proposed for this research (see chapter seven).

justice and peace" (ibid: 10), then teacher education programmes need to focus on the creation of the type of teacher education in which prospective teachers become not only committed, competent and reflective, but critically reflective and transformative intellectuals (Giroux 1988a; Harris 1994). Inherent in this vision of teacher education is the belief that schooling represents a struggle for meaning which centres around power relations, a view that is widely endorsed in South Africa (Davidoff et al. 1995; Robinson 1994; Van den Berg 1994), and internationally (Beyer 1991; Burbules 1986; Verma 1993; Zeichner and Tabachnick 1991).

Giroux and McLaren (1986: 108-110) present two arguments regarding the immutable necessity for teacher education to centre around the fundamental concerns of democracy and critical citizenship, the very concerns encompassed in the vision for teacher education proposed by the Department of Education (DE 1996b). The first calls for the development of a critical language[31] to be utilised to reconstruct the relationship between teacher education programmes and the public schools, as well as between public education and society. The second relates to the notion of authority and teacher work. Teacher education programmes that have a high regard for promoting democracy in the schools need to redefine their present relationship with these institutions, an opinion which concurs with many writers (Burbules 1986; Giroux 1984; Giroux and Simon 1984; Giroux and McClaren 1986; Meerkotter and Van den Berg 1994). It is suggested that teacher education institutions need to build into their programmes the transformation of public schools (Beyer 1991; Van den Berg 1994; Verma 1993). The student teachers at these institutions have to develop the abilities to critically examine all practices which currently lead to the perpetuation of the status quo.

In order to rethink the purpose and meaning of teacher education, and to realise the necessary changes at meso level, educators need to discard practices which perpetuate discipline and control in favour of approaches that are based on emancipatory authority (Beyer 1989; Giroux and McClaren 1986). A shift of this nature will permit learners to analyse whatever they are involved with in a critical manner, and direct their alternatives to further the aims and aspirations of a democratic way of life. Inherent in the idea of emancipatory authority is the contestation pertaining to the dominant view of teachers as 'technicians' in tension with the notion to view teachers as transformative intellectuals. The latter position perceives teachers as professionals who are capable of linking teaching and learning to the education of students who will challenge the power relations entrenched within the bureaucratic structures and the nature of the workplace, where teachers and teacher educators operate, and which

[31]To provide teachers with the tools to embark on a critique of the dominant ideology, to enable them to critically analyse the democratic and political shortcomings of schools.

stand in the way of the democratisation of society[32].

The power relations largely contribute to the powerlessness/ disempowerment of teachers and teacher educators. A number of closely linked, interrelated facets underpinning the quality of teachers' (and teacher educators') work that contribute to their disempowerment have been identified. Included are the feminization (Apple 1988), technologizing (Apple and Teitelbaum 1986), deskilling (Tanner and Tanner 1987), intensification Popkewitz and Lindt 1989) and the privatization (Little 1990) of their work (see chapters five and six for further discussion around these points). Power relations also form part of the curricular practices in initial teacher education, reinforced by the traditional separation between lecture-theatre theory and classroom-experience practice. This division needs to be bridged, a view echoed in the sentiments of, for example, Grundy (1987); Hargreaves (1990); Lovat and Smith (1991); Skilbeck (1992).

Fundamental, thus, to the reconstruction of initial teacher education programmes is the ongoing professional development of teachers on the one hand, and the process of school improvement on the other. Referring to the situation in Britain, Hargreaves (1990) lists seven principles, many of which concur with the recommendations for South Africa, (Hofmeyr et al.- *IPET, TSUD Report* 1994; IPET, CEPD Report 1994; NEPI 1992a; the *White Paper on Education and Training* -DE 1995; *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development* -DE 1996b) that may guide the reconstruction of teacher education:

- that a General Teaching Council, responsible for scrutinizing educational standards, and acting as a link between teachers and the government on matters such as educational policy, needs to be established;
- that the levels of qualification for teachers should be reviewed, since the knowledge and skills demanded of teachers has been escalating, and consequently more is expected of teachers, therefore the quality of their initial teacher education has to be improved;
- that initial teacher education should be largely school-based, and that the current practice teaching is not sufficient, thus calling for a narrowing of the gap between theory and practice;
- that there should be a close partnership between practising teachers and the teacher educators, and that the practising teachers should be the principal partners in this association;
- that there should be a national curriculum for initial teacher education, with the standards being protected by bodies such as the general teaching council;

[32]Included here is the pecking-order syndrome. This is where persons in a position of power relative to others, are subject to the power of others, and constantly release their own frustrations and pressures by shifting expectations and constraints further on down on to others 'below' them.

- that there should be a national scheme for the continuing professional development of teachers; and,
- that there should be better, more relevant research and development in education[33].

Focusing on the vital requirements for initial teacher education to develop critical, reflective and creative awareness and understanding regarding the construction of knowledge, Skilbeck (1992: 27) outlines a number of pointers that could contribute to the area of teacher reconstruction, some of which include to:

- develop in the learners critical mindedness, as well as an interest in and an ability for reflective enquiry which could enable the learner to abandon the notion that knowledge is absolute and certain;
- ensure that teacher education focuses on the goals, general procedures and organisation of research. In this regard the teacher educators themselves need to be researchers, engage in the literature, attend seminars and include a research dimension in their courses. This is an area that requires staff development within teacher education;
- realise that learners need to practice, in a planned manner, relevant techniques and procedures of research;
- understand that students need to cultivate an interest to read research literature; and, that
- there ought to be closer collaboration between practitioners and academics.

These recommendations are vital for the reconstruction, development and transformation of teacher education in South Africa[34]. It therefore becomes imperative that any reconstruction of teacher education cannot proceed without prioritising the re-education of the teacher educators themselves via ongoing professional development programmes.

The reconstruction of education in South Africa is at present accompanied by numerous tensions. Amongst others, the teaching profession is faced with huge cuts in the provision of funds, rationalisation and redeployment of teachers, a drastic shortage of schools and a fragmented and inefficient system of teacher education. Nonetheless, any new strategy in education has to incorporate the area of teacher education, since this is one of the central pillars of the education system. This necessitates that urgent strategies which will nurture and strengthen the growth of professional expertise

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[33]See also Skilbeck (1992: 23-31) and Sprague (1992) for the positive effects of greater research on the current low status of the teaching profession.

[34] Some of these are at present receiving attention in committees and forums, at different levels (amongst others, HEDCOM, COTEP, and the Committee for the Accreditation of Teacher Education - CATE). These committees (and others not mentioned) are considering various new directives for teacher education in South Africa.

need to be devised, implemented and monitored (Hofmeyr et al.- *IPET, TSUD Report* 1994; IPET, CEPD 1994). Environmental education is proposed (by the researcher) as a central component in these strategies since it has the potential to function as a focal catalyst for transformation across all areas of the curriculum, and could also reach into the realms of social transformation. The urgency for its central position in teacher education and curriculum reform is underscored by the fact that current social inequalities and injustices can largely be attributed to dysfunctional exploitation of the environment, which has resulted in the present environmental crises.

3.4 MICRO LEVEL CHANGES: REALITIES AND CHALLENGES

Having deliberated on the dimensions of the changes at meso level, the micro level changes, which include the facets that shape the curriculum for education for sustainable living will be explored. In this regard, the section deliberates on:

- A discussion of the rhetoric and reality of the curriculum, which includes the philosophical assumptions that underpin the conceptualisation of the curriculum, in an attempt to arrive at the conceptualisation of the curriculum in terms of inclusivity, an important vision, in terms of redress in South Africa, in section 3.4.1.
    - The inclusion of the conceptualisation of a curriculum (which encompasses the development thereof), should be viewed as a backdrop for setting the scene for the philosophical foundations to realise change at micro level.
- The challenges embedded within the notion of schooling, which are interrelated with the aforementioned, and portrays some of the constraints that underscore the realisation of changes, in section 3.4.2.
    - The inclusion of the notion of schooling, is twofold. While it outlines the broader ideological constraints to change, it is also argued that the impediments concerning schooling should be included in the knowledge base of initial teacher education programmes (Beyer 1991; Verma 1993) to prepare students for their future places of work.

The aforementioned two facets (conceptualisation of the curriculum and the notion of schooling) are included in this section, which deals with micro level changes, but, in effect, these are also intrinsically interlinked within the challenges necessary for change at macro level (ideological dimensions), and for changes at meso level (since it impacts on the pedagogical approaches). This, once again, illustrates the interrelatedness and multidimensional nature of change (see chapter two).

- Some considerations for a framework for education for sustainable living are outlined in section 3.4.3. Included are:
  - approaches to curriculum development and implementation (3.4.3.1);
  - education for sustainable living in the light of the COTEP (1996) document's outcomes-based framework: definition, values and skills (3.4.3.2);
  - approaches that need to be considered for the incorporation of education for sustainable living into the curriculum for initial teacher education (3.4.3.3); and,
  - a synopsis of considerations for a curriculum framework for education for sustainable living (3.4.3.4).

As stated in chapter two, while this section reviews the changes required at micro level, these changes are interrelated to those at macro and meso levels, and, any attempt to bring about change should address all three levels of change.

3.4.1 The curriculum: rhetoric and reality

The curriculum is central to the education process, including the education of teachers. There is general consensus amongst educationalists, critical theorists and researchers that the curriculum is a social product, and that many facets of schooling (see section 3.4.2) contribute to the reproduction of class, gender, religious and racial divisions in society (Beyer 1989; Grundy 1987; Lacy 1987; Pepper 1987; Stenhouse 1975). This occurs through hegemonic ideologies in the curriculum as well as in the hidden curriculum (Christie 1991; Giroux 1988a; Jacklin and Kruss 1995). The hidden curriculum, which is part of the ethos of an educational institution, promotes certain patterns of thought, disposition, and activities without ever overtly teaching them. These inevitably tend to maintain the status quo, by directing the learners to what their roles should be, to what is acceptable and what is not (Ensor 1995). Furthermore, very often what is omitted from the curriculum of the institution reinforces the particular ideological position of that institution (Beyer 1989; Van den Berg 1994). The hidden curriculum is a manifestation of power relations, which are covertly promoted. However, it can (and often does) persist quite forcefully simply through passivity, habit or ignorance of the unintended consequences of the actions of a person. It attempts to mould the values of student teachers and teachers in line with those of the dominant discourse.

Different perspectives cast the curriculum in different moulds regarding its shape, content and purpose, none of which are ideologically or politically neutral. It has been argued that curriculum is as part of the greater social, economic, cultural and political flow of events which alienate the design thereof

from the educator (O'Donoghue and McNaught 1991; Popkewitz 1984; 1987; Robottom 1987a) and that, furthermore, it is closely linked to control and the technical rationality that are not neutral in any way (Robottom 1991). On the issue of neutrality, Beyer (1989: 25) summarises this deception by arguing that

> ...the appearance of neutrality has served to shape the culture of the classroom in ways that belie its political nature, in substituting technical, seemingly neutral measures...for politically and morally sensitive discourse. As a result, the very political purposes served by classroom practice have been veiled in an aura of scientific objectivity, certainty and neutrality. Thus, the culture of the classroom, while serving political interests, has kept these interests hidden as it has covered them with a veneer of neutrality, making it difficult to see the relevance of any but the most technical, ameliorative frames of reference as relevant for teaching.

Many teachers (and teacher educators) viewed the curriculum in the narrow terms of course/syllabus content in South Africa, a view that is supported by King and Van den Berg (1991) and Van den Berg (1994). Internationally (Kemmis and Stake 1988), and also in this country (NEPI 1992a) there has been a shift away from this notion of curriculum as taught content. This shift in the conceptualisation of the curriculum has evolved towards an understanding that includes all aspects of teaching and learning. Stenhouse claims that the meaning of curriculum has evolved as a result of the changes perceived by the curriculum movement; no longer can it be perceived to be a syllabus, which is a simple compilation of the information (content) to be completed by the educator and the learner. It is also not even what in German is referred to as a *Lehrplan*, which embodies a prescription of aims, methods and content (1983: 95). Quoting Johnson (1967), Kemmis and Stake elaborate on this slightly broader perception of a curriculum as

> ...a structured series of intended learning outcomes...[C]urriculum prescribes (or at least anticipates) the results of instruction (1988: 37).

This is how many educators in South Africa perceive the curriculum. In this regard, the syllabus documentation specifies the aims, objectives, content, methods and desired outcomes (NEPI 1992b; King and Van den Berg 1991). These rife approaches are both, nonetheless essentially technicist, referred to by some authors as the Research, Development, Dissemination, Adoption model (RDDA model) where curricula and resource materials are typically developed by 'outside experts'. Popkewitz (1984), Papagiannis et al. (1982) and O'Donoghue and McNaught (1991) argue that these externally controlled initiatives to curriculum development in general (and more so in environmental education) have been characterised by a lack of success on a worldwide scale. One of the factors contributing to

the failure in curriculum development (including environmental education) is the unacceptable division of labour in which teacher educators become separated from the development of the curricula and, in fact, are reduced to mere technicians who have to follow recipes. This is untenable for two reasons: firstly, curriculum development necessitates the active participation of all the stakeholders in the learning process; and secondly, such an approach leads to curriculum reproduction rather than curriculum reconstruction (Van den Berg 1994).

Stenhouse (1975: 4-5) argues for a more encompassing definition of the curriculum, which he perceives as:

> ...an attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice.

This is the perception of the curriculum referred to in the *Curriculum Report* (NEPI 1992b) as the "curriculum-in-use". Kemmis and Stake (1988: 39) assert that Stenhouse's view of curriculum is more encompassing than that of many authors, and that this definition can be employed by most teachers, curriculum developers and school administrators. They argue, however, that despite the broad view of curriculum embodied in Stenhouse's definition, there are movements in curriculum theory that recommend an even wider, more all-encompassing definition that embraces not only curriculum as within the school or within the system, but also includes the external relations of the curriculum to society. This is what is referred to as an 'inclusive curriculum', which includes the hidden curriculum, in that it:

> ...recognises the value-laden nature of schools and society. The focus of an inclusive curriculum is on discovering, questioning and redressing 'exclusionary' practices (QED 1993: 9).

It is argued that a curriculum is inclusive when the following three conditions are embedded in its design, delivery and management:

- acknowledges and places a great value on the position and experiences of diverse social and cultural groups;
- analyses inequalities critically, and counters them; and,
- identifies and strives to eliminate all barriers which frustrate the participation of stakeholders.

This broadening of the consideration of curriculum places under scrutiny the relationship between curriculum and culture on the one hand, and between education and society on the other.

The link between curriculum and culture is understood in the framework of reproduction theory (Giroux 1990; Kemmis and Stake 1988; Lundgren 1983). Giroux (1990) asserts that curriculum theory can be viewed as a focal area which steers knowledge, values and social relations in order to maintain the status quo, thus reproducing specific ways of life. The pivotal implication of this position is that theories of curriculum need to interpret schools as cultural sites in their analysis, and not just simply as sites of instruction (Giroux 1991). In so doing, the social manifestation of culture will come under the microscope, amplifying factors implicit to current social constructions, including, for example the notion that social forms of dominant reality initiate learners into specific modes of thinking and behaviour (Ashenden et al. 1984; Beyer 1989). In addition, a scrutiny of this nature will point to the frequent marginalisation[35] and exclusion from the dominant discourses of the voices, histories and experiences of those, who by virtue of aspects such as ethnicity, socio-economic status, race and gender, are regarded as periphery (Giroux 1991).

To view the curriculum as a discourse as well as an organised structure of social relations signifies specific relations of power (Aronowitz and Giroux 1991). Giroux (1990) gives two examples of curriculum approaches advocated by Rightists. The first example relates to a curriculum which serves in the interest of an industrial psychology that strives to reduce educational institutions and learning to concerns which relate to the economic and corporate world. Defined as the Economic-Reproductive Model of Education (Aronowitz and Giroux 1986: 74-79), this analysis concurs with the view of Lundgren (1983) who believes that curriculum theory mirrors the relationship between production (aspects of the work and the life within a society) and its reproduction as illustrated in schooling and the curriculum. A second example presented by Giroux (1990) relates to the curriculum being developed in the light of Western civilisation, where schools take on explicitly congruent roles designed to furnish learners with the information, language and values necessary to further the goals and traditions of western culture. This position reflects a collapsing of the Cultural-Reproductive and the Hegemonic-State Reproductive Models of education (Aronowitz and Giroux 1986: 79-96) into one.

Critical theorists reject these approaches to the curriculum on the basis of their reductionist interpretation of democracy which fosters the reproduction of current social reality rather than its transformation. As an alternative, Giroux (1990) appeals for the discourse of curriculum theory to incorporate a societal philosophy devoted to the reinstatement of institutions of learning to their original task. He contends that these should become sites of critical education which strive to empower learners

[35]This depicts the immediate past situation in South Africa, largely still the status quo, but which is being redressed in terms of the goals as stipulated in the *White Paper on Education and Training* (DE 1995).

to exert control over their own lives, particularly relating to the production and the accumulation of knowledge. This belief is based on his earlier collaboration with Simon (1984: 142-144; see also Giroux 1990: 49-50) which elaborates on the notion of the curriculum as a language of critique and possibility. There, they argue that if the curriculum is informed by the language of critique, curriculum studies could portray a powerful position within the institution. Here, the partisan nature of human learning and struggle could provide a departure point for coupling knowledge to power and commitment. This would lead to the advancement of forms of community life that seriously consider the notions of liberty, equality and human solidarity. This, however, would require a change in focus away from the traditional uncritical and apolitical views. Curriculum studies would now need to be established around the intention of educating students to provide the direction necessary to struggle for an improved quality of life for all. This would unquestionably link knowledge to power.

As far as the discourse of possibility in curriculum development is concerned, Giroux and Simon (1984) argue that this approach to curriculum discourse seriously considers the social and historical instances that make up the forms and confines of culture. Furthermore, it is informed by all facets pertaining to social life. This, they argue, makes the lives of the learners more meaningful. As a language of possibility, curriculum discourse would be combined with features of self and social empowerment. This would incorporate the striving to generate dynamic forms of community life based on the principles of equality and democracy.

This potential for curriculum is, however, undermined by the facts which reflect current practices:

- the central task of teacher education is to prepare student teachers to teach;
- teaching, however, does not take place in a void, but in the unique settings of schools;
- schools are political institutions in that they function largely within the parameters and confines stipulated by the government (Meerkotter and Van den Berg 1994);
- the functioning of schools, within the confines of what is laid down by the authorities is broadly referred to as the notion of schooling, and is dictated by the socioeconomic and political mainstream (Aronowitz and Giroux 1986; McKay and Romm 1992).

These constraints link the curriculum to the notion of schooling, since the central focus of teacher education is to prepare and equip students for the schools (Beyer 1993; Verma 1993). It is argued that many of the constraints and inequalities portrayed by the notion of schooling should be addressed in teacher education programmes (Freer 1993; Iredale 1993; Van den Berg 1994; Meerkotter and Van den Berg 1994). Verma (1993: 3) illustrates this point:

> Teacher education needs not only to focus on the classroom in terms of the 'mechanics' of teaching and learning, but also on the impact of these on classroom interaction. That impact has important implications for the wider societal processes, especially as far as the reduction of inequalities are concerned. Teachers need to be made aware that the teaching-learning processes are not neutral and are heavily cultural in character. This has important bearing not only on what is learned (and how effectively it is learned), but also on how pupils perceive themselves, their fellow pupils and other people. It is important that we understand more about the cultural messages....

Thus, teacher education programmes need to prepare students for the constraints grounded within the notion of schooling (subsequently discussed), as part of their programmes, in order to address some of the changes at micro level (shaped by the macro and meso dimensions).

3.4.2 The challenges grounded within the notion of schooling

When there is concern about the quality of education, teachers are often referred to as the main agents responsible for both the cause and the resolution of the problems (Angus 1986; Beyer 1989; Brennan 1991). However, by holding teachers responsible for inadequacies that frequently have their origins outside the classroom and the school indicates a misunderstanding of the dynamics of teaching and what is required for more effective school practice (Beyer 1989; Harris 1994; Smyth 1987). Several writers (Angus 1986; Beyer 1989; Giroux 1984; 1990; Lundgren 1991; Meerkotter and Van den Berg 1994) have called for a broader, more contextualised view of schooling and of the cultural dynamics thereof. These writers assert that the ideas, practices and values evident in educational settings are shaped by perspectives that have social, political and ideological frames of reference. A cardinal perspective here is the description of schools as cultural sites[36], a perspective which includes attempts to make schooling more relevant to the experiences of learners with assorted cultural backgrounds.

Schools reflect the disparate cultures that comprise society (Giroux 1984; 1988a; b; 1992; Lundgren 1991; Van den Berg 1994). Schools are thus social sites made up of numerous dominant and subordinate cultures, each characterised by the power they have to define and legitimate. At the micro level of school culture, the school can be viewed as a social institution with its unique norms, anticipations, assumptions, and values, all of which infiltrate the institutional life of the educators, administrators, and the learners (Beyer 1989). A school culture at this level operates on two tiers. Firstly, it includes the official policies and regulations established by the institution relating to matters

[36]The notion of regarding schools as cultural sites is not a recent one in that numerous reforms which occurred during the 1960s and the 1970s considered this aspect to a certain extent (Angus 1986).

such as the formal curriculum, student behaviour and attendance, staff conditions and examinations. Secondly, institutions also create informal culture codes via the hidden curriculum, which include aspects like dress code, particular styles of teaching and learning, ways of thinking and certain habits (Beyer 1989; Christie 1991; Grundy 1987). The school culture in its totality therefore influences the stakeholders' views of what is perceived as normal, acceptable and right.

Due to the fact that culture is one of the principle factors informing educational practice (Aronowitz and Giroux 1991; Beyer 1989; Angus 1986), it impacts on choices relating to what counts as suitable curriculum content, appropriate codes of behaviour of all stakeholders in the learning process and the relationship between these stakeholders and numerous other aspects regarding learning and teaching (Aronowitz and Giroux 1991). That these cultural choices in an educational setting normally place those on the margins[37] of society at a severe disadvantage goes without saying since they do not form part of the dominant patriarchal, middle-class, Anglo-Saxon culture. These are some of the reasons why Huckle (1994) argues that schools are not ideal sites that are susceptible to changes, the very changes that are fundamental for the realisation of education for sustainable living.

This imposition of dominant cultural norms in the educational domain runs counter to the primary purpose of public schooling in which schools should be viewed as democratic public spheres, as democratic sites dedicated to self and social empowerment and transformation. In this light, the practice of schools may be accounted for from a political perspective. This would emphasise the transformative role that schools can play in promoting a democratic society (Giroux and McLaren 1986). In addition, since the concept of authority is central to the discourse of schooling, closely linked to the democratisation of schools is a reconceptualisation of the idea of authority cast in emancipatory terms, in order to assess critical practices in teaching (Burbules 1986; Giroux and McLaren 1986). The authority of the educator should be defined in specific terms, and the benefits and privileges of the position can be warranted only in terms of furthering the interests of those undergoing education. Where authority becomes inflexible and tyrannical, education, in its highest sense, is terminated (Burbules 1986). Authoritarian practices include the legitimation of both a particular curriculum and the social division of labour among teachers. They also serve as a basis for the patriarchal nature of school administration and organisation which is linked to the ethical and political foundation of schooling[38].

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[37]For example, women, children from lower socio-economic backgrounds, and people of colour.

[38]Regarding the gender inequalities in the school context, O'Donnell (1984) argues that even in feminised areas of top level occupations, which includes teaching, the main positions are occupied by males.

In terms of the administration and organisation of schools, the experiences, resources and finances that are necessary for education need to be administered and managed in an appropriate way (Burbules 1986), for example, that it be centred along the lines of the radical change paradigm (Hoyle 1990), that has been suggested to be appropriate for education for sustainable living (see section 2.3). These organizational features can only be justified when they aspire to further the interest of the learner. This is often not the case since entrenched hierarchical structures often lose sight of the educational goals. They become too preoccupied by the power structures in which they are embedded and which they wish to perpetuate. Thus, the role of schools can be viewed as being primarily concerned with the transmission of cultural knowledge, skills and values of those who have the political power in society (Apple 1979; Aronowitz and Giroux 1991). Schooling therefore functions to promote social stability, entrenched within the maintenance paradigm (Hoyle 1990) thereby reproducing current social and economic inequalities. This scenario is achieved and reinforced by the current technical nature of schooling which has been strengthened in the practices presently evident in teacher education (Beyer 1989; Giroux 1988a; Harris 1994; Smyth 1987), and is a significant impediment that requires serious attention, if real change is to be realised.

On the contrary, education for sustainable living in teacher education is concerned with social reconstruction, transformation and justice (Fien 1992; Huckle 1983a; 1991), as well as with ecological and social sustainability. This is in conflict with the dominant notion of schooling. This might be so because education for sustainable living undermines social stability by creating conflict, in that it challenges the interests and value systems of those who are in power. Underpinned by socially critical educational (see section 3.1.2) and eco-socialist environmental ideology (see sections 3.1.3; 3.1.4), education for sustainable living challenges what is perceived to be normal, acceptable and right, by going beyond the obvious, in an attempt to find wider, historical, cultural and social explanations. Furthermore, a central thread inherent to the philosophical underpinnings of education for sustainable living, is the enhancement of critical praxis (see sections 3.1.4; 3.3.1) that endeavours for a theoretically informed practice, to be furthered by critical reflection. Critical reflective practice aspires to empower learners to participate in the democratic transformation of society, rather than to reproduce and perpetuate the status quo inherent in the notion of schooling.

Education for sustainable living has the potential to overcome the impediments inherent within the notion of schooling, which is compounded, in South Africa, by the pervasive influences of CNE and FP (see section 3.1.1). The overtly ideological agenda may provide the learner with some of the insights to unpack the broader ideological assumptions operative within their prospective places of work (the school) and the retrogressive approaches that may retard the realisation of real change. However,

what are the key components that need to be incorporated within a programme for sustainable living for teacher education? This will be subsequently reviewed.

3.4.3 Considerations for a curriculum framework for education for sustainable living

3.4.3.1 Approaches to curriculum development and implementation

While it is prescriptive to suggest what content needs to be included within a teacher education programme for education for sustainable living, cognisance needs to be taken of the guidelines outlined for teacher education programmes, as stipulated in the COTEP (1996) document (which governs the norms and standards for teacher education programmes), and the *White Paper on Education and Training* (DE 1995). These policy documents are neither ideologically oriented towards education for sustainable living nor prescriptive in terms of how to incorporate environmental education into initial teacher education. The term 'prescriptive' here refers to prescription in terms of a collaborative, consultative and participative framework. These oversights are, ironically, their strengths. They leave, by default, the way open to explore the process of incorporating environmental education into the initial teacher education curriculum in an active participatory and collaborative manner by the practitioners and other stakeholders. Unconsciously, therefore, it would seem these policy documents have, in a sense, transcended the 'old ways' of curriculum development and implementation, referred to as the RDDA method (O'Donoghue and McNaught 1991; Robottom 1987a; see section 3.4.1). It is therefore now possible to explore the best possible strategies to incorporate environmental education into the initial teacher education curriculum, taking into consideration the local contexts, relevance and more innovative and critical approaches.

3.4.3.2 Education for sustainable living in the light of the COTEP (1996) document's outcomes-based framework: definition, values and skills

The COTEP (1996) document reflects a shift from a contents-based education, referred to as a "product, in-put"[39] model, to an outcomes-based education, what is referred to as a "process, out-put approach". The conceptual framework of COTEP, in terms of the 'norms and standards' for teacher education co-incides with the outcomes-based approach adopted by the National Qualifications

[39]"Underpinned by the "*Criteria for the Evaluation of South Africa Qualifications for Employment in Education*" that had been drawn up by the Committee of Heads of Education more than twenty years ago.

Framework (NQF)[40]. The latter signals a shift towards an outcomes-based education and training system, underpinned by the principles of equity, access, potability and human resource development (EIC, IEB 1996). Outcomes-based education necessitates the consideration of the formulation of intended outcomes of learning, as a starting point, which is in contrasted to the content-based education of the previous government, where the starting point was the specification of a body of knowledge that was to be learnt.

A summary from documentation from the Department of Education, which includes *An Agenda of Possibilities: National Policy on Teacher Supply, Utilisation and Development. Discussion Document*, DE 1996b; *National Policy on Learning Programmes and Related Matters for General and Further Education and Training*, DE 1996c; *Draft Document Curriculum Framework for General and further Education and Training,* DE 1996a; and the Education Information Centre and Independent Examinations Board (ECI, IEB 1996), illustrates that these outcomes are divided into:

- Essential outcomes, that underpin the learning and teaching process are not restricted to any specific learning context. Informed by the Constitution of South Africa, legislation, the RDP and government policies, the objectives of these outcomes, include to:
  - promote the culture of lifelong learning among all citizens;
  - promote a new ethos and patriotism in the democratic South Africa; and,
  - enable all learners to function sensitively in a multi-cultural and multi-lingual society
- Learning Area outcomes, outline the broad learning outcomes in each of the eight areas of learning. These outcomes are informed by the essential outcomes and, serve as a basis for assessing the progress of learners.
- Specific outcomes, these are context specific, and describes the competence which learners should be able to demonstrate, as a basis for assessing the progress of the learners.

Regarding the position of teacher education, although the South African Qualifications Authority (SAQA) has been established, the NQF has a long way to go before it reaches finalisation (DE 1996a:6). While the COTEP document refers broadly to the roles of both these accrediting bodies - SAQA and the NQF, the general understanding is that finality is yet to be reached regarding the alignment of the COTEP document with the guidelines of the NQF (DE 1996a; COTEP 1996; TLSA

[40]The NQF is a new approach to education and training, through providing a single scaffolding on which all learning standards, levels and qualifications will be registered for national recognition (DE 1996b). The NQF aims to close the gap between education and training, a move that has the support of both the Departments of Education and Labour. The government's policy document, the *White Paper on Education and Training* (DE 1995) outlined the role of the NQF and the South African Qualifications Authority (SAQA). The SAQA Act (Act 58/1995) was passed on the 4 October 1995, and gives SAQA the power to set up and maintain the NQF (EIC; IEB 1996).

1996d). Nevertheless, COTEP (1996) signifies a move towards an outcomes-based education, although the terminology regarding specification of outcomes must still be aligned with that of the NQF. The outcomes are described in terms of two broad categories of competences, the general and the specific competences (COTEP 1996: ii), which concurs with the specific outcomes of the NQF.

The COTEP (1996) document is prescriptive in its outline of the aims, which are described in terms of the knowledge, skills, attitudes and values that students should develop in initial teacher education programmes for teacher education evaluation:

> [T]he categories of knowledge, skills and values are specified in terms of outcomes or competencies. Competence gives expression to the aims of teacher education in the form of discrete units. Competencies are equivalent to behavioural objectives, but are broader and not therefore as easily measured (ibid: 14).

This perception, in which competence takes the form of behavioural objectives, is typical of the behaviourist construct which Norris (1991) argues is the most common construct of competence. Although the COTEP document does outline that knowledge, attitudes, skills and values are interactive[41] and should be seen in a holistic way, its emphasis is placed on behavioural objectives and the assessment of knowledge and skills (linked to behaviour), which indicates that it embraces the behaviourist, rather than the generic or cognitive[42] construct to competence. A framework for education for sustainable living in terms of competencies, does not imply the narrow[43] perception of competencies (as depicted in the COTEP document), but rather the more encompassing perception, as portrayed in the cognitive construct.

- Values

The values dimension in teacher education programmes should not be seen in isolation from the skills and knowledge components. This section outlines the broad area of values that underpins a teacher education programme for education for sustainable living, and will further be deliberated on in section 3.4.3.4. Regarding the recommendations of COTEP (1996: 25-27) on the competences regarding the

[41] This is essentially what the generic construct of competence entails (Norris 1991).

[42] This construct to competence also includes the abilities and potential of the learner, rather than focusing only on the behavioural facets (Norris 1991).

[43] In terms of environmental education, Wilke et al. define an environmental educator in terms of "expected behavioural competencies" (1987: 3). Their competencies embrace the behaviourist construct of competence in environmental education, underpinned by ecological scientific principles, which are far removed from the ideological underpinnings of education for sustainable living.

values dimension[44] of teacher education programmes, the two areas which are outlined include the values related to the schools (where students will be operating in), and the attitudes that students require, in order to promote professionalism. Of significance for environmental education is the recommendation that teacher education programmes should foster in the student, "a concern for the quality of life of all people, and for the quality of the environment" (COTEP 1996: 26), which has been tabled at all the international and national conferences (and documentation). However, education for sustainable living strives to equip students with the insight and skills needed to elucidate their views on environmental issues whilst they become more sensitive to and concerned for a holistically balanced environment. Such an endeavour requires the clarification of the learners' environmental values and attitudes. Values and attitudes[45] are affective constructs, with the former being more stable and enduring than the latter. In environmental values education, the acquisition of appropriate skills for the analysis of values are important. Knapp (1983: 23-26) outlines the following skills as significant:

- the skills of analysing alternative viewpoints environmental on issues;
- recognising the values that underlie them; and,
- evaluating the consequences of alternative viewpoints to environmental problems.

A concern of critical environmental educators on the question of values education is the extent to which the educator should directly teach specific values. Certain environmental educators argue that the teaching of values of a critical environmental ethic should be overt (Fien 1988; 1991; 1992; Huckle 1983b; Maher 1986). Huckle (1983b), argues that social change can only ensue from progressive educational programmes which inform learners about the common roots of disparity and environmental degradation, and which connect a healthy environment to political agendas. The view that educational processes are not neutral, and that actions which occur in the classroom are directly linked to the external economic, political and social order, is supported by researchers such as Apple (1988), Grant and Zeichner (1984), Maher (1988), and Fien (1992). Their clarification of the contending values in environmental issues demands an imperative role for values education as well as for political education (Huckle 1991; Martin 1990) in a critical pedagogy (Huckle 1993) of education for sustainable living. The inclusion of 'core democratic values'[46] (Fien 1992) in environmental education programmes is

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[44] Values, attitudes and dispositions are grouped together (COTEP 1996: 25).

[45] Rokeach (1973) describes a value as an enduring belief in a specific mode of conduct or desired state of existence which is more preferable than others. Knapp (1983: 22) defines a value as a standard that guides and determines personal behaviour, and he argues that attitudes, which stem from values, guide our actions and decisions for situations arising in our daily lives and are value expressive for specific situations.

[46] Underpinned by the interaction and interdependence of people-nature relationships for ecological sustainability, and the people-people interactions to foster social justice (Fien 1992).

directed towards the development of a strong and enduring critical environmental ethic for sustainable living.

- Skills

The area of skill development in teacher education programmes should not be seen in isolation from the knowledge (and values) component, therefore this section outlines the broad areas of skill development that require attention, and will further be deliberated on in section 3.4.3.4.

COTEP (1996: 17-23) identifies four broad groupings of skills that students need to develop in their teacher education programmes. Included are:

- communicative skills (which are vital in a country with eleven official languages);
- methodological skills (which include those related to teaching and learning);
- classroom management skills; and;
- the skills related to assessment procedures.

The emphasis on methodological and classroom management skills (COTEP 1996: 19-23) clearly depicts the technicist nature of the vision of COTEP for teacher education programmes, with elements that pertain to the mastery of distinct behaviours and skills , centred within the personalistic paradigm (Zeichner 1983) clearly portrayed. Alternatively, the Environmental Education Research Project (see section 3.2.2) calls for the development of:

- critical thinking;
- problem-solving;
- evaluation;
- value positions clarification; and,
- action and advocacy skills.

These, however, are more in line (and focused) with the skills that students need to develop in an education for sustainable living programme, underpinned by eco-socialist environmental ideology and an socially critical educational orientation (Fien 1992). As an example, critical thinking and problem-solving skills may advance, on the one level, a critical environmental consciousness, and political literacy, while on the other, these are central to further critical praxis.

3.4.3.3 Approaches that need to be considered for the incorporation of education for sustainable living into the curriculum for initial teacher education

More than one approach needs to be considered for incorporating environmental education into initial

teacher education, which, ultimately, should be decided on by the particular institution in relation to what is best suited for its specific needs. Consequently, the four possible ways of incorporating education for sustainable living into initial teacher education level, adapted from the 'organisational approaches'[47] (UNESCO 1993) are considered as a foundation to provide cohesion to the prescriptions outlined in the COTEP (1996) document for initial teacher education in South Africa. These are:

- To incorporate education for sustainable living[48] as a major subject, dealing with both environmental studies content and environmental education components.
- Identify one or more major subjects that deal with both environmental studies and environmental education in an integrated manner.
- A major environmental studies[49] subject dealing with the content, and then infusing the environmental education competencies into the professional studies and education courses.
- Infusing environmental education into the courses outlined in the COTEP (1996) document that cannot be included with environmental education, with the environmental education competencies being dealt with in the education and professional studies components.

Implicit in the fourth option, however, is for environmental education to be integrated into the education[50] and professional studies[51] courses where the pedagogical approaches of environmental education could be addressed, while the other subject areas could include principles of environmental education. Regardless of which approach is adopted, the successful implementation and practice of environmental education in initial teacher education will also depend on an efficient evaluation system.

When viewing the specific outcomes/ competencies encompassed within a framework for education for sustainable living, evaluation in teacher education programmes should not be overlooked, and ought

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[47] The UNESCO Asia-Pacific Regional Experts' meeting on overcoming the barriers to environmental education through teacher education at Griffith University Australia 5-9 July 1993 examined four possible ways of incorporating education for sustainable living into the curriculum for initial teacher education.

[48] Referred to in the COTEP (1996) document as environmental education.

[49] Referred to as environmental education (ibid).

[50] Education is offered as a subject, and is compulsory for all student teachers in the present curriculum for teacher education. The COTEP (1996) document outlines a few changes regarding the content and the weighting, in terms of credits, for future teacher education programmes.

[51] This is a new area that is proposed in the COTEP (1996) document, and it appears that it is to replace the didactics component of the present teacher education programmes, as well as other areas like environmental and economic literacy. The potential worth of this new area is undermined in that too many aspects of the teacher education programme that cannot be covered elsewhere are included in this course (see section 3.3.2).

to be perceived broadly. A variety of techniques needs to be employed on a continuous and ongoing manner. Furthermore, these need to be empowering in the manner in which they facilitate the professional self-development of the practitioners. An evaluation structure of this type demands that the technicist systems of the past, which included 'inspection' in the form of tests, observation and assignments, be abandoned. Instead, action-based projects, interviews and critical self reflective strategies need to be considered. In short, a more process-oriented evaluation strategy is proposed.

3.4.3.4 A synopsis of considerations for a curriculum framework for education for sustainable living

Drawing from the literature, there are fundamental proficiencies (Huckle 1995; NIER 1993; QBTR 1993; UNESCO 1993; UNESCO-ACEID 1993) which will further the attainment of a democratic and just society, that student teachers need to develop during their initial teacher education courses. Also important is the incorporation of students' (as well as local schools' and other stakeholders') voices in the curriculum development (acting, and evaluation included) process. Furthermore, student teachers must be afforded the opportunity to gain practical teaching experience in the area of environmental education[52] to increase the potential for incorporating environmental education into the curriculum for initial teacher education. Notwithstanding the value of these suggestions (NIER 1993; QBTR 1993; UNESCO 1993), the proviso is that teacher educators need to be competent to bring these into fruition.

Education for sustainable living aims to make all teachers aware of their involvement in, and consequent responsibility for, living a sustainable life (Huckle 1995; UNESCO 1993). This overall goal should further the development of a critical environmental consciousness, critical thinking and problem-solving skills, a critical eco-socialist environmental ethic, political literacy and critical praxis in the learner (Fien 1992; Huckle 1995). However, to realise this, Huckle (based on the work of Sterling 1992 in Huckle 1995) identifies the following interrelated goals for education for sustainable living:

- to enable people to understand the interdependence and interrelatedness of life on earth, and what the consequences of their actions are on the total environment, from local to global;
- further to the understanding of all facets (social, political, economical, cultural, technological) that may inhibit sustainable development; and,
- to integrate environmental and economic decision-making (1995: 24).

These goals, underpinned by ecosocialist environmental ideology and socially critical education

[52] That practice teaching is neglected in the curriculum for initial teacher education (Siebörger and Kenyon 1992) was also established for the situation applicable to environmental education in this research.

orientation (Fien 1992, Huckle 1993), inform the framework for a curriculum for education for sustainable living in initial teacher education, which is summarised in **Table 3.1**. Included are:

- ecological principles, which include various ecological concepts, to enable learners to understand the environmental crisis, and acquire the necessary skills to solve it;
- interrelationships and interdependence between people and the natural world;
- a variety of local and global environmental issues,
- social environmental issues;
- how the social, economic and political systems impact on the environment, and that the roots of these problems are centred within these systems; and,
- political literacy, for example, distribution and redistribution, power and decision making.

Also included within the framework is for students to:

- develop an environmental ethic to enhance ecological sustainability and social justice;
- develop skills for critical thinking, inquiry, evaluation and problem-solving;
- become competent in outdoor education and fieldwork;
- develop personal qualities, for example, positive attitudes towards conservation; and,
- be afforded the opportunities to engage with these during practice teaching.

A summary of education for sustainable living, (**Table 3.1**) synthesised from the literature (Fien 1992; Huckle 1993; 1995; NIER 1993; QBTR 1993; Tilbury 1993; UNESCO 1993), outlines the perceptions of what needs to be included within a framework for education for sustainable living in teacher education encompasses:

- Environmental studies competencies/ outcomes which cover
  - ecological foundations;
  - social foundations;
  - environmental investigation and evaluative skills; and,
  - environmental action skills.
- Professional competencies/ outcomes.
- The development of personal qualities.

In terms of initial teacher education programmes, it is also recommended that students are afforded the necessary experience to reflect the objectives and guiding principles of education for sustainable living

Table 3.1 Suggested framework for Education for Sustainable Living for initial teacher education

AREAS THAT MIGHT BE CONSIDERED FOR A CURRICULUM FRAMEWORK FOR EDUCATION FOR SUSTAINABLE LIVING	
ENVIRONMENTAL STUDIES COMPETENCIES/ OUTCOMES	**Ecological Foundations**: The environmental educator needs to grasp and develop insight into the major concepts and principles of ecology as a basis for developing similar outcomes in students. Included are the necessary knowledge and skills to: • apply a knowledge of ecological concepts and principles, in order to identify the major ecological principles that underpin environmental issues, when these issues are analysed, • apply a knowledge of ecological concepts and principles to predict the ecological consequences encompassed in alternative solutions to environmental problems, • identify, select and interpret appropriate sources of information, in ongoing attempts to investigate, evaluate and find solutions for environmental problems.
	Social Ecology Foundations: The environmental educator should be able to understand the principles and concepts that underpin social ecology, with the view of developing corresponding outcomes in the students. Included are the knowledge and skills that are needed to: • understand fully that people cannot be separated from the natural world, the concept of interdependence, • grasp how the natural resources are used in the different social and economic systems which portray the variety of environments, • gain the necessary insight into the impact of unsustainable human actions, from individual, community and corporate dimensions, • explain sustainable practices, (indigenous farming) in contrast to modern unsustainable lifestyles and land use, • analyse local to global environmental issues, and deliberate on the ecological and social implications of these, • recognise that social and environmental impact assessment are necessary if sound decision-making for the environment is to be realised, • identify the value assumptions behind sustainable growth and sustainable development, and recognise and justify which principles underpin sustainable living, • distinguish alternative solutions for remediating environmental issues, and debate the ecological and social implications of these, • deliberate on the socio-economic and political structures that underpin environmental decision making, • recognise the need for responsible citizenship action to address the environmental crisis.
PROFESSIONAL COMPETENCIES/ OUTCOMES	**Environmental Investigation and Evaluation Skills**: The environmental educator must have the ability to monitor the quality of the environment, investigate environmental issues, and evaluate alternative solutions in order to develop, select and incorporate curricular strategies and materials in their practice. These competencies need to be developed in the students, and include: • the particular skills and knowledge that is needed to identify environmental issues, and to investigate these, • the skills to access data from a variety of sources, and via the employment of different techniques (interviews, surveys, etc.) to enable the learner to monitor different aspects depicting environmental quality • the competence to analyse environmental issues, and the related value positions regarding the ecological and social implications, • the competence to recognise alternative solutions for environmental issues, the ecological and social impacts of these solutions, and to recognise and analyse the value positions underlying these solutions, • the ability of the learner to clarify their value and attitudinal positions on a particular environmental issue, their proposed solutions, • the ability to clarify, evaluate and change their positions when new information is obtained.
	Environmental Action Skills: To improve and protect environmental quality (and quality of life) the environmental educator needs to show the willingness and competence to take positive action for the environment, which students need to develop as well. The proposed strategy to embark on is action research, which includes the competencies to: • evaluate and decide on a suitable form of action (after the problem has been identified → investigated→ the data of the investigation has been evaluated→ possible actions have been listed→ and the outcomes of these actions have been predicted, • develop and implement action plans and strategies, • evaluate the effects of action and the role and participation of the learner in the action.
	The environmental educator should be able to: • employ education philosophy knowledge in curriculum development programmes and strategies, materials development programmes and strategies, in order to realise the goals of education for sustainability, • utilise current theories of learning, thinking, moral reasoning, knowledge-attitude-action relationship and political socialisation in the selection, development and implementation of curricular strategies, to realise the goals of education for sustainability, • apply the theory of transfer of learning in the selection, development and implementation strategies in curricular materials and strategies, to ensure that the acquired knowledge, attitudes and skills are encompassed in the learners' decision making and lifestyles and actions, • incorporate a variety of teaching strategies to attain the pedagogical approaches underpinned by socially critical education philosophy, in order to realise the goals of education for sustainability, for example, • interdisciplinary approaches, outdoor education and fieldwork, critical thinking and inquiry based learning, values education, games and simulations, case-study approaches, action research as a strategy for active problem solving, community and indigenous-based learning, handling of controversial issues, local issue-based learning.
PERSONAL QUALITIES	The environmental educator should develop the following personal qualities: • belief in, and the commitment to the principles of sustainable living, and the role of education in achieving these, • willingness to work collaboratively, • openness to consider alternative viewpoints, and the willingness to engage in these, • sensitivity to cultural diversity, • respect and tolerance of the views of others, • foster a care for, and a commitment to improve environmental quality, • preparedness to become personally involved, and the willingness to participate in environmental reconstruction.

Adapted by the researcher form Huckle (1995); Tilbury (1993); UNESCO (1993); QBTR (1993)

in practice teaching situations (NIER 1993; QBTR 1993; UNESCO 1993). Students therefore need to prepare lessons and teaching activities to gain the necessary experience to engage in the socially critical pedagogy of education for sustainable living. Huckle summarises these in terms of:

- active and experiential learning;
- furthering critical[53] thinking in the pupils;
- engendering a sense of power in the pupils to shape their own lives and the environment in which they live;
- furthering values education in a critical sense;
- developing the skills in pupils to critique the dominant ideology identify democratic alternatives; and,
- developing political literacy in pupils to reflect and act on environmental issues to further the democratisation of society (1995: 18).

However, this brings into question the feasibility of this framework, given that education is not value free, and that educational institutions, generally, function to reproduce the norms and values of those who are in power (see sections 3.1.1; 3.4.2). Broadly, the feasibility of education for sustainable living lies partly in the acknowledgement that the political-economy and social functioning of Western education is in conflict with the goals of education for sustainable living. With regards to the former, South African education is, to a large extent, dictated by the West, considering the central role of the IMF and World Bank (see section 3.1.4). This view concurs with that of the TLSA (1996 b: 2). It is claimed (TLSA 1996c: 3) that the IMF and WB are international business undertakings who lend money, with certain pre-conditions. For South Africa, the latter includes:

> [A] reduction of government expenditure on health, education, housing, and other social services, [and] an emphasis on vocational training so that education has a direct input into the economy. In this way the IMF and the WB have been the main instruments by which the imperialist countries have forced the other countries of the world to open their markets and to engage in trade, greatly to the advantage of the former. The package also frequently contains exchange rate adjustments which increase the advantage to the imperialist countries and accelerate the flow of wealth to them from the already impoverished third world countries.

While acknowledging that issues like these are in conflict with the goals of education for sustainable living, it may be possible critically to interrogate such issues, thereby advancing the development of skills to critique the dominant ideology, to reflect, and possibly to identify democratic alternatives.

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[53] Critical thinking in both the logical and emancipatory sense.

However, actively to address issues like these is daunting; which illustrates that education for sustainable living is not an easy task (see also section 3.1.4). Similarly, the bureaucratic functioning of educational institutions is in conflict with the the fundamentals of democracy and social justice, that education for sustainable living necessitates. In short, education for sustainable living proposes an alternative approach (conceptualisation, development and interaction) to the curriculum (see section 3.4.1), contrary to the whole notion of schooling (see section 3.4.2) which might be intimidating and rather difficult for many educators.

Furthermore, the feasibility of education for sustainable living within initial teacher education programmes is subjected to the participation and commitment of all the staff (teaching and non-teaching) and students at an institution. In this regard, the institution also needs to 'mirror' an ethic of sustainability in its functioning, i.e. there ought to be an environmental audit on issues like energy consumption, inappropriate technology, waste production and recycling. This implies that a concerted effort might be necessary to change towards an 'environmentally friendly' institution, beyond self interest, which, once again, is not an easy task since it might impact on the budget of the institution. In South Africa 'environmental-friendly products' are far more costly. This is linked to the wider aspects of economic markets and consumerism, which might be perceived to be too difficult to tackle.

Nevertheless, the successful incorporation of practice teaching into education for sustainable living will depend on the formal incorporation of environmental education into the schools. It was estimated that environmental education will become part of the formal school curricula in the next five years (Botha 1995: personal communication). However, with regard to the eight[54] areas of learning that have been proposed for general education and training in the *Draft Document Curriculum Framework for General and further Education and Training* (DE 1996a); and the subsequent *National Policy on Learning Programmes and Related Matters for General and Further Education and Training* (DE 1996b) environmental education has been excluded. It is, however, possible to incorporate education for sustainable living into each of these areas, provided that the eight Learning Area Committees (LACs)[55] include it as an area of focus for teachers. If not, the danger exists that environmental education is very likely that it will be marginalised and left to the natural sciences to pursue. Nevertheless, formal policy to secure environmental education onto the agenda for formal education is yet to materialise, and, until

[54]Communication, Literacy, Language Learning; Human and Social Science; Technology; Numeracy and Mathematics; Physical and Natural Sciences; Culture, Arts and Artistic Crafts; Economic and Management Sciences; and Life Orientation.

[55]The LACs have been established with the view to identify a number of focuses in each of the eight proposed areas of learning (DE 1996c).

it does, it remains a major obstacle in terms of furthering the aims of education for sustainable living in teacher education.

In the preceding sections (3.1-3.4) an attempt has been made to demonstrate that education for sustainable living demands a reconstruction of current teacher education. An argument has been forwarded that this reconstruction is underpinned by the necessity for the realisation of changes at macro, meso and micro levels in order to secure, and to sustain, an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education. However, in order to reconstruct, some insight is needed on what has to be reconstructed. Central are the assumptions that underlies this research (see section 1.6) which argue that teacher education is a vital area for the development of a strong and enduring critical environmental ethic for sustainable living, that is necessary to address the environmental crisis. Therefore, it is necessary to review the current status of environmental education within teacher education internationally (3.5.1) and nationally (3.5.2), and more specifically, environmental education within initial teacher education to bring into focus the status quo, of what lies at the core of the thesis. The various aspects and factors of significance to these parameters are consequently discussed in a review of this terrain, which follows.

3.5 ENVIRONMENTAL EDUCATION IN TEACHER EDUCATION

3.5.1 International situation

- International recognition of the importance of environmental education in teacher education

The international recognition of the need for environmental education in teacher education dates back to the early 1970s, and has evolved within the broader environmental education movement. The earliest recorded concern on an international level was expressed at the European International Union for the Conservation of Nature and Natural Resources (IUCN) 'Environmental Education' Conference on environmental education in Switzerland in 1971, where many countries highlighted the value of teacher education in environmental education (Tilbury 1992; Williams 1985). At this conference it was recommended that prospective teachers should be equipped with the necessary expertise to implement environmental education successfully at their schools. This urgent need for environmental education in teacher education was declared in the Belgrade Charter in 1975 (UNEP 1976a). Here, teachers were identified as important agencies for environmental education, and the need for teacher education

programmes to be advanced was emphasised.

The Tbilisi Declaration of 1977 (UNESCO 1977a; b; 1978a; b) also emphasised the importance of environmental education in teacher education. This was the most important landmark to highlight the need for teacher education in environmental education at international level (Wilke et al. 1987). Other international conferences that accentuated the need for environmental education in teacher education include the International Congress on Environmental Education and Training held in Moscow in 1987 (UNESCO 1988), the Bergen Conference in 1990, and the Earth Summit 1992 (UNESCO 1992a; b). The Earth Summit, Agenda 21 recommended that:

> Educational authorities, with the appropriate assistance from community groups or NGOs are recommended to assist or set up pre-service and in-service training programmes for all teachers...(UNESCO 1992a Ch. 36: 4).

In addition, on a global scale, several writers (Selim 1977; Wilke 1985; Robottom 1987b; c; Stone 1990; Fien 1991; Spork 1992) stressed the importance of environmental education in teacher education by declaring that the future well-being of the environment may be dependent on effective environmental education curricula for prospective teachers. Despite this widely acknowledged need for environmental education to become part of the agenda of teacher education, this situation remains at an unsatisfactory level (NIER 1993).

- Environmental education within initial teacher education: The international scene

Environmental education in initial teacher education remains at an unsatisfactory level, despite the escalation in recognising its vital role internationally (NIER 1993; Tilbury 1992; UNESCO 1993; UNESCO ACEID 1994; Williams 1988). As far back as 1977, Selim noted that environmental education within initial teacher education was inadequate. A review of the terrain reveals this is still very much the situation today, in spite of the same sentiments having been expressed continuously throughout the past seventeen years since the Tbilisi Intergovernmental Conference (Fien 1990; Peyton and Hungerford, 1980; Stapp et al. 1980; Williams 1985; 1988; Mishra et al. 1985; Simpson et al. 1988; Hart 1990a; Tilbury 1992). The reasons for this inadequacy are numerous.

In conjunction with the impediments at macro level (see sections 3.1; 3.2), in the first instance, there is the factor of inconsistency. Where environmental education is offered, it varies enormously, not only between various countries but also inter-institutionally at a local level as well (Ballantyne and Aston 1990; NIER 1993; Wilke et al. 1987; Williams 1988; Peyton and Hungerford 1980). Then there is the

problem of linkage. One of the fallacies that is evident in many countries is that environmental education is linked to science education (Robottom 1991) or to science and geography (Williams, 1988). Similarly, Wilke et al. (1987) write about countries like Columbia, Thailand, Russia and Bulgaria, where environmental education courses in initial teacher education are compulsory for student teachers, but that these courses are conservation related and therefore inadequate. Delivery and mode of presentation (impediment at meso level- see section 3.3) is yet a further obstacle to the implementation of efficient environmentally oriented teacher education. In 1980 Stapp et al. conducted a survey in some European countries (Sweden, Norway, France, Bulgaria) pertaining to environmental education in initial teacher education and found that the emphasis was largely on the transmission of knowledge via the one-way lecturer-dominated approach. This was complicated in programmes at senior primary level where abstract, academic environmental knowledge was the focal point. The research carried out by Williams (1988), which shows that the natural sciences remained the focal point for environmental education[56] in initial teacher education, reinforces the general inadequacy of this central aspect of teacher education. The general situation at universities as far as environmental education in initial teacher education is concerned does little to enhance this dismal trend (NIER 1993; Williams 1988)[57].

However, a glimmer of optimism does exist at a few institutions. At Deakin University in Australia, for example, at B.Ed (Bachelor of Education) level, environmental education takes the shape and direction of socially critical education, and consequently emphasises social and critically reflective processes[58]. Teacher education at Griffith University in Brisbane in Australia has a similar orientation (Fien 1992; Richmond 1992: personal communication). The environmental education course offered in the education faculty of Kenyatta University in Kenya is another example. Korir-Koech (1988) describes the course as having a strong holistic emphasis, and points out that it enjoys strong support from a specially created Centre for Environmental Education which caters for the needs of student

[56]These findings ratify the earlier findings of (UNESCO 1977a; Stapp et al. 1980)

[57]Although there are quite a few universities where environmental education courses are offered at undergraduate level, e.g. Ohio's Miami University (Thomas 1980 in Ballantyne and Aston 1990); Ohio State University and University of South Maine (Williams 1988), in the United Kingdom, and in Queensland Australia (QBTR 1993), the general provision is inadequate and unsatisfactory. The National Institute for Educational Research, Japan (NIER 1993) organised a regional seminar on environmental education and teacher education in Asia and the Pacific (20 October to 5 November 1993), attended by twenty-five participants from thirteen countries. Although examples of sound environmental education practice were reported, the lack of adequate environmental education in initial teacher education (and in-service) was listed as one of the shortcomings (NIER 1993: 4), revealing a lack of research in this vital area.

[58]An evolution of the course is outlined by Markowitz and Robottom (1987: 9-14).

teachers.

3.5.2 South African situation

The need for environmental education in teacher education has also been expressed on a continuous basis in South Africa (EEPI 1994; Hurry 1982; Irwin 1988; 1993; Leketi 1992; Loubser 1991; Richards 1985; Shongwe 1992a; Wagiet 1996). What is interesting about the South African situation is that a Teacher Education International Conference at Mooi River in Howick Natal in 1982 paved the way for the establishment of Environmental Education Association of Southern Africa (EEASA). It is not difficult to read into this shift a realisation that environmental education should constitute the central underpinning of teacher education. Successive EEASA conferences and workshops at both national and regional level have reaffirmed the pivotal role of environmental education in teacher education (Irwin 1994: personal communication).

Of significance in this connection is the *White Paper on Environmental Education* (DEA 1989 see section 3.2.2 for critique on this document) which stated, as a general aim, that environmental education will be 'promoted, encouraged and supported' in an active way in formal, non-formal and informal education (DEA 1989: 6-7). In terms of teacher education, it proposed that there was a definite need to incorporate environmental education at both pre-service as well as in-service levels for teachers (DEA 1989: 7). Pertaining to environmental education within initial teacher education, the *White Paper* proposed that:

- all student teachers need to be made aware of the aims, principles and methodology of environmental education;
- specialised programmes on environmental education need to be included in teacher preparation programmes; and,
- skills and techniques necessary for environmental education outside the classroom ought to be emphasised in teacher preparation programmes.

With regard to in-service environmental education, the *White Paper* proposed that:

- there is a definite need for practising teachers to focus on environmental education, and that such programmes needed to be developed through seminars and workshops; and,
- experienced teachers need to be co-opted at environmental education centres to review its uses, and also to engage in resource development in this field.

The need for adequate provision of environmental education within teacher education cannot be

overemphasised, as the current provision for environmental education, despite the sound proposals in the (DEA 1989), is negligible. After the *White Paper on Environmental Education*, there have been no further formal policy initiatives.

However, significant recent initiatives in this field include that environmental education in teacher education was addressed as part of the Environmental Education Policy Initiative (EEPI 1994), which has evolved into the Environmental Education Curriculum Initiative (EECI 1996), and has been workshopped at regional and national levels. The EECI, in essence, has been established to further the goals of the EEPI from policy, to curriculum development level (EECI, EEASA, DEA&T 1996). At the National EEPI Workshop in 1993 certain recommendations pertaining to the area of teacher education were accepted. These recommendations included the areas of initial and continuing teacher education for environmental education. Regarding environmental education within initial teacher education, certain guidelines were proposed, including that environmental education ought to become a compulsory component of all teacher education and that it should be part of all National Curriculum Policy documents. Specific recommendations (in addition to these mentioned for initial teacher education) have also been made for environmental education for continuing education. Included here were the recommendations that there should be partnerships between the Department of Education, colleges, NGOs and all other interested parties for in-service training in environmental education, and that staff and financial resources should be made available for the development of materials and programmes in a consultative manner.

These recommendations are in line with international proposals to further the aims and objectives of education for sustainable living (NIER 1993; UNESCO 1993; UNESCO ACEID 1994). However, resembling the international situation, despite the continuous declaration of the need for, and the commitment to environmental education, teacher education in South Africa appears to be far from satisfactory (Lotz 1995; O'Donoghue 1993a). Thus, despite the fact that the *White Paper on Education and Training* (DE 1995) acknowledges the importance of environmental education within teacher education, a concerted effort is needed to secure a policy[59] that environmental education (as proposed by the EEPI process) permeates the agenda of teacher education. Such an opportunity seemed to be within reach, considering the Department of Education's Proposed Environmental Education Research Project that was envisaged for 1996 , but , which is unfortunately on hold at present (EECI 1996).

[59]Thereby addressing one of the challenges that underpins change at macro level.

- Environmental education in Initial teacher education in South Africa

A scrutiny of environmental education in initial teacher education in South Africa illustrates a situation which is in perpetual flux. Sometimes, for certain reasons, courses in environmental education are discontinued after a short stint[60]. These may include the loss of key personnel, (due to rationalisation by the education departments) the lack of support, funding, resources and expertise. The limitation pertaining to informative documentation (or a data base) regarding initiatives in environmentally-based teacher education has been a further drawback[61]. The fragmentation of teacher education under the previous government (see section 3.3.2), the lack of an official policy for teacher education broadly, and more specifically, for environmental education, contributed to the exclusion of this area for many teachers.

Despite problems of cohesion, co-ordination, continuity and lack of policy, environmental education courses at initial teacher education level are offered at some colleges of education and universities in South Africa (Ballantyne and Aston 1990). These[62] include the environmental education programmes at some of the colleges in the former- Bophuthatswana (now North-West Province), at Edgewood College of Education (in KwaZulu-Natal), at Cape Town College of Education (in the Western Cape Province), and at Rhodes University (Grahamstown- in the Eastern Cape Province) and the universities of Cape Town and Stellenbosch (Western Cape Province).

In addition to the courses listed above, this research project established that a few other environmental education course initiatives do exist, or are in the process of materialising. These include, for example, the initiatives at Boland College of Education and the University of South Africa (UNISA).

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[60]Due to the failure of such an initiative at the institution where the researcher works, this research project was initiated (see section 1.6).

[61]Since 1991, however, SHARE-NET, an informal collaborative structure through which individuals, projects and agencies can both contribute to and benefit from current environmental education resource development activities in Southern Africa, has published address list booklets. These contain lists of projects, special interests, names and addresses of convenors involved in any environmentally-related activities. Recently, Ferreira and Janse Van Rensburg (1995) also compiled a very useful booklet which, it is hoped, will strengthen the data base of environmental education initiatives and practices.

[62]These are aspects that have been investigated in this research study. Nightingale (1987) commented on the environmental education elective as a component of the fourth year course in geography for senior primary student teachers at Edgewood College of Education. Subsequently, as was found during this research, environmental education has also been included in the biology course at Edgewood College of Education. An overview relating to environmental education in initial teacher education at the colleges in the former Bophuthatswana (now North-West Province) is given by Irwin (1987a; b; 1993), Shongwe (1992a; b) and by Leketi (1992).

Furthermore, the Natal College for Further Education submitted a proposal for a diploma course in environmental education for 1995, and a Bachelor of Education (B.Ed.) course module is also currently being considered at the University of Natal, Pietermaritzburg. Notwithstanding that these courses in environmental education have been implemented, in spite of a lack of formal policy and all the other barriers mentioned, the extent to which these courses might have a positive influence in schools is largely unknown (Shongwe 1992a; b), which highlights the need for further research into environmental education in teacher education in South Africa[63].

Viewing the current state of affairs regarding the relationship between teacher education and environmental education, the task of initiating environmental education in a curriculum for teacher education becomes problematic for teacher educators in the absence of widespread research. The lack of guidance from research, compounded by a shortage of resources, fails to inform the lecturers, consequently exacerbating the retardation of the implementation process. This situation calls for urgent research into the whole area of environmental education within teacher education, including policy and practice, and for the formulation of guidelines to facilitate the implementation of environmental education in teacher education institutions.

This need, however, raises the question as to what constitutes 'effective' environmental education. While neither a universal answer nor a quick fix recipe exists, this research argues for environmental education, in the light of education for sustainable living, underpinned by socially critical educational, and eco-socialist environmental ideology (Fien 1992; Huckle 1993). This is not an easy task, since it proposes a vision that is in conflict with the dominant paradigm. Thus, for education for sustainable living to become a reality, educators need to address the challenges to realise the changes at macro, meso and micro levels. At each level of change several impediments in the way of change have been identified. These are subsequently summarised.

3.6 ENVIRONMENTAL EDUCATION: IDENTIFYING THE BARRIERS TO CHANGE

From the discussions in previous sections, an argument that education for sustainable living poses profound challenges (see sections 1.2.2.1; 1.3.3), which may function as constraints (3.1.1; 3.3.2; 3.4.1; 3.4.2) to the implementation of environmental education practices has been put forward. These

[63]Outside of the work of Hurry (1982), Clacherty (1988), Ballantyne and Aston (1990), Leketi (1992) and Shongwe (1992), Wagiet (1996), and research projects currently in progress at Stellenbosch University and the University of Durban Westville, little else exists.

constraints may be perceived to be reinforced and multiplied due to the tensions that arise between the socially critical direction of education for sustainable living (see section 3.1.2), and the role that education plays as a medium for economic and cultural reproduction (see sections 3.4.1; 3.4.2). As a consequence, these constraints may pose significant problems in terms of the philosophical underpinnings and classroom practices for teachers and teacher educators involved in environmental education. These impediments, in the way of realising education for sustainable living, have been discussed in terms of the changes at macro, meso and micro levels, that need to be considered in order to work towards the transformation for education for sustainable living.

At the macro level, the shortcomings are twofold, and encompass the broader structures, that includes that of policy and governance, and the recognition of the ideological and value-laden nature of education. First, the area of policy for environmental education within formal education comes under the microscope. A major obstacle in the way of securing and sustaining an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living at initial teacher education level, is a lack of formal policy for environmental education in this country. An analysis of policy documentation[64] currently in use for teacher education necessitates a scrutiny of the COTEP (1996) document. Acknowledging that the analysis of this policy document has not been complete nor comprehensive, the analysis was shaped by drawing on the contributions towards policy analysis from Ball (1993), Grundy (1994a; 1994b) and Apple (1994). A consideration of the distinctions between 'policy as a text'[65] and 'policy as a discourse'[66] (Ball 1993), the inclusion of both the text and the discourse[67] into the analysis (Grundy 1994a; 1994b) and a consideration of the

[64] The *White Paper on Education and Training* (DE 1995 see section 3.1.4) and the COTEP document (1996 see section 3.3.2), demonstrate a host of impediments that are restrictive to secure a place for education for sustainable living within teacher education. While the White Paper is a broad education policy document, it is not the appropriate document to explore for teacher education specifically. The COTEP document (1996) may be a more appropriate document to analyse the position of policy on envisaged environmental education practice (see sections 3.3.2; 3.4.3.2; 3.4.3.3).

[65]Policy analysis from this perspective alone restricts the reader to the patterns of language employed by the writer, and is subjected to diverse interpretations and possible strategies for implementation.

[66]To add this dimension to the analysis of policy documentation allows the reader to unpack the text, on the one hand, in terms of what is said, and, also, what is not said, whilst also bringing into focus the social realities of authority and power relations (Grundy 1994a).

[67]When analysing policy documents in terms of texts and discourses, a further dimension has to be added to place the discourse into perspective. Grundy (1994a) argues for a critique of the communicative conditions through which the discourse was produced, and those that it promotes, to bring into focus those areas relating to production and reproduction.

contexts'[68] (Apple 1994; Grundy 1994b) have been useful to arrive at the impediments[69] outlined below.

The COTEP document, analysed in terms of the texts, contexts and subtexts is conceptually flawed with regard to education for sustainable living. This policy document articulates:

- A behaviourist notion of governance in its subscription to a 'top down' hierarchy of authority and accountability, which unfortunately places the administrative vision and function for teacher education institutions within the maintenance paradigm (Hoyle 1990), thus opting for the retention of the status quo rather than the transformation thereof.
- In its conceptualisation of environmental education, it is essentially flawed and ambiguous. By focusing on the external, natural environment, it slips insidiously into the apolitical, thereby circumventing a call for the analysis of the structural roots and consequences of the environmental crisis.
- The perceptions of specific outcomes/ competence embrace the narrow, behaviouristic construct to competence, rather than the generic or cognitive construct.
- An emphasis on methodological and classroom management skills, with elements that pertain to the mastery of distinct behaviours, exemplifies the technicist nature of the vision of COTEP for teacher education programmes.

The second dimension at macro level (which is interlinked with that of policy), encompasses the overtly ideological nature of education, also of education for sustainable living. In this regard, it is argued that the specific socio-economic and political contexts pertaining to the South African society, which are also manifested in the education system impacts on the personal philosophies and the ideologies of practitioners. Definite constraints to the realisation of education for sustainable living (that embraces an ecosocialist environmental ideology and a socially critical education orientation) at initial teacher education level includes:

- The past bureaucratic structures in the education system, which are still operative, and, largely responsible for the persistence of Christian National Education and Fundamental Pedagogics at educational institutions.
- Practitioners (and prospective teachers) of environmental education fail to unpack the pervasive hegemonic ideology of CNE, which finds expression in FP that is still widely practised.

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[68]Apple (1994) argues that an analysis of policy needs to critique the text, the discourse, the latter from a contextual position (which includes the historical contexts) of all those relations that have been omitted (economic, authority, race, gender insensitivity, etc).

[69]These impediments are summarised in the light of the facets that are restrictive to realise real change at macro, meso and micro levels, and will be discussed in that order.

- The skills to employ ideology as a "pedagogical tool", to make sense of past (and present) injustices and inequalities, (so that these can be resisted), are lacking in current teacher education programmes.

At the meso level of change, the competence and confidence of the practitioner in the practice of education for sustainable living pose significant challenges. While it is argued that the teaching approaches to secure education for sustainable living require critically reflective practitioners and transformative intellectuals, to further the attainment of critical praxis, obstacles retarding this are directly linked to the approaches that teacher education institutions adopt, in their preparation of student teachers. Central to these meso level impediments are the macro level dimensions, which include those aspects that shape the practice of the teacher educators, for example, their historical baggage and the powerlessness of their work. Some of the impediments at meso level include:

- The behaviouristic approaches that dominate many of the teacher education institutions in South Africa, specifically the colleges of education that were (and some still are) subject to externally developed syllabuses, controlled and enforced via the externally set examination which is imposed on student teachers. These approaches reinforce the disempowerment of many of the teacher educators, since to a certain extent, the function of many teacher educators has been reduced to that of technicians, incapable of engaging in, for example, aspects like curriculum development (see section 2.3). In essence, these approaches have denied many teacher educators the opportunity of developing the necessary skills to engage in a more critical and innovative manner in their practice.
- The approaches at teacher education institutions, especially some of the colleges of education, do not prepare students for the realities that they have to face when they are out practice teaching in the schools and once they qualify as teachers.
- Educational barriers (Ham and Sewing 1988)[70] are those related to the practitioners' lack of competence to carry out environmental education programmes, which are directly related to their teacher preparation programmes. Robottom (1987b) criticises the conventional teacher education programmes in that they do not prepare students adequately for sustained environmental education practices. Furthermore, they do not stress the importance for students to become actively involved in their community settings.
- Attitudinal barriers that stem from the assumption that a lack of positive attitudes towards

[70]The barriers identified by Ham and Sewing (1988) relate to school-based environmental education. However, these are also relevant to teacher education programmes, especially for colleges of education that are still functioning within the college-school sector, along the same lines (policy and governance) as that of the schools (see section 2.1).

environmental education will prevent teachers from venturing into related activities in the classroom, a view that finds support in the research conducted by Ham and Sewing (1988) in the USA. Although Ham and Sewing (1988) refer to attitudinal barriers, they venture neither into the factors contributing to the powerlessness of the teachers (teacher educators), nor into the deeper underlying causes from which these negative attitudes may stem. In an attempt to identify and comprehend the seemingly inherent negative attitudes towards the environment and environmental education, the area of values education requires exploration, which is echoed in the sentiments of the EEPI (1994), and outside of South Africa for example, Huckle (1983b); Knapp (1983); Rokeach (1973).

The challenges at micro level relate to the curriculum for education for sustainable living at initial teacher education level, which encompass the knowledge base and the necessary skills and values in the area of education for sustainable living. While the impediments to the curriculum for education for sustainable living are summarised in terms of the micro level challenges that face practitioners, these cannot be perceived in isolation from the challenges at macro and meso levels. Included here are:

- The perceptions of the curriculum in a narrow sense, rather than in terms of inclusivity.
- The outmoded and centralised control regarding the approaches to curriculum development.
- The content of the teacher education programmes does not prepare students for the realities of the schools in which they will operate (i.e. constraints related to the notion of schooling)
- Conceptual barriers, that arise from a flaw in consensus related to the scope and content of environmental education (O'Donoghue 1993a; b). This fallacy can be attributed to the perception that environmental education is often equated with the science curricula. This misconception has also been highlighted by Robottom, who asserts that many argue for a "disciplinary base" in environmental education which, in most instances, is perceived to be science (1987: 199; see also Greenall 1987; Tilbury 1993). Education for sustainable living, in contrast, calls for the inclusion of environmental studies competencies (ecological foundations; social foundations; environmental investigation and evaluative skills; and, environmental action skills), professional competencies, and the development of personal qualities (see section 3.4.3.4).
- A further conceptual barrier to the implementation of education for sustainable living practices revolves around the fact that environmental education is frequently equated with outdoor education. This undergirding conservational thrust is especially dominant in Western capitalist societies, and does not contest the socio-economic and political base of society (see section 3.1.4). A final misconception in the domain of environmentally-positioned teacher education is that environmental education is viewed as a separate subject to be attached to the curriculum.

This view is in patent conflict with the interdisciplinary nature of environmental education. Greenall (1987: 16), however, offers a ray of optimism. Commenting on the necessary dynamic nature and state of environmental education, she points out that there is a growing acceptance of the viability of environmental education as a separate subject:

> While the necessity of an interdisciplinary or holistic approach is still recognised, it has become increasingly apparent that this approach is not realistic within the existing structure of most schools, whereas a new subject may be.

- Logistical barriers to the successful implementation of a socially critical environmental education programme in initial teacher education include those which arise from a perceived lack of time, money, resources, transport problems, class sizes, the location of the school etc. Many of these barriers are linked to the perceptions of teachers who equate environmental education with the undertaking of fieldtrips (see section 1.3.2), an upshot of the conceptual barrier category which simplistically aligns environmental education with nature conservation.

The practice of environmental education (in a socially critical sense) in educational institutions has been an area of concern for researchers who have conducted evaluations in this field in a number of countries. In Australia, for example, such studies were conducted by Linke (1980), Greenall (1981) Stapp and Stapp (1983) and Huckle (1987), all of whom expressed concern at the dearth of critical environmental education practices. Similar results have been obtained from studies done in Europe[71] and in England (Tilbury 1993).

A valuable contribution to environmental education within initial teacher education emanated from the research conducted in England by Tilbury (1993). While the thrust of her research centres on environmental education within initial teacher education, which corresponds to this research study (see section 1.6), her research differs from this research study in several aspects. The focus of this research is primarily on the teacher educators, while a substantial aspect of Tilbury's (1993) research is attributed to the psychological (eg. cognitive) aspects of pupils at the middle school level. Furthermore, the contextual realities of environmental education within initial teacher education in England are also very different to the South African situation. Outside of the historical context in South Africa (see section 3.1.1), there has been no formal policy to secure a place for environmental education within

[71]For example, studies of the "Environment and School Initiative Project" of the Organization for Economic Cooperation and Development (OECD) revealed that environmental education is often peripheral at schools and that only the motivated teachers would engage in such activities (Fien 1992).

initial teacher education or other levels of the formal education system in this country, which is different to the situation in England. Morover, the research conducted by Tibury (1993) culminates in the development of a curriculum model for environmental education within initial teacher education, while this research study attempts to explore the potential for the implementation of education for sustainable living, and to identify a strategy for this, for initial teacher education, for senior primary school student teachers in the Western Cape.

Outside of the work of Ballantyne and Aston (1990), who investigated the provision of environmental education in teacher education in South Africa (February 1988 to June 1990) and that of Leketi (1992), Shongwe (1992a) and Irwin (1993), who investigated the situation in the former- Bophuthatswana, no recent, comprehensive study for the country as a whole has been conducted. Similar to the international situation, these researchers reported that provision for environmental education within teacher education in South Africa is inadequate, thereby raising the issue of barriers which stand in the way of its successful inclusion in teacher education. The challenge to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education is to develop appropriate strategies, grounded in research, to overcome these barriers.

3.7 CONCLUSION

This chapter has attempted to place the literature with which the researcher has critically engaged in a theoretical framework, of which the parameters included two major themes, environmental education and teacher education, with the central focus, environmental education within initial teacher education. Education for sustainable living, (the conceptualisation of environmental education for the 1990's), demonstrated several ramifications for environmental education within initial teacher education. Fundamentally, education for sustainable living demands a reconstruction of current teacher education, which in turn, is underpinned by the necessity for changes that will further this reconstruction, in order to secure, and to sustain, an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education.

A theory of change that underpins this process of transformation towards education for sustainable living, explored the different levels necessary for, and, to sustain the changes at macro (see sections 3.1 and 3.2), meso (see section 3.3) and micro levels (see section 3.4) , in the area of education broadly, also, specifically, teacher education.

The fundamental changes at macro level point to the need for the development of a policy for environmental education within the formal education system (section 3.2). It is argued that in order to secure a place for education for sustainable living within formal education, policy is needed to secure (and sustain) the incorporation of education for sustainable living into all levels of the education system (tertiary, secondary, primary and pre-primary). While the importance of environmental education is now recognised in the policy governing teacher education (COTEP 1996), it is conceptually flawed in terms of education for sustainable living. Furthermore, policy is still lacking for the other levels of the education system (pre-primary - secondary education), for which students are educated to teach, which unfortunately widens the gap between teacher education and the schools. Notwithstanding the importance of policy, the development and the contents thereof are as important. In this regard, more consultative and participative avenues need to be created to include the voices of the practitioners and the learners, while also securing a more local and relevant vision.

Additionally, a further challenge at macro level, is the ideological dimension that underpins education for sustainable living (see sections 3.1.1; 3.1.2; 3.1.3; 3.1.4). Underpinning this position is a conviction that environmental problems have their roots in socio-economic and political structural imbalances in our society. In this regard, education for sustainable living has been highlighted as an appropriate direction for environmental education, through which the transformation towards an ecologically and socially sustainable and just society can be achieved. Emanating from this critical engagement, environmental education for sustainable living has been put forward as a fundamentally central means to address the environmental crisis which humanity is facing. Grounded in a socially critical education ideology and an ecosocialist environmental orientation, education for sustainable living can provide the necessary tools for educators and students to 'free' themselves from the hegemony of CNE that still, at present, finds expression through FP at teacher education institutions.

The proposed changes at macro level cannot be viewed in isolation of the challenges that face the success for education for sustainable living at the meso level (3.3), since these have a direct impact on the approaches that teacher educators embark on (3.3.1). The widely practised uncritical and behaviouristic approaches are in direct conflict with the goals of critical praxis, that has been identified as fundamental for education for sustainable living. These approaches are shaped by the baggage which they bring into the lecture rooms, and includes aspects such as their education, professional development, their powerlessness, research, etc (3.1.1; 3.3.2; 3.3.3). The micro level changes (that are interrelated with the macro and meso levels) on the other hand, have to contend with irrelevant, externally developed and uncritical curricula (3.4.1). A new vision of the curriculum for initial teacher education needs to be conceptualised in terms of inclusivity, developed by the practitioners in a

participatory and consultative manner. Further challenges include that students need to be prepared for the situations where they will be teaching. Thus, the curriculum for teacher education also needs to address aspects pertaining to the notion of schooling (3.4.2). Additionally, since the new direction for teacher education in South Africa is structured along an outcomes-based framework, further challenges for the realisation of education for sustainable living are for students to develop those specific outcomes/competencies (see section 3.4.3.2) that are widely recognised, for example, environmental studies competencies (ecological foundations; social foundations; environmental investigation and evaluative skills; and, environmental action skills), professional competencies, and the development of personal qualities (3.4.3.4). While these are important, the construct of what constitutes competence should not be viewed in a narrow behaviouristic sense, but rather in a broader, encompassing view of generic and cognitive.

This review has also identified the appropriate education of teachers (3.5), particularly at initial level, as a major priority if environmental education is to be successfully implemented in schools. The barriers (3.6), however, outline that this will not be an easy task, therefore, a further vital consideration that has been identified is the need for research into the area of teacher education in environmental education (UNESCO 1980; NIER 1993; UNESCO 1993; Wilke, Peyton and Hungerford 1987; Williams 1988). Tilbury sums up this concern:

> Environmental education as a whole has not experienced the benefits of widespread research. Thus not surprisingly, specific information on environmental education is hard to find, and when the information needs to be narrowed down to the area of teacher education, then the task of eliciting such information becomes even more difficult (1993: 276) .

She calls for research to address the intricacies found in teacher education institutions, and argues that the future of the environment might rely on further research into environmental education at teacher education level.

CHAPTER FOUR

STRATEGIES FOR EXPLORATION

4.0 INTRODUCTION: DEFINING THE REQUIREMENTS

Popkewitz contends that research is a

> complex process in which particular data gathering techniques assume meaning and significance only in relation to the assumptions of the larger intellectual traditions in which techniques are applied...[therefore]...to focus solely on techniques and procedures produces certain limitations to the conduct of enquiry. The lack of situating concepts and techniques within their social and philosophical contexts produces knowledge that is often trivial...(1984: ix).

Elaborating on this conceptualisation of research, Van Manen (1990: 27-29) articulates the various components intrinsic to research into complex processes by highlighting the necessary separation of the:

- methodology, referred to by Kuhn (1970) as a paradigm;
- method; and,
- techniques, which include:
    - data collection techniques; and,
    - data analysis procedures.

This distinction correlates with the scope and nature of the current research, and finds expression in the following forms:

- the methodology, which is interpretive;
- the method, which is the multisited case study; and,
- the techniques, which for data gathering encompassed the employment of semi-structured interviews (Elliot 1981; Patton 1990; Vulliamy 1990) and the collection of relevant documents (Cantrell 1993; Patton 1990).

In this research, centred within the interpretive paradigm, the grounded theory approach (Burgess et al. 1994; Kirby and McKenna 1989; Glaser and Strauss 1971; Tilbury 1993), developed through the case study method, is employed. With regard to the underlying aim of the research, this concurs with what Cantrell (1993: 83) perceives as interpretivism: "Understand and interpret...social structures as well as the meaning people give to phenomena".

An additional aspect requiring consideration in the research design of this study is the sensitive and controversial nature of the information being sought. Confidentiality and anonymity were therefore incorporated into the design of the research as an ethical consideration (Hitchcock and Hughes 1989). Furthermore, recognizing that education, the research process and the interests that guide a particular study in the interpretive paradigm are values-laden and not neutral, does not negate the need for rigour and trustworthiness in the selection, justification and use of particular research procedures (Cantrell 1993). These components, in terms of qualitative research (Lincoln and Guba 1985), were catered for by including mechanisms in the research design which would ensure both the validity and the reliability of the data (see sections 4.6.2 and 4.6.3). And finally, closely tied in with the values-laden notion of the interpretive research paradigm, is the issue of the "inter-subjective" construction of the research situation (Hitchcock and Hughes 1989: 101) which demands "reflexivity" from the researcher:

> ...by holding our own assumed research structures and logics as themselves researchable and not immutable, and by examining how we are part of our data, our research becomes, not a self-centred product, but a reciprocal process (Steier 1991: 7).

Each requirement for undertaking the research is elaborated on in the remainder of this chapter.

4.1 THE RESEARCH PARADIGM: EQUIPPING FOR EXPLORATION

4.1.1 Overall considerations: a paradigm rationale

Due, predominantly, to historical factors in the South African context (see section 3.1.1), this research study incorporates aspects such as identity and values which manifest themselves in the realm of initial teacher education. These aspects may either be sympathetic to social transformation or, alternatively, inherently entrenched in a desire to perpetuate current dominant hegemonic trends. The philosophical underpinnings of these tensions, in the opinion of the researcher, demand that this research be grounded within a paradigmatic context. This view of the researcher ties in with that of many researchers, for example, Carr and Kemmis (1986); Husen (1988); Robottom (1988); Robottom and Colquhoun (1992); Robottom and Hart (1993) and Popkewitz (1978) who argue that research paradigms provide the philosophical framework that guides research activity. It was therefore necessary for the researcher to engage in a paradigm debate in order to arrive at a philosophical framework most able to accommodate and articulate this research process (and the associated tensions).

4.1.2 Paradigm debate

Many researchers have engaged in the 'paradigm debate' (Guba 1990; see also Popkewitz 1984), especially around issues distinguishing positivistic and non-positivistic paradigms (Hitchcock and Hughes 1989). In an attempt to clarify which paradigmatic direction to adopt along this continuum, Patton's (1990: 37) perceptive articulation of some of the tensions which not only need to be encapsulated by the research design, but also those which underpin the domain to being investigated proved most useful:

> A paradigm is a worldview, a general perspective, a way of breaking down the complexity of the real world. As such, paradigms are deeply embedded in the socialization of adherents and practitioners. Paradigms tell them what is important, legitimate, and reasonable. Paradigms are also normative, telling the practitioner what to do without the necessity of long existential or epistemological consideration. But it is this aspect of paradigms that constitutes both their strength and their weakness in that the very reason for action is hidden in the unquestioned assumption of the paradigm.

Similarly, Popkewitz, Tabachnick and Zeichner (1979: 53) perceive a paradigm in terms of teacher education as

> ...a matrix of beliefs and assumptions about the nature and purposes of schooling, teaching, teachers and their education that gives shape to specific forms of practice in teacher education.

With these insights in place, the work of Kuhn (1970) in arguing that a paradigm is a loosely connected set of ideas, values and rules that govern the conduct of inquiry, the way in which data is interpreted and the way the world is viewed[1], laid the foundations for the overarching requirements of an accommodating research framework. The different traditions within educational research are thus referred to as paradigms, separated into the positivist, interpretivist and the critical (Cantrell 1993; Carr and Kemmis 1986; Kemmis 1988; Robottom and Hart 1993). While the different paradigms respond

[1] Much debate has developed from Kuhn's work (Lakatos and Musgrave 1970; Blaug 1975; Papagiannis et al. 1982; Schubert 1986). Consequently, the paradigm debate over the past ten years has evolved beyond the techniques of data collection (qualitative verses quantitative) to focus on the ideology that underpins research (Robottom and Hart 1993).

differently to the disposition[2] of knowledge, (Robottom and Hart 1993), valuable contributions that question the foundations of the knowledge claims in all paradigms (Solsken 1993: 319) is found in Postpositivist inquiry (McWilliam 1995; Solsken 1993) and Poststucturalism (Lather 1990), although these are not the orientations in which the research is centred.

4.1.3 Paradigm engagement

Much research into education and environmental education is dominated by the positivistic approach[3] (Hart 1990a; Janse Van Rensburg 1995; Robottom and Hart 1993; Schubert 1986; Stevenson 1993). Environmental education research and development, in the light of education for sustainable living, particularly in teacher education, may be in opposition to the nature and spirit of the positivistic world view (Hart 1990a). Instead, what may be more appropriate is a qualitative research procedure that strives to investigate the potential for realising real change. In the context of this study, change that aspires to transform existing inflexible and centralised structures and practices into structures and practices which would foster the realisation of sustainable living for all.

A research procedure of this nature may be found in the interpretivist paradigm (Cantrell 1993; Tilbury 1993; Schwab 1965), also referred to as the 'naturalistic paradigm' (Guba and Lincoln 1981; Lincoln and Guba 1985) or an alternative paradigm of environmental education research (Cantrell 1993), which has a different set of underlying assumptions than that of the positivist tradition. Research in the interpretive paradigm is underpinned by qualitative research methods that include aspects which are historical, and the analysis that is largely ethnomethodological and illuminative. This kind of research provides a holistic understanding and clarification of the problems under investigation, which is to explore the practice, provision and potential for environmental education at initial teacher education level for senior primary student teachers. Also, interpretive research contributes to the process of practical decision making, in the context of developing a framework for environmental education that is grounded within the perceptions of the interviewees involved in the research process, policy

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[2]For example, the different paradigms are distinguished in terms of the options for inquiry related to the ontological, epistemological and methodological dimensions.

[3] Environmental education is frequently linked to the sciences, and research in this area is consequently conducted within the positivist paradigm (Hart 1990a; Robottom and Hart 1993). Descriptions of educational theory and research support research strategies based on the logic and methodology of the natural sciences, which may be largely positivistic (Cantrell 1993; Carr and Kemmis 1986; Robottom and Hart 1993). In the positivist paradigm, research is conducted using mainly quantitative methods based on statistical techniques. These are not always wrong, and may be appropriate within the specific circumstances and the contextual nature of the particular research. In this research, the statistical techniques employed included simple tables, graphs and the usage of totals in certain instances, which are not incomparable with the interpretive paradigm.

development in the area of the curriculum for initial teacher education, and the growing literature in the area of environmental education, both nationally and internationally. In this regard it provides a context of meaning, rather than being technical (Codd 1988; Vulliamy 1990). Furthermore, embedded within the qualitative research procedure, this study follows the grounded theory approach[4] (Burgess 1994; Vulliamy et al. 1990; Glaser and Strauss 1971; Kirby and McKenna 1989 see section 1.7), which is developed through the case study method, both explored in the next section.

Criticisms against the interpretive paradigm are levelled by various researchers (Carr and Kemmis 1986; Grundy 1987; Robottom and Hart 1993; Stevenson 1993) who argue in favour of an action research method, centred within a critical paradigmatic methodology. Major points of critique, include that:

- interpretive research is individualistic (Robottom and Hart 1993);
- it declines to challenge the social structures that may restrict the individuals' understanding of their situation (Carr and Kemmis 1986; Stevenson 1993); and,
- interpretive research seldom leads to the furthering of action (Robottom 1993).

Notwithstanding the validity of these points of critique against research centred within the interpretivist paradigm, the validity is somewhat questionable as far as this research study is concerned. The nature of the focus of the research project is to examine the potential for the implementation of environmental education into teacher education in the Western Cape, with the emphasis on a collaborative and participative approach with the prospective practitioners and not on individuals. Furthermore, the social structures that might facilitate, or, adversely, hamper the implementation of environmental education into teacher education are considered and reflected upon and challenged, where these are relevant (chapters five, and six).

Regarding the furthering of action, a question,

> *"how can interpretive researchers' interpretive reconstructions of practitioners' reality serve as a useful guide to further action?"*

posed by Robottom (1993: 141) needs to be considered as a means of justification for placing this study within the interpretive paradigm. As outlined in section 1.6, this study has its roots in a failed attempt at an innovation to incorporate environmental education into the curriculum for initial teacher education

[4]No initial research structure was used, in that there was no preconceived hypothesis and theory that the research study planned to test. Instead, the key factors and categories emerged during the research process.

students at a college in the Western Cape. This 'failure' urged the researcher to undertake this research in order to ascertain why environmental education has been successfully incorporated into teacher education programmes elsewhere in South Africa, and how it is functioning at these institutions (multisited case study one). The researcher wanted to obtain insight from a wide spectrum of institutions on what the status of environmental education in South Africa was. In short, 'what' environmental education is offered, and 'how' it is operating. This 'wide spectrum' included interviewees at thirteen institutions, located in different provinces in multisited case study one. The rationale of wanting to gain a broad understanding from a wide spectrum of institutions regarding the functioning of environmental education, made the interpretive paradigm, instead of strategies embedded within the critical paradigm, like, for example, action research, the most suitable for this research study. In addition, if environmental education is to be implemented into teacher education in the Western Cape, the researcher wanted to ascertain what the perceptions and visions of the prospective implementers of environmental education are, and why environmental education has not been incorporated into these Western Cape Colleges of Education (multisited case study two).

The theory that emerged from the two multisited case studies (see section 4.5.3) and from a review of the terrain pertinent to the parameters this research (chapter three), formed the foundation for the development of a framework for an environmental education programme that has been incorporated into the initial teacher education programme at the same college of education where the initial innovation had failed. A synopsis of this is outlined in the epilogue of this thesis. To return to the question posed by Robottom (1993 at the beginning of this paragraph), thus, in essence, the interpretive researcher's interpretive reconstruction of practitioner's reality served as a useful guide for the incorporation of environmental education into the initial teacher education curriculum, and, in this context, encompasses and reflects the areas of concern central to this study.

4.1.4 Grounded Theory Approach

This research study is congruent with the grounded theory approach in terms of both the gathering and the analysis of the data, considering that these are not regarded as distinct, separate and mutually exclusive phases of the research process. Pertaining to the gathering of data, no hypothesis and priori theory has been identified to be tested during the research. Instead, the research process had a wide focus at the outset, which was gradually narrowed down, in that the first multisited case study[5] informed the research procedure of the second multisited case study. This is in line with the grounded

[5]Guided by the development of research schedule A, and the collection of relevant documents (see section 4.4).

theory approach, where the focus of the research is continuously refined (Tilbury 1993). The data analysis employed, which involved a system of coding, and the constant comparative method (Kirby and McKenna 1989 see section 4.5), facilitates the identification of concepts which are the building blocks of theory (Burgess et al. 1994). The emergence of these theoretical building blocks from the data, is congruent with the grounded theory approach.

Regarding the analysis of data for this research project (see section 4.5), engaging with the grounded theory approach proved to be appropriate on two levels. First, it informed the analysis of the data, by the employment of coding (referred to as indexing by Mason 1994; Ritchie and Spencer 1994) that assisted the researcher to make meaning of the data in the light of the emerging categories, sub factors and key factors[6] (see section 4.5.3). Second, by analysing the content and constantly comparing the categories that emerged from the content, it guided the researcher to extract concepts from the data (Richards and Richards 1994), thus leading to the generation of the theory grounded within the key factors.

The employment of grounded theory in qualitative research is widely cited (Burgess 1985; 1994; Glaser and Strauss 1971; Kirby and McKenna 1989; Richards and Richards 1994; Tilbury 1992; 1993; Vulliamy et al. 1990). Despite the appropriateness of the employment of grounded theory in qualitative research procedure, the extent to which researchers employ this strategy to its 'entirety', that is, the extent to which theory is actually generated during the research process is questionable (Burgess 1994). For this research, theory is generated at three interrelated levels, subsequently discussed (see also section 1.7).

- Grounded theory: The generation of theory

At level one, theory emerges from the research data, and is underpinned by objectives one to four (see section 1.6). In the first instance, theory emerges from the research data, which portrays the status of environmental education at tertiary institutions in South Africa where it is formally implemented for senior primary student teachers (objective one). Also, the theory depicts some of the aspects inherent in the status that might facilitate the incorporation of education for sustainable living into the curriculum for initial teacher education in the Western Cape (objective two). Furthermore, the theory portrays what the major influences at the colleges of education in the Western Cape are, which have a bearing on the possibility of incorporating education for sustainable living into the curriculum at these

[6] Referred to as core variables by Tilbury (1993), see section 4.5.3.

institutions (objective three). Finally, at level one, theory emerges from the research data that identify some of the barriers that might impede the possibility of incorporating education for sustainable living into the initial teacher education curriculum (objective four).

At level two, theory emerges from a review of the terrain, fitting to the research parameters. This theory is applied at two interrelated levels. First, it is applied to develop a theoretical framework to guide the analysis of the data (see section 3.1.4). Secondly, it is applied to outline the challenges that stand in the way of securing and sustaining an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education. These challenges are perceived in terms of a theory of change, delineated in chapter two. This theory of change outlines the challenges that are necessary for the realisation of education for sustainable living, at macro (see sections 3.1; 3.2), meso (see section 3.3) and micro (see section 3.4) levels.

At level three, a synthesis of the theory that emerged at both levels one and two, is underpinned by objective five (see section 1.6). This theory is considered in relation to education for sustainable living and the challenges for change for initial teacher education, and the theory that emerges from the data. This theory is employed to develop a framework for the incorporation of education for sustainable living into initial teacher education for senior primary student teachers at teacher education institutions in the Western Cape, and includes suggestions on the nature of such a programme, its implementation and its governance.

4.2 RESEARCH METHOD: CASE STUDIES

4.2.1 A window into case study methods

The present study, in exploring current environmental education practices at initial teacher education level in South Africa, and how these could impact on the implementation of environmental education at initial teacher education level in the Western Cape, seeks to discover *why* environmental education at initial teacher level is in the shape that it is and *how* it can be reformulated to fulfil its socially transformative potential, fundamental to education for sustainable living. With these underpinnings forming the central thrusts of the investigation, the case study became an appropriate research method for this study since its locus of concern is on

> how or why questions are being posed when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context (Yin 1989: 13).

Definitions of case studies include those of MacDonald and Walker (1977) who regard a case study as an investigation of an instance in action, or as an in-depth investigation of a particular case; and Stake (1985, in McKernan 1991) who perceives a case study as the study of a single case or bounded system. Similarly, case studies may also be considered an umbrella term for research methods having in common a focus on enquiry (e.g. environmental education within teacher education) around an instance (Adelman, Jenkins and Kemmis 1976). In addition, the evaluative case study is described by Stenhouse (1988) in these terms:

> In evaluative case studies a single case or a collection of cases is studied in depth with the purpose of providing educational actors or decision makers with information that will help them to judge the merit and worth of policies, programmes and institutions...the evaluator is thus concerned with multiple case studies in a number of sites: hence, multisite case study (in Keeves 1988: 50).

It is within these definitions that the underlying justification, further explored in the next section, for the employment of the case study method for this research lies.

4.2.2 Why the case study method?

The flexible nature of the case study method enabled the employment of research techniques (conducting of interviews and collection of relevant documents) appropriate to the aims and objectives of the research (Thomas 1990). The flexibility issue is important for a study of this nature where a diverse range of teacher education institutions, each being at different stages with regard to the provision of environmental education, are involved. Additionally, the fact that the case study is eclectic and process-driven, rather than product-driven (McKernan 1991) and that it is adaptable to changes in circumstances (Anderson 1990; Stenhouse 1982), further made this method appropriate to the concerns of this investigation.

Furthermore, the case study method provides an excellent opportunity to explore the subjective elements of meanings which the interviewees attribute to the curriculum, curriculum change (Ball 1984) and innovation (within environmental education). These features are important to this study since it attempts to examine, for example, what the interviewees' understanding of environmental education

is and what importances they attribute to environmental education etc[7].

In summary, the flexible, eclectic nature of the case study method, permitting the exploration of the subjective elements and the diversity between the institutions, while maintaining the boundaries of the two contexts under investigation, justify its employment for this research. Case study research methods has, however, come in for substantial criticism; it therefore requires interrogation and comment in order to ensure the appropriateness of this method to the research context.

4.2.3 Critique of case study methods

Case study research has been criticized for a number of reasons. Included is the critique that case studies are atheoretical in nature (Atkinson and Delamont 1985; Walker 1983). Similarly, Angus (1986) criticises case studies for failing to address the "false consciousness" involved in many teachers' seeming lack of awareness of the ideological influences on their intentions and actions. However, Walker (1983: 164-165) regards case study research as:

- interventionist;
- biased, and relaying a distorted picture of the way things are; and,
- conservative.

Although there is a degree of truth in the allegation that this method of investigation has interventionist potential, the aim of the research required that teacher educators (the potential practitioners of environmental education) at institutions where environmental education is currently absent, be interviewed to ascertain, for example, what their perceptions are relating to environmental education, and the potential incorporation thereof into the curriculum for initial teacher education. Furthermore, since environmental education is practised at some teacher education institutions, the practitioners had to be interviewed to ascertain how and why environmental education is functioning, and what their perceptions are. While these research necessities could, from a positivistic position, be construed as being detrimental to the overall objectivity of the findings of the study in that they could lend themselves to the biasing and distortion of data, such a perception has to be offset and balanced by the somewhat positivistic emphasis that research findings need to reflect an objective and empirical 'truth'. This position seems to disregard the fact that neither education nor educational (environmental

[7]Such subjectivity is, however, questioned by those who look for scientific objectivity (Lather 1986a; b; Thomas 1990). Eisner (1985: 184) strongly denounces the notion of objectivity, and argues that: "Pristine objectivity is an epistemological impossibility".

education) research is neutral or value free (Lather 1986b; Smyth 1987). Neither does it acknowledge the inherently subjective and interpretive nature of the researcher (Ely 1991)[8].

The criticism that the case study research method is inherently conservative, though perhaps valid, is irrelevant in the current investigation which is located in an interpretive paradigm that seeks to outline the challenges that impede change at macro level. In this regard, this study explores the ideological underpinnings of teacher educators' perceptions and practices. Furthermore, the analysis of the data (in chapters five and six) reflects on the ideological influences which impinge on the shape and substance of teacher educators' attitudes and functions.

4.2.4 Sites of the study

As stated in section 1.7, 'multisite' refers to a case study which considers the situation at various research sites. In this research the 'sites' are the various tertiary institutions where the researcher examined environmental education in teacher education. Two multisited case studies were carried out (Stenhouse 1988; Burgess et al. 1994). The selection of the research sites was based on the aim of the research which, in turn, is underpinned by five objectives as outlined in chapter one (section 1.6) which impacted on the collection and analysis of the data (Burgess 1984; 1985).

The two multisited cases in this study are:

- various tertiary institutions in South Africa involved in the initial teacher education of senior primary student teachers where environmental education has been implemented; and,
- six colleges of education in the Western Cape region where environmental education has not been formally implemented at initial teacher education level for senior primary student teachers.

[8] An example of accommodating the inevitable subjectivity in any research is reflected in the acknowledged bias which contributed to the selection of sites for investigation. Much of what has been written (published or unpublished) about environmental education was read by the researcher, and therefore must have played some role in the selection of institutions for interview purposes (see section 4.3.1). In addition, some of the lecturers involved in the presentation of environmental education at these institutions are actively involved in the area of environmental education in EEASA or other environmental organisations, and are known to the researcher.

4.3 NEGOTIATING ACCESS IN THE RESEARCH PROCESS

Negotiating access is a two-fold procedure, involving gaining access to the interviewees' institutions as well as to their inner, subjectively constructed worlds (Measor 1985). Entry into both requires compliance with a number of ethical considerations. Regarding the former, formal protocol was therefore followed to gain access. In some instances, a telephone-call was sufficient while in others, written permission to gain entry had to be sought. Such letters were written six weeks in advance to ensure access to these institutions (see Appendix Three).

Access to the interview, which provided the major source for the generation of data[9] in the research study, occurred during the further negotiations between interviewees and the researcher prior to the actual interviews. During this process, the researcher only encountered one interviewee who was reluctant to divulge personal details. The willingness and openness of the other interviewees could be attributed to the fact that the data was gathered during 1992, the year of the Rio conference (UNESCO 1992c). Constraints to divulging opinions and perceptions which may otherwise have been in place were possibly overridden in the context of the extensive media coverage and general public awareness generated by the conference.

4.3.1 Negotiating access for multisited case study one: Identifying the institutions and the interviewees[10]

A letter outlining the broad aims of the study, together with a reply card[11], was sent to a hundred colleges of education throughout Southern Africa[12] to ascertain whether environmental education formed part of the teacher education curriculum at initial teacher education level for senior primary student teachers at these various institutions (see Appendix Five). The reply cards which were returned (sixty institutions responded) were analyzed, and this information, in addition to that obtained via telephonic communication with the institutions, was used to select the institutions in order to progress

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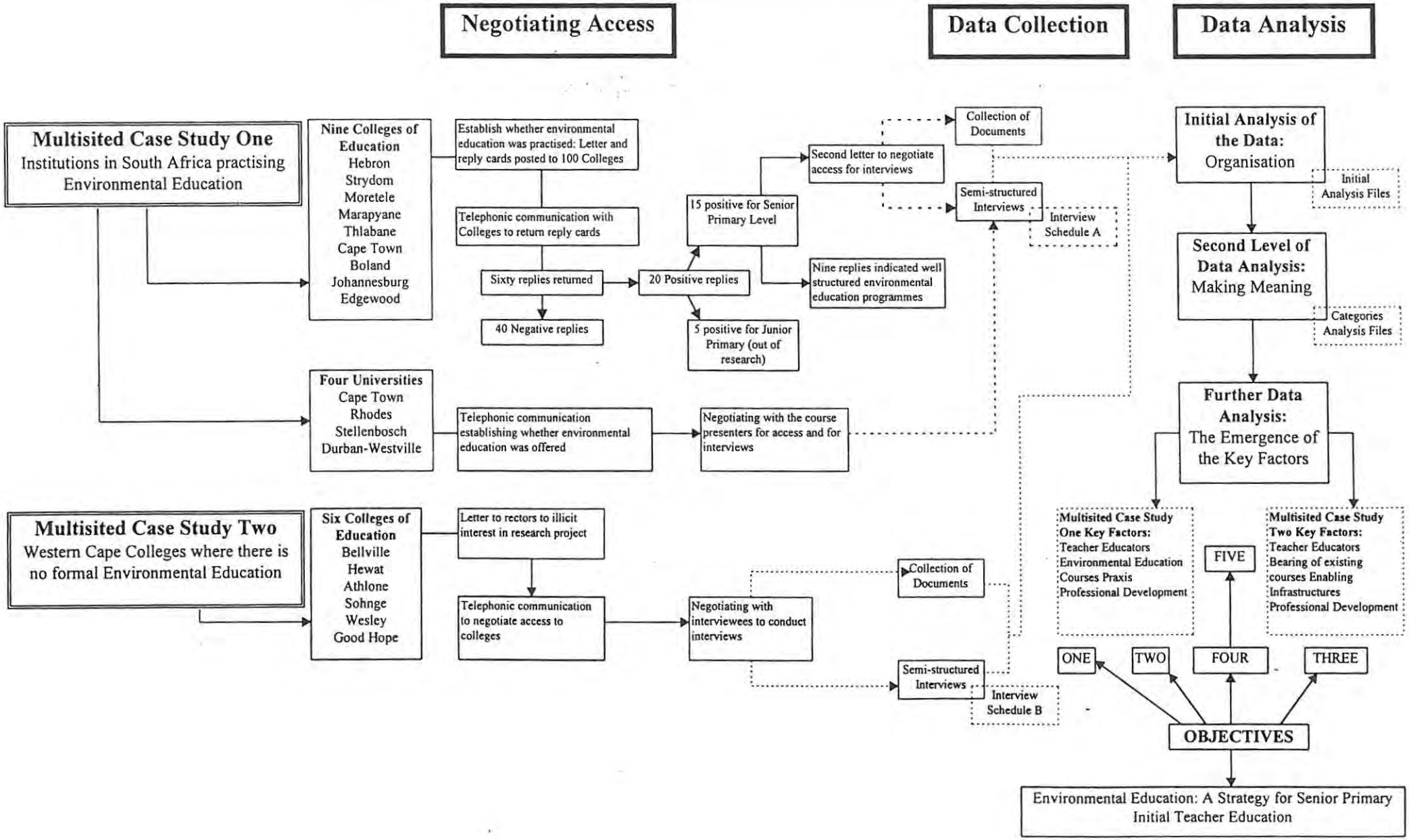
[9] See section 4.4.1 for the techniques employed in the collection of data.

[10] Refer to figure 4.1 for an overview of the research process.

[11] Refer to Appendix Section for the letter, as Appendix three, and the reply card as Appendix four.

[12] Regarding the universities contacted in the research process, members of the Environmental Education Association of Southern Africa (EEASA) were of tremendous assistance by providing the researcher with the names of contact persons and their telephone numbers.

Figure 4.1 Synopsis of the Research Process



to the next stage of the research.

The analysis[13] of the reply cards revealed that of the sixty colleges which had responded, forty do not offer environmental education for senior primary student teachers. Of the twenty institutions which had indicated that environmental education forms part of their initial teacher education curriculum, five stated that environmental education is offered at Junior primary level only, an area which does not fall into the scope of this study. Fifteen colleges indicated that environmental education is offered at initial teacher education level for senior primary student teachers. Based on the specific responses on the returned cards, the researcher contacted institutions telephonically in order to find out more about the environmental education components in the initial teacher education courses. After talking to the teacher educators involved in these courses, it appeared that six of the respondents had actually misinterpreted environmental education as ecology (encompassed in the natural sciences/ biology, geography and, in one instance, gardening). The remaining nine institutions were again contacted telephonically, this time to ascertain whether they were interested in participating in this study and, depending on the response, to arrange for interviews with the members of staff involved in the presentation of the environmental education components or courses in environmental education. All nine responded positively.

The nine colleges are located in four different provinces:

- one in Gauteng /Johannesburg (Johannesburg College of Education);
- one in KwaZulu-Natal (Edgewood College of Education);
- two in the Western Cape (Cape Town and Boland Colleges of Education); and,
- five in the North West Province /Bophuthatswana (Hebron, Strydom, Moretele, Marapyane and Thlabane Colleges of Education).

Universities were contacted at the same time as the colleges. Telephonic conversations with the contact persons at universities identified four universities where environmental education is offered at initial teacher education level for senior primary student teachers[14].

These universities are located in three different provinces:

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[13] This served as a starting point for the research. Subsequent to this analysis the two multisited case studies were identified.

[14] The University of South Africa was not included since the modules on environmental education offered (via distance education) applied mainly to postgraduate students operating at secondary schools.

- two of the universities are situated in the Western Cape (Universities of Cape Town and Stellenbosch);
- one is in KwaZulu-Natal (University of Durban-Westville); and,
- one is in the Eastern Cape (Rhodes University).

The researcher then arranged for interviews with as many of the course presenters as possible, at both the colleges and the universities. There were a total of twenty-five interviewees.

4.3.2 Negotiating access for multisited case study two

Regarding the tertiary institutions in the Western Cape, no environmental education was offered at initial teacher education level for senior primary student teachers at six of the eight colleges of education in the Province (outside of Cape Town and Boland Colleges of Education that were grouped into multisited case study one)[15]. The University of the Western Cape was excluded since no course at initial teacher education level for senior primary student teachers exists. The other two universities in this region (Stellenbosch and Cape Town Universities) offer environmental education, and were grouped into multisited case study one. In the Western Cape region, the informal tertiary educators network provided useful input, since the researcher had interacted with members from all these institutions during previous meetings. However, access had to be negotiated with the interviewees (rectors and heads of the various subject departments) prior to the next stage of the research. Negotiations for access included written and telephonic communication, as well as personal visits to arrange for access to some of the institutions.

In summary, formal protocol to negotiate for access, (as outlined in **Figure 4.1**) involved:

- sending letters outlining the proposed research project to the six colleges where no formal environmental education is offered at senior primary initial teacher education level;
- making telephonic enquiries to ascertain whether the letter had arrived at the institutions, and soliciting for the colleges to form part of the research project;
- making follow-up telephone calls to arrange for interview times with the rectors and the various departmental/ subject heads at the colleges; and,
- follow-up visits to the colleges to collect relevant documents, scrutinise resources, and conduct interviews.

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[15] See section 4.7.2 for a list, and location of the colleges.

4.4 THE RESEARCH PROCESS: COLLECTION OF THE DATA

The three major techniques of data collection which underpin interpretative research studies are participant observation, interviews and documentation. In this research, however, participant observation was not included[16] for the following reasons:

- participant observation was beyond the means of the researcher, since most of the institutions are located in other provinces, involving a considerable amount of travel, cost and time;
- participant observation would not have sufficiently captured the setting, because it is impossible to observe everything, (since at some institutions there were up to four presenters of environmental education courses) or have access to everything; and,
- participant observation would have generated volumes of extra data, beyond the scope of one thesis.

These reasons for not employing participant observation in this research correlate with those listed by Cantrell (1993: 95-96).

4.4.1 Rationale for choice of data-gathering techniques

The decision to utilise semi-structured interviews and documentation as the major sources of data was founded on a number of considerations. The first is informed by theoretical insights. Refer to section 4.4.2 for further elaboration; also see Guba and Lincoln (1981) who regard interviewing as the cornerstone of qualitative research. The second emerged after lengthy consultation with colleagues who had been involved in the unsuccessful attempt to introduce environmental education at the college where the researcher works (see section 1.6) and with three 'outside' persons involved in the informal tertiary educators network[17]. They identified, with the researcher, several questions that needed urgent answers if any attempt could be made to implement environmental education in senior primary teacher education. This realisation led to the necessity of adopting the semi-structured interview component

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[16] However, the exclusion of participation observation does not deny the strengths thereof, especially regarding certain facets of multisited case study one (see section 4.8 for further critique). As far as multisited case study two (Western Cape) is concerned, participant observation would not have enriched the data much, since the interviewees at all the institutions followed the same prescribed syllabuses, resembling that followed at the college of education where the researcher works. Regarding the projects and extra-curricular activities in which these interviewees were involved, follow up visits to these institutions were conducted to clarify and illuminate specific aspects.

[17] These meetings were individually based, which, in retrospect, was not the best situation since, had they occurred in the form of a focus group, more dialogue and discussion could have taken place (Steward and Shamdasani, 1990; Patton 1990), which might have resulted in a more fruitful and collaborative exercise to develop the first interview schedule.

of the data-collection mechanism as well as to the development of the first interview schedule. The use of documentation as the complementary component in data gathering was a logical extension of the semi-structured interview strategy since it would provide the necessary contextualisation of perceptions elicited during the interviews (Cantrell 1993).

Multisited case study one was conducted using interview schedule A (Appendix one). After the completion of this multisited case study, interview schedule B (Appendix two), informed by the initial analysis of the first multisited case study, was developed and used for the interviews conducted for multisited case study two. The initial analysis of data for multisited case two shaped the formulation of the questions that were put to the interviewees at the overseas institutions, although the analyzed data is not incorporated in the research study[18]. In this manner the focus of the research process was sharpened.

4.4.2 The Interview Process[19]

Patton (1990: 281- 290) distinguishes three different approaches to qualitative interviews:

- the informal conversational interview, which centres on the spontaneous generation of questions in the natural course of an association;
- the general interview guide approach, where the topics and concerns to be dealt with are pre-determined, but the interviewer determines the sequence and wording of questions when the interview takes place; and,
- the standardized open ended interview, where the exact wording and sequence of the open-ended questions are determined prior to the actual interview. The dynamics of the interviews, which were the primary data-gathering means of the study, were characterised by digressions as the interviewees began to articulate their perceptions regarding the whole concept of

[18] In 1992, I communicated with environmental educators in Australia and Scotland where environmental education is incorporated into the school curriculum, and in the curriculum for teacher education. With the assistance of two environmental educators (Ian Robottom in the State of Victoria and John Fien in Queensland), other interviewees at universities in these states were identified (twelve in Australia and ten in Scotland). In Scotland, Jim Dunlop of the Overseas unit at Jordanhill College assisted in the arrangement of interviews with other interviewees at colleges of education in Scotland. These two countries were selected since environmental education formed part of the formal curriculum at school level, and I wanted to examine how student teachers were educated in this regard. It was felt that this insight could assist in the process of incorporating environmental education into initial senior primary teacher education level in the Western Cape.

[19] While the classification of interviews into structured, semi-structured and unstructured forms is contested by Hammersley and Atkinson (1983), Stephens et al. (1990) argue for their distinction, based on the ratio between "open-and-closed-ended" questions, and suggests that less standardized interviews have a larger proportion of open-ended questions (see also Griffin 1985 and Vulliamy 1990).

environmental education as pivotal to teacher education.

For this research study, the standardized open-ended interview approach (Elliot 1981; Patton 1990) was employed during the interviewing at different stages of the research process. Despite the fact that the dynamics of the interviews were characterised by digressions as the interviewees began to articulate their perceptions regarding the whole concept of environmental education[20], the researcher discovered, as the interviewing progressed, that one of the major disadvantages of using the standardized open-ended interview, with its fixed pre-set questions, was the inflexibility of the schedule compounded by the large number of questions that were put to the interviewees, which, to a certain extent, prevented the interviewees from conversing freely about issues not included in the interview schedule. However, this 'more controlled', standardized open-ended interview paid dividends regarding obtaining the data which the researcher regarded as having direct implications for satisfying the tentative objectives and underlying assumptions of the study.

4.4.3 Collection of documents[21]

During all the stages of the research, the opportunity to collect potentially relevant documents was taken (summarised in **Table 4.1**). These documents include those that were collected during the researcher's visit to Australia (i.e. VEEC 1991; QED 1993) and Scotland. Occasionally, interviewees were reluctant to provide the researcher with relevant course outlines; in these instances, the researcher contacted the interviewees after the interviews, but without much success. For multisited case study two, however, the syllabuses (centralised and prescribed) of all the subject areas at all year levels in the teacher education curriculum for the colleges in the Western Cape were obtained[22].

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[20] This situation closely resembled the views of Elliot (1981) and Patton (1990) who argue that the standard open-ended interview is characterised by the interviewer asking pre-set questions which, nonetheless, allow the interviewees the freedom to digress and raise their own topics.

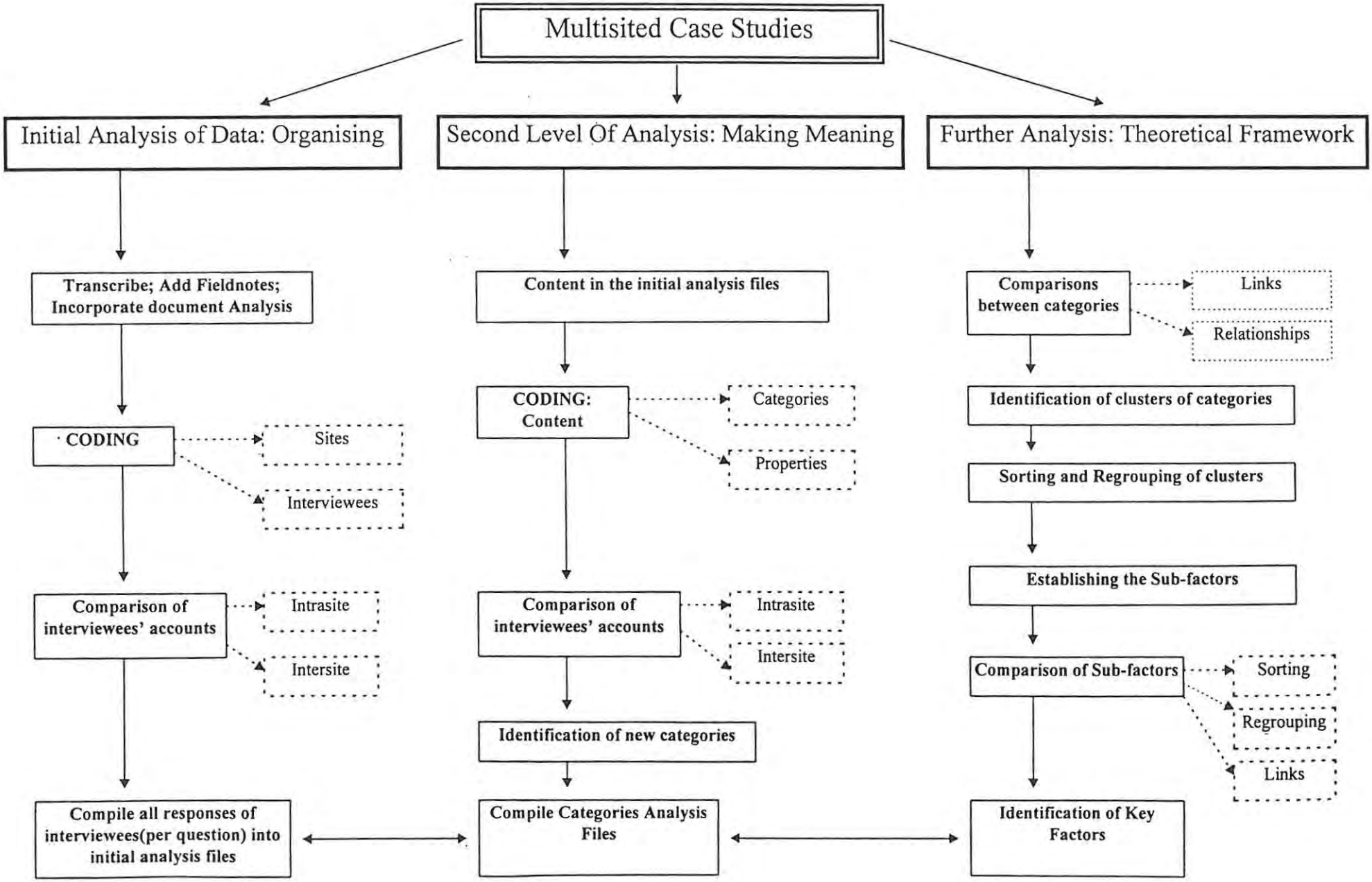
[21] See section 4.5.4 for how the documents were analysed.

[22] Information obtained from an analysis of certain documents from overseas institutions is used in the analysis of the data (chapters five and six) to inform the identification of a strategy for environmental education at initial teacher education level in the Western Cape in chapter seven.

Table 4.1: Documents collected during the research process.

MULTISITED CASE STUDY ONE	MULTISITED CASE STUDY TWO	OVERSEAS DOCUMENTATION
Prescribed syllabuses followed at certain institutions, for the different year levels.	The **syllabuses** in the subject areas of: • biology, • geography, • history, • education, • mathematics, and, • language, for all year levels in the teacher education curriculum for the colleges in the Western Cape. **Further documentation on**: • projects, • fieldwork, • environmental day programmes, • programmes of environmental clubs, and, • policy documents.	**Course outlines** for environmental education from the institutions.
Course outlines followed at other institutions.		Outline of **project work**.
Resource materials: • fieldwork activities, and, • descriptions of project work.		**Resource materials**: • fieldwork activities, • study guides, that include course readers for students and presenters, and, • format and outline of assignments.
Copies of examination papers on environmental education at a number of institutions.		**Policy documents available**
Policy documents available		

Figure 4.2 Employment of Grounded Theory: Data Analysis



4.5 RESEARCH PROCESS: Analysis of the data

Following the grounded theory approach, the gathering of data and the analysis thereof (4.5.1) proceeded simultaneously within each of the institutions/ sites of the multisited case studies. In this regard, Burgess (1985: 5) remarks that trends in social research (including education) display a move from distinct, separate "stages" to a position where the gathering, analysis and the theorizing of the data are closely related. He quotes Bechhofer (1974 in Burgess 1985: 6) who argues that:

> The research process... is not a clear-cut sequence of procedures following a neat pattern but a **messy interaction** between the conceptual and empirical world, deduction and induction occurring at the same time [my emphasis].

The data analysis process for the research is described in terms of the three levels of analysis that were followed (as shown in **Figure 4.2**):

- initial data analysis;
- the second level of data analysis (content analysis and the constant comparative method); and,
- the further data analysis (identification of the key factors).

A distinction in this research is made between the second level and further analysis of data, which is combined into "analysis of data after collection" (Cantrell 1993: 98). This methodological sequencing finds precedent in Cantrell (1993: 98) who argues that:

> ...the most typical and widely used method is the development of a coding through content analysis - identifying categories or themes based upon patterns and ideas that emerge from the data. The researcher reads through the data, looking for primary patterns and ideas that emerge from the data (i.e. words, phrases, thoughts, events) which repeat and stand out...Through sorting, comparing and contrasting, a system for classification emerges.

4.5.1 Initial analysis: Organising the data

The purpose of the initial[23] analysis was to organise the data as it was collected. It included:

- transcribing of the interviews;
- recording the direct quotes of an interviewee for a specific question from the interview schedule;

[23] This is what Cantrell refers to as "analysis during data collection" (1993: 98).

- outlining additional comments and responses to a specific question;
- adding supplementary fieldnotes taken down during the interview;
- applying information from the documents that were collected from the site to clarify some of the accounts of the interviewees and for validation purposes, (see section 4.6.2; further uses of documents are outlined in section 4.5.4);
- comparing the responses to a specific question of all the interviewees at a site;
- making notes of consistencies and inconsistencies of the accounts relayed by the interviewees at a site;
- organising all the responses to a specific question of all the interviewees at a site via a system of coding;
- comparing the responses (to each question) of the interviewees between the different sites; and,
- compiling all the responses to a specific question, of all the sites, into the initial analysis files.

The initial analysis of the data of all the interviews at an institution for both multisited case studies followed the steps outlined above. The interviewees' responses were grouped under each of the headings of the questions posed during the interview. These were then placed into 'initial-analysis files'[24]. After interviewing all the interviewees at an institution, the researcher proceeded to the next institution, following the same procedure, thus maintaining the efficacy of a multisited case study (Burgess et al. 1994). Following the completion of the interviews at an institution, the initial-analysis files were revised to add the new information obtained (per question), until all the responses of the interviewees at the thirteen institutions for multisited case one were placed into the initial analysis files. Responses from each interviewee were compared with that of another interviewee at the same site (intrasite), and then comparisons were made between the responses of the interviewees at the different sites (intersite) within a multisited case. This process of comparison was assisted by coding which was employed at two levels. First, it served to organise the data into the initial analysis files (referred to as indexing by Richards and Richards 1994), signifying the first step in the conceptualisation of the data (Burgess 1994). These codes were assigned to separate the interviewees within (numbers for the different interviewees: 1, 5, 3 etc.) and between the sites (letters for the various institutions E1; D3; G1; G5 etc.). Second, to facilitate the second level of data analysis (see section 4.5.2), a different method of coding (colour and symbol coding) was employed to assist with the summarizing and synthesis of the data, which resulted in the identification of the various categories that were emerging.

[24] Such files contained the responses of all the interviewees' (in a multisited case) to a particular question.

4.5.2 Second level of data analysis: Making meaning of the data

The second level of the analysis of the data for a multisited case took place after the data from all the sites had been gathered. At this stage of the data analysis process, a different level of coding was employed to facilitate the generation of categories and the relationship between these emerging categories from the 'content'. Following Patton (1990) and Cantrell (1993), content analysis, i.e. the process of identifying, coding, and categorizing the primary patterns in the data was employed. The 'content' refers to the data in the initial-analysis files. These were colour coded, and the different colours and symbols were employed to identify the emerging 'categories' (colours) and 'properties' (symbols, i.e. triangles, squares, stars, etc.) of that category (Hughes 1994; Mason 1994; Kirby and McKenna 1989). A 'category' is viewed as a conceptual element of a theory, whilst a 'property' is an element of a category (Glaser and Strauss 1971: 36). A concept, however, is identified in terms of an idea/ phrase/ word/ theme, and is distinguished from the direct responses of the interviewees. In this manner, the interviewees' responses in the 'initial-analysis files' were sorted into categories and, in so doing, the categories emerged. These categories, and their underlying properties, (identified and named by the researcher) emerged from the data.

Further comparisons at this level entailed sorting and re-grouping the data from category to category, or to develop new categories, and to establish links between the categories, which is the basis of the constant comparative method (Kirby and McKenna 1989). In this regard, the interviewees' responses (initial analysis files) were rearranged to group similar responses together, as far as possible, or to create new categories. This resulted in clusters of categories that were similar (see section 4.5.3). At this stage, the researcher referred back continuously to the original interview transcriptions to avoid misinterpretation of the interviewees' accounts. Comparisons were made between the accounts of the interviewees within a site (intrasite) and between the various sites (intersite) within a multisited case. The constant comparative method enabled the researcher to identify similarities and differences, and the interconnections and interrelationships in the data between the categories (Glaser and Strauss 1971; Hammersley, Scarth and Webb 1985).

A potential weakness of this form of representation, however, is that it might become too reductionist. To prevent this from occurring, direct quotations from the interviewees are listed, where relevant. It may be added that in many instances several of the interviewees held a specific view, although only one or two quotations were used to illustrate a point (see chapters five and six). The data, at the end of the second level of analysis, was grouped in 'categories-analysis' files.

4.5.3 Further analysis of the data: Identification of key factors

For the further data analysis (see **Figure 4.2**), the 'categories-analysis' files were reflected on and arranged together. Regrouping and rearrangement were continuously carried out. Further analysis resulted in searching for links and relationships between the different categories-analysis files. This resulted in the grouping of some of the categories-analysis files into bigger 'clusters', named the 'sub factor' files. At this stage of the data analysis, the researcher was looking for links and connections between the sub factor files, and, after sorting, grouping and re-grouping these sub-factors, the key factors, which Tilbury (1993) refers to as the core variables, were identified. Concurring with Tilbury (1993: 249), the key factors "link the data together". These key factors (clusters of 'sub-factors' files) are regarded as the crucial areas that influenced environmental education (or the potential for environmental education) at the various sites. For multisited case one, the key factors identified were the:

- influence of the teacher educators (course presenters);
- environmental education courses functioning at a specific site;
- praxis of environmental education; and,
- professional development of the teacher educators (see chapter five - **Figure 5.1**).

The key factors identified for the second multisited case study are:

- the influence of the teacher educators;
- an exploration of the bearing of the existing subject areas in the teacher education curriculum on environmental education;
- an examination of the institutional influences, and enabling infrastructures for environmental education that exist within and between the different colleges of education; and,
- the aspect of professional development of the teacher educators (see chapter six - **Figure 6.1**).

Although the second (see section 4.5.2) and further analyses for the two multisited case studies proceeded independently, there was a great resemblance in the key factors. The influence of the teacher educators, curricula influences and the issue of professional development were the central recurring themes for both multisited case studies. The last aspect in both multisited case studies, the aspect of the professional development of the teacher educator, is crucial to this study as it seeks the reasons for the barriers to the implementation of a viable environmental education in teacher education programme. Also, whilst the data obtained from these case studies speak for themselves, the viability of environmental education in the light of education for sustainable living should be viewed against the backdrop of current documentation which informs practice at both a structural (i.e. content, methodology and implementation of environmental education in initial teacher education) and an

ideological level at the institutions involved in the study.

4.5.4 Analysis of documents

Documents (summarised in **Table 4.1** see section 4.4.3) were first evaluated via "external and internal criticism" (Cohen and Manion 1994: 52-53). In this regard, subsequent to verifying the authenticity of the documents (external criticism), the documents collected for both multisited case studies one and two were scrutinised to:

- clarify certain unclear responses of some of the interviewees that could be obtained from, for example, the syllabuses or course outlines;
- validate interviewees' responses, for example, programmes conducted on environmental days, information on the activities of environmental clubs and societies; and,
- analyse aspects relating to the course structure e.g. time, examinations, progression.

The documents were further subjected to internal criticism. The latter was steered by the analysis pertaining to texts and discourse (Ball 1993; Grundy 1994a; b), and contexts (Apple 1994; Grundy 1994a; b see section 3.6) to ascertain the worth of certain facets pertaining to aspects that could not be observed during the interviews, including:

- the nature of projects and fieldwork activities in multisited case study one;
- the philosophical underpinnings of the environmental education courses (multisited case study one), explored via the interpretation of assignment outlines and examination papers; and,
- the interest in environmental education (for multisited case study two), by examining outlines of programmes conducted during diarised environmental days and schedules of environmental clubs and societies.

Regarding multisited case study two, the various syllabuses were analysed more than once, for additional purposes, in the light of texts, discourse (Ball 1993; Grundy 1994a) and contexts (Apple 1994; Grundy 1994a; b).

- Firstly, they were analysed to ascertain if the environment is mentioned in any way.
- Thereafter they were analysed again to determine whether any environmental issues are referred to in any of these syllabuses.
- A third round of analysis was carried out to gain some insight into the ideological perspectives (for example, the 'prescribed' roles of the teacher educators and the students; hidden curriculum, etc.) that underpin initial teacher education curricula in the Western Cape Region.
- Documentation on projects and fieldwork were analysed to determine whether environmental

education was already functioning at these institutions (informally) which could inform the aim of the research.

In summary, the purpose of documentation was to provide additional information as well as to clarify and validate data (see section 4.6.2) obtained during the interviews (Cohen and Manion 1994; Cantrell 1993). Together with the data obtained from the case studies, the documentation therefore raised issues pertaining to the reliability and validity of the data, and asked questions which focus on the ethics of research.

4.6 ETHICAL ISSUES, VALIDITY AND RELIABILITY FOR THE RESEARCH

4.6.1 Ethical Issues

Denzin (1970) and Lather (1986a) argue that no research is value free in that all researchers take value and ethical stances in the research process. These stances are underpinned by the generation of valid and reliable knowledge (Merriam 1988). However, it is up to the researcher to ensure that the participants are safeguarded against any repercussions emanating from their expression of perceptions which aid and abet this generation of knowledge.

Given the fact that the interviewees are practitioners, and given the structural impediments to 'freedom of expression' in the organisations in which they work, especially in the light of the sensitive nature of the area being probed, ethical measures had to be taken to safeguard the confidentiality of the information expressed and the anonymity of the participants. Codes were therefore assigned to institutions within each of the multisite cases (A, B, C, etc.), and to the interviewees at a specific institution (A1; A2; D1; D4, etc.), to safeguard and respect the views of the interviewees (Simons 1989).

These ethical necessities notwithstanding, they have their limitations regarding the transparency of institutions in so far as the possibility of entering a dialogue which, at its roots, is motivated by the vision of transformation, on the part of the researcher. Confidentiality (and to a certain extent, anonymity) need, therefore, to be reviewed, if collaborative and participative approaches to environmental education are to be fostered, in the context of the underlying aim of the research (see section 1.6). Nonetheless, granted that qualitative research is neither value-free nor neutral, educational research has to uphold and be grounded in ethical values such as honesty, fairness and respect for

others, over and above the fact that privacy, confidentiality and informed consent need to be secured (Soltis 1989: 129)[25].

Whatever perspective is taken regarding the ethics underlying research, there is, nonetheless, the requirement that data is valid.

4.6.2 Validity

Validity is a contentious issue in qualitative research (Guba and Lincoln 1981; Lather 1986a; b; Maxell 1992; Reason and Rowan 1981). Advocates of the positivistic paradigm criticize the lack of 'conventional' means of validation procedures in qualitative research. This criticism is strengthened by the fact that the categories of validity employed in qualitative research (e.g. internal/ external validity) are founded on positivist assumptions which underlie quantitative research designs. In this connection, Maxell (1992: 282-284) argues that:

> All qualitative researchers agree that not all possible accounts of some individual, situation, phenomenon, activity, text, institution or program are equally useful, credible or legitimate...the ways in which researchers make these discriminations do not pertain entirely to the internal coherence, elegance, or plausibility of the account itself, but often refer to the relationship between the account and something external to it...[thus]...validity refers to accounts, not to data or methods.

Encompassed within this argument is the search for a reformulation of 'trustworthiness' (Cantrell 1993; Mishler 1990). Hammersley and Atkinson (1983) argue that data can be neither valid nor invalid; therefore, to insist on a form of quantifiable validity is to set up a red herring. Of actual concern, instead, should be the inferences drawn from the data. This implies that a greater understanding of the research account becomes more important for qualitative research than the validity of the data in the positivistic sense (Maxell 1992; Mishler 1990).

In this regard Maxwell (1992) identifies five broad categories of understanding that are relevant to qualitative research, and five corresponding 'types' of validity that concern qualitative researchers. These encompass descriptive validity, interpretive validity, theoretical validity, generalizability and evaluative validity. Implicit here is for the researcher to be 'morally obligated' (Soltis 1989) to give

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[25] Griffin (1985), in raising a pragmatic point relating to ethics, argues against research being a one-way process, and urges the researcher not to ignore her/his responsibility to the interviewees. In this regard the researcher recognizes the need that the interviewees need to be informed when this thesis is completed, and that a copy of it should be made available to them if they wish to read it.

a true reflection of the accounts relayed by the interviewees, and to describe and interpret these in a clearly stated, valid manner[26]. In other words, at stake is not the positivistic issue of seeking objectivity and truth; instead, the adding of depth and insight to the analysis of data (Fielding and Fielding 1986) and the phenomena under study (Muralidahr 1993), and the relaying of trustworthy data (Hammersley and Atkinson 1983; Mishler 1990) are central to qualitative research.

In this context Lather (1986a) argues that alternative techniques and concepts need to be devised for the acquisition and clarification of trustworthy data in order to counter the positivistic notions of validity. One such technique proposed by a number of researchers is that of triangulation[27] (Denzin 1978; Guba and Lincoln 1981; Lather 1986b; McFee 1992; Merriam 1988; Muralidahr 1993).

In this study, in order to ensure the validity of the data, three forms of triangulation were employed. Firstly, the interviews were counterpoised with the collection and analysis of relevant documents, which enabled the researcher to employ triangulation 'between techniques' of data collection (Denzin 1978; McFee 1992). Secondly, regarding triangulation 'within a technique' (McFee 1992), within interview schedules one and two, the same question was put to the interviewees in a different manner to gain greater insight[28]. And thirdly, 'data triangulation' (Muralidahr 1993) was employed in that all the course presenters for environmental education were interviewed at a particular research institution/ site (multisited case study one), which served to validate aspects of the data supplied by the different interviewees at the same institution. For multisited case study two, most of the departmental heads, in addition to the rector at the institutions, were interviewed for the same reason (Denzin 1978; Muralidahr 1993).

Hence, comprehensive precautions were built into the research process to ensure the validity and objectivity of the data. These, however, cannot be assumed adequate unless they are reliable.

4.6.3 Reliability

Reliability refers to the extent to which the findings of a research project can be replicated and whether

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[26] This was the procedure followed by the researcher. Furthermore, copies of the fieldnotes, recorded interviews, and all relevant information are available for scrutiny, provided the ethical issues (anonymity and confidentiality, as outlined above) are heeded to.

[27] Triangulation is a technique for considering data-worthiness (validating research findings) by valuing the accounts of the research from various perspectives (Merriam 1988; Denzin 1978; McFee 1992; Muralidahr 1993).

[28] This is relayed in chapters five and six.

similar conclusions, based on the same data and theory, can be drawn (Cantrell 1993). Reliability, in the positivistic sense is, however, problematic in qualitative educational research as situations do not remain static. In this regard, several authors (Guba and Lincoln 1981; Lincoln and Guba 1985; Merriam 1988; Patton 1990; Reason and Rowan 1981) argue for alternative techniques to ensure reliable and valid research findings. Merriam (1988: 171-172), for example, argues for alternative techniques in reliability for case studies

> [B]ecause what is being studied in education is assumed to be in flux, multifaceted, and highly contextual...and because the emergent design of a qualitative case study precludes apriori controls, achieving reliability in the traditional sense is not only fanciful, but impossible.

In addition, alternative techniques propose that in research, the researcher's position should be clarified and clearly stated (Goetz and LeCompte 1984: 214-215)[29], involving a disclosure of the:

- assumptions behind the study;
- theory and methodological positions; and
- researcher's position vis-a-vis the interviewees.

4.7 INFORMATION ABOUT THE INTERVIEWEES

4.7.1 Multisited case study one

Twenty five interviewees (six females and nineteen males) from thirteen teacher education institutions from different provinces in South Africa were involved in this case study. Since the interviews were conducted in English, which was not the home language for seventeen of the interviewees, those at the colleges in the North West Province[30] lasted longer than anticipated to ensure that there were no misinterpretations of their accounts. Afrikaans speaking interviewees did not pose a problem as the researcher is fully conversant in Afrikaans and uncertainties were immediately clarified.

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[29] These suggestions (Cantrell 1993; Goetz and Le Compte 1984) are facets which the researcher outlines in the thesis. The assumptions underlying the research have been stated in chapter one (section 1.6). This chapter gives a detailed description of the research process - the methodology, methods and techniques used, so that a similar study can be reconstructed and corroborated, to secure the aspect of reliability, bearing in mind that replication of a qualitative study might not yield identical results (Merriam 1988). It also relays the researcher's position in relation to the interviewees.

[30] Bophuthatswana, when the interviews were conducted.

Table 4.2 Summary of interviewees involved in multisited case study one.

NAMES OF TERTIARY INSTITUTIONS	LOCATION OF THE INSTITUTIONS
Hebron College of Education	North West Province (ex-Bophuthatswana)
Marapyane College of Education	"
Moretele College of Education	Johannesburg, Gauteng
Johannesburg College of Education	North-West Province
Strydom College of Education	Durban, KwaZulu-Natal
Edgewood College of Education	North-West Province
Thlabane College of Education	Wellington, Western Cape
Boland College of Education	Cape Town, Western Cape
Cape Town College of Education	Grahamstown, Eastern Cape
Rhodes University	Westville, KwaZulu-Natal
University of Durban- Westville	Stellenbosch, Western Cape
Stellenbosch University	Cape Town, Western Cape
University of Cape Town	
HOME LANGUAGE OF THE INTERVIEWEES	The home languages of the interviewees included: • Setswana: seven interviewees; • Ghanian: two interviewees; • Fanti: one interviewee; • Zulu: one interviewee; • Venda: one interviewee; • Tamil: one interviewee; • Afrikaans: four interviewees; and, • English: eight interviewees.

4.7.2 Multisited case study two

Forty interviewees were involved in this multisited case study. Although all the colleges (where the interviewees were lecturing) are now administered by the Western Cape Education Department (WCED), when the data was collected, five of the them were administered by the former House of Representatives, whilst one was administered by the Department of Education and Training (see **Table 4.3**). The researcher interviewed teacher educators in senior positions (rectors and heads of subject departments) at the colleges, for these are the key persons who determine policy at colleges. Considering the aim of the research (see section 4.0), if the potential to implement an innovation is considered, individuals in positions of 'authority' are more likely to promote or, conversely, to impede such innovations (like environmental education). Where the Head of a subject department was not available (two instances), the senior lecturer was interviewed. What was disappointing, and yet very typical of the South African education system, was that all the rectors were males, and of all the heads of subject departments, only twelve out of thirty-six were females, reflecting the gender inequalities and a discrimination against females regarding senior positions at colleges (NEPI 1992a).

4.8 CONCLUSION: REFLECTIONS

This chapter has described the research design in terms of methodology (section 4.1) method (4.2) and techniques (sections 4.3; 4.4 and 4.5). Ethical issues were discussed in section 4.6.1, while rigour and trustworthiness were discussed in terms of validity (section 4.6.2) and reliability (section 4.6.3) in the light of qualitative research. Background information about the interviewees was also outlined (section 4.7).

In terms of reflecting on the research process, a review thereof, in reverse order, starting from the techniques, then the method, and, lastly, the methodology will be discussed. Regarding the techniques employed, a major shortcoming identified in terms of data gathering is the exclusion of participant observation for multisited case study one. Notwithstanding the reasons outlined in section 4.4 for excluding this form of data gathering, the inclusion of participant observation might have enriched the data considerably. This form of data collection provides first-hand experience of events as they occur within context and prevents prejudice, bias and selective perceptions (Cantrell 1993). Additionally, to gain further insight into the ideology underlying the teacher educators' practice (Grundy and Hatton

Table 4.3: Multisited Case Study Two: Information of the colleges and the interviewees

NAME OF THE COLLEGE	LOCATION OF THE COLLEGE
Bellville College Hewat College Athlone College Sohnge College Wesley College Good Hope College	Bellville Athlone Paarl Worcester Salt River Khayelitsha
POSITION (STATUS) OF INTERVIEWEES AT COLLEGES	Rector (Head of College) • Heads of Subject Departments of: • Biology, • Geography, • History, • Language (English), • Education, and • Maths
HOME LANGUAGE OF THE INTERVIEWEES	• English: seventeen interviewees; • Afrikaans: eighteen interviewees; and, • English and Afrikaans: five interviewees.

1995), close liaison and interaction is necessary, which might have been achieved via participant observation. Finally, participant observation would have enabled the researcher to see a holistic picture of the functioning of the environmental education courses, which might have provided an enhanced insight into these practices.

When viewing the three major sources of data collection for case studies - participant observation, collection of documentation and interviewing (Cantrell 1993; Yin 1989), the standardized-open ended interview strategy (Elliot 1981; Patton 1990) employed here (see sections 4.4.1 and 4.4.2) also presented certain flaws. Having been anxious not to leave out any aspect, and besieged with obtaining the maximum information (considering time and financial implications implicit in the extensive travelling schedule), the researcher wanted to fit in too many pre-set questions into one interview. Perhaps an interview schedule containing fewer pre-determined questions (like the one employed during the researcher's overseas visit) would have been a more appropriate alternative.

Regarding the method (see sections 4.2.1, 4.2.2 and 4.2.3), which has a bearing on the methodology (see section 4.1), one of the points of critique levelled against case studies by Walker (1983), relates to the interventionist nature (see section 4.2.3) of interpretive studies (Carr and Kemmis 1986; Hart 1993; Robottom and Hart 1993) where the researcher is often an outsider (Robottom 1993), as opposed to critical reflective inquiry (Hart 1993; Robottom 1993) where the researcher is the practitioner. While acknowledging the validity of this critique, which could characterise this research as interventionist, it is important that the critique be viewed in relation to the aim (section 4.0), the assumptions (see section 1.6) and the historical context underlying this research.

Regarding the historical context underlying this research (see section 1.6), the research study was initiated due to an unsuccessful attempt to incorporate environmental education into the curriculum for teacher education at a college of education. The constraints that impeded this initiative can be assigned to the broader formal education system in South Africa, centred within the challenges in the way of change at macro (which includes a lack of formal policy), meso (approaches to initial teacher education) and micro (curricular constraints) levels. A significant barrier, however, was the powerlessness of the teacher educators, which is linked to the choice of the method employed in this thesis. Several factors contributed to the researcher's having excluded, for example, action research, in favour of a research embedded within the interpretive paradigm. Central was that those impediments, which contributed to failure of the innovation where the researcher works, are manifested in the other colleges, since external examinations, centralised syllabuses and a general resistance to change are prevalent at all these colleges. The disempowerment of the teacher educators in this regard should also

be highlighted.

The researcher acknowledges being an 'outsider', 'intervening' in the lives of the interviewees; however, she is also a practitioner, (like the interviewees) and wanted to explore what practitioners of environmental education are 'thinking' and 'doing', which has made environmental education feasible elsewhere, while it did not 'take off' where she operates. This is not to say that environmental education practices at these institutions are successful. However, it does provide a starting point for formulating appropriate environmental education practice at initial teacher education level.

The culmination of this research should therefore be viewed as a stepping stone to the next stage of the process (see epilogue), where the researcher, having reflected on the outcomes of the two multisited case studies, incorporated environmental education into the curriculum for initial teacher education at the college of education where the failure of the initial innovation (see section 1.6) sparked the initiation of this research study.

CHAPTER FIVE

MULTISITED CASE STUDY ONE: THE STATUS OF ENVIRONMENTAL EDUCATION IN INITIAL TEACHER EDUCATION FOR SENIOR PRIMARY STUDENT TEACHERS IN SOUTH AFRICA

5.0 INTRODUCTION

Education for sustainable living (the conceptualisation of environmental education for the 1990s), demands a reconstruction of current teacher education (see section 3.3.3). This reconstruction requires changes at macro, meso and micro levels, that will advance the realisation of education for sustainable living (see chapter two). In attempting to ascertain the status of environmental education in initial teacher education for senior primary student teachers in South Africa, the multisited case study described in this chapter drew on objectives one, two and four of this study (see section 1.6). Informed by objective one that investigated the standing of environmental education at the different institutions nationally, objective two explored those aspects in current environmental education programmes at initial teacher education level for senior primary student teachers at these institutions, which may realise the changes necessary for the incorporation of education for sustainable living into the curriculum for initial teacher education at teacher education institutions in the Western Cape. Objective four examined what the teacher educators, who present the environmental education courses at institutions nationally, perceive as barriers[1], which might obstruct the successful implementation of education for sustainable living at initial teacher education level.

Advised by the grounded theory approach (see sections 1.7; 4.1.4), that was developed through the case study method (see sections 1.7; 4.2), the analyses of the data obtained from the interviews in this first multisited study, resulted in the emergence of four key factors (see section 4.5.3) which underpinned these three objectives. The relationship between the objectives, the key factors and the

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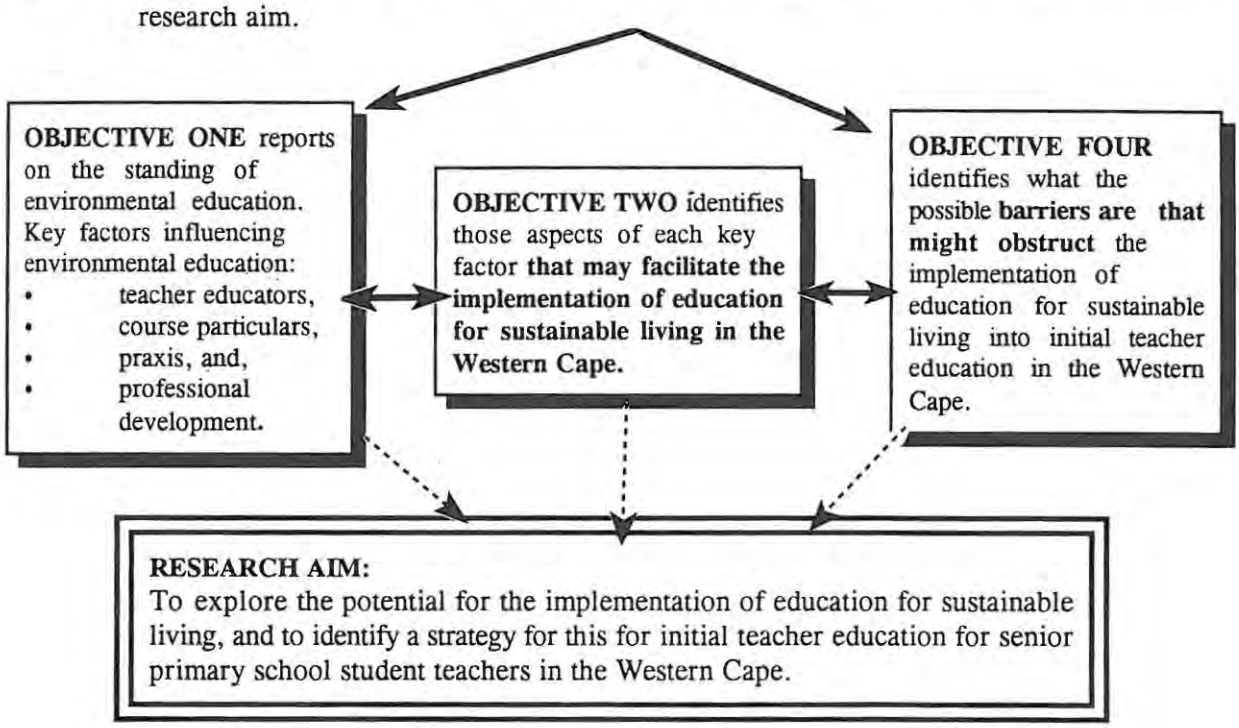
[1] Definite impediments in the way of realising the changes necessary for education for sustainable living emerged from the key factors and their concomitant sub-factors (see section 5.5). These impediments, and the barriers identified specifically by the interviewees in this multisited case study, and in multisited case study two (section 6.5) are considered in chapter seven, where guidelines for a framework in education for sustainable living is deliberated on.

general aim of the research is outlined in **Figure 5.1**. The interplay and interrelatedness between the macro (see sections 3.1; 3.2), meso (see section 3.3) and micro (see section 3.4) level challenges necessary for the realisation of education for sustainable living are discussed in terms of each key factor. In each instance, the data obtained from the interviewees, in relation to both the key factors which emerged, and their concomitant sub-factors, inferences were drawn during data analysis in terms of education for sustainable living. This procedure was followed in order to ascertain the extent to which current teacher education practices in environmental education facilitate the realisation of education for sustainable living, and, if not, to identify those areas in which they are deficient. In doing so, and in attempting to explain the reasons for these deficiencies, alternative guidelines for education for sustainable living in initial teacher education manifest themselves[2]. The questions that were put to the interviewees are contained in interview schedule A in the Appendix section.

Figure 5.1 Multisited case study one: The relationship between the objectives, key factors and the research aim.



The philosophical framework for education for sustainable living, grounded in socially critical educational and ecosocialist environmental ideological positions, forms the foundation which underpins this investigation (see section 3.1.4). This framework encompasses:

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[2] These will be dealt with fully in chapter seven.

- a critical eco-socialist environmental ethic;
- a critical environmental consciousness;
- critical thinking and problem-solving skills;
- political literacy; and,
- critical praxis.

While the changes necessary for the realisation of education for sustainable living cannot be viewed in isolation since they are interrelated and multidimensional, a critical environmental consciousness and a critical eco-socialist environmental ethic may foster change at macro level. Critical praxis, however, is an important dimension to bring about change at all levels, including the realisation of change at meso level, when viewed as a pedagogical approach[3]. Political literacy and critical thinking and problem solving skills in turn, may secure the micro level changes.

5.1 KEY FACTOR ONE: THE INFLUENCE OF THE TEACHER EDUCATORS

The first key factor which emerged from the data analysis highlighted the influence of the teacher educators, the major stakeholders in teacher education, (ANC 1994; Hofmeyr et al.- *IPET, TSUD Report* 1994; IPET, CEPD 1994), also for environmental education (Hart 1990a; Huckle 1995; Irwin 1988). This key factor is underpinned by two sub-factors:

- the knowledge-base of the teacher educators in their field, as well as their formal qualifications in environmental education, their participation in environmental education organisations[4] and their primary school teaching experience;
- their ideological positions and persuasions regarding education and environmental education, their understanding and perceptions of the environment, their perceptions on curriculum and what should be included in a curriculum for environmental education within teacher education.

In the light of the changes necessary for the realisation of education for sustainable living, it is argued by the researcher that a solid knowledge-base, and the associated experiences in the area of environmental education may secure the meso level changes, (the furthering of critical reflective

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[3] As a pedagogical approach, to foster change at meso level, critical praxis requires the integration of critical reflective teaching and moral action.

[4] The interviewees' affiliation to environmental education organisations reflects their interest in this field (Huckle 1987; Spork 1992), and it can serve as an avenue to supplement their knowledge base in environmental education.

practitioners as a pre-requisite for critical praxis - see section 3.3). The changes at meso level, however, are to a large extent dependent on those changes necessary at macro level (see sections 3.1; 3.2), where the practitioners may employ socially critical educational orientations and ecosocialist environmental ideology to advance the goals of education for sustainable living (see section 3.1.4). The macro level changes, in turn, demand a reconceptualisation of practitioners' perceptions of the curriculum (see section 3.4.1), which are embedded within the challenges to realise change at micro level. The interplay and interrelatedness between the macro, meso and micro level challenges that confront practitioners of environmental education are subsequently discussed, in terms of key factor one, underpinned by its two sub-factors.

5.1.1 The knowledge base of the teacher educators

The 'poor qualifications' of teacher educators and their lack of experience in the fields for which they are preparing students to teach have been identified as areas of concern (NEPI 1992a; Salmon and Woods 1991). Thus, since both formal and ongoing interaction and support within environmental education for practitioners are necessary for the successful functioning of environmental education (Irwin 1988; Stone 1990; Tilbury 1992; Williams 1992), this sub factor reflected the interviewees' knowledge-base in environmental education (i.e. formal qualifications and participation in environmental organisations[5]) and their experience in the area of primary education. Insight into these domains was achieved through the question *"Was environmental education included as part of your formal education?"* (biographical data question 5) since it is assumed that educators practise with greater confidence in a given area if they are educated in that area (Hartshorne 1991; Williams 1992).

An analysis of the interviewees' responses arranged their qualifications in the field of environmental education into two categories (see sections 4.5.2 - 4.5.3). The first category comprised seven interviewees who had studied postgraduate courses in environmental education:

- two had studied environmental education as part of a Masters degree;
- two had completed post-graduate diplomas in environmental education at overseas institutions;
- one had opted for an elective in environmental education for a B.Ed degree; and,
- two held Ph.D (and Masters) degrees in the area of environmental education.

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[5] Participation in environmental organisations signifies an interest in this field, and it can serve to broaden their knowledge base in environmental education (Spork 1992).

The second category, applicable to five interviewees, related to the situation where aspects of environmental education had been included as a component of specific courses they had studied:

- three interviewees said that environmental education had been incorporated in their course work in geography at university level;
- one interviewee specified that environmental education had been included within the area of environmental science; and,
- one interviewee said environmental education had formed part of a rural resource development course.

The analysis revealed that more than half (thirteen) of the interviewees had no formal qualifications in the area of environmental education. This has adverse ramifications for the challenges to realise change, in terms of practising education for sustainable living with the necessary confidence and competence, an opinion that is supported, by, for example, Williams (1992). These ramifications may impact on the nature of the environmental education programmes at the institutions, undermining the potential for realising change at all levels. Teacher educators who lack the necessary background often fail to adopt more critical and reflective perspectives, which is echoed in the sentiments of Hart (1990a) for environmental education.

Linked to the interviewees' formal qualifications in environmental education is their affiliation to environmental education organisations. Data in this regard was obtained from the analysis of question 73: *"Are you a member of any organisations involved with the promotion of environmental education?"* Fourteen of the interviewees said that they were affiliated to environmental education organisations, (including all the interviewees at the four universities), but eight of the thirteen interviewees (who held no formal qualifications in environmental education) had not broadened their knowledge base (informally) via this source.

This unsatisfactory position correlates with the findings of NEPI where the vital role of the teacher educators is acknowledged, and where it is argued that "the poor quality of teacher educators [is] one of the central weaknesses in the [education] system" (1992a: 86)[6]. In addition, this disturbing reality finds articulation in the assertion by some environmental educators that not being part of (and not participating in) environmental education movements may contribute to the lack of socially critical approaches to environmental education, which is fundamental for the successful functioning

[6] This statement is based on the analysis of a survey of the Teacher Education research group of the National Education Policy Investigation (Pendlebury et al. 1992:6).

of education for sustainable living (Huckle 1987; Spork 1992). The distressing nature of this situation is further exacerbated by the fact that only four of the interviewees had any primary school teaching experience. Whether teacher educators without the necessary experience and expertise are equipped to embark on student teacher development programmes is doubtful, especially in the South African context where primary schooling is characterised by high dropout, failure and repetition rates, consequently begging for redress in terms of efficiency, effectiveness and quality (Motala 1993).

5.1.2 The environmental and education ideological positions of teacher educators

The second sub-factor examined the interviewees' environmental education ideological[7] positions. The ideological orientations are central to the challenges associated with the realisation of change at macro level (see sections 3.1- 3.1.4). It is argued by the researcher that the practitioners' practice is largely shaped by their ideology, an opinion which is widely supported (Greenall 1989; Grundy and Hatton 1995; Trainer 1990; Walsh 1984). Education for sustainable living, however, calls for alternative practices, (centred within the challenges to realise change at meso level) to advance critical praxis.

The interviewees' ideological positions were examined in relation to their:

- Perceptions of the environment, which shed light on their environmental ideological positions. The latter, however, gives some indication of their understanding of the causes of the environmental crisis;
- Understanding of environmental education, which reflects both their environmental ideological perspectives (in terms of the New Environmental Paradigm/ ecocentrism verses the Dominant Social Paradigm - Milbraith 1984; O'Riordan 1989) and their educational ideological orientations (vocational, liberal or socially critical - Kemmis et al. 1983);
- Perceptions of a curriculum, in terms of inclusivity (QED 1993), that added further insight into their environmental education ideological positions; and,
- Suggestions about what should be incorporated into a framework for environmental education. While this aspect reflects the interviewees' environmental education ideological orientations, it also explores the challenges that confront the realisation of change at micro

[7] The researcher realises that further interviews and research are needed to gain more insight into the ideological positions of the interviewees, and that this cannot be decided via one interview. However, an exploration of the interviewees' perceptions of environment, environmental education, a curriculum, and their suggestions regarding a framework for environmental education, expands further on their environmental education ideological positions.

level.

This information was then employed to construct meaning of the interviewees' understanding of environmental education in terms of education for sustainable living.

5.1.2.1 Perceptions of the environment

To find out what their perceptions of the environment entailed, the interviewees were asked: *"How would you define 'environment'?" (Question 10)*. Their responses were analysed in terms of the concept of the total environment (Queensland Education Department 1993; see section 1.2.1), which comprises the three interacting and interdependent components of the natural, social and personal environment centred within the New Environmental Paradigm (Milbraith 1989; see section 3.1.3). Six categories of interpretations of the environment, represented in **Table 5.1**, were ascertained. Each category of interpretation is illustrated by one or two direct quotes (although there were other similar views) expressed by the interviewees.

Of the eight interviewees who held a narrow view of the environment, typical of technocentrism (O'Riordan 1981; 1987; 1989), embedded within the Dominant Social Paradigm, seven perceived the environment as the natural (biophysical), separate from humans, and were oblivious of the social and personal environmental dimensions (first two categories). The other interviewee (category three) held a typically cornucopian view (O'Riordan 1987; 1989), perceiving the environment as a 'commodity' to be manipulated and controlled by humans. The other seventeen interviewees held a wider perception of the environment, acknowledging that the environment is broader than nature (Weston 1986; Wynberg 1993; QBTR 1993). Of these interviewees, nine (category four) referred broadly to the natural and social environment, while five (category five) incorporated the interdependence and interrelationships between natural and social environments.

Unfortunately only three interviewees' (category six) perceptions of the environment concurred with those of several environmental educators and environmentalists (Di Chiro 1987; Fien 1992; Pepper 1987; Wals 1990; Weston 1986). Outside of the perceptions of this tiny minority, the narrow perceptions of what constitutes the environment for the majority of the interviewees can be perceived as a definite impediment in the light of the challenges for realising the changes for education for sustainable living. These three interviewees presented a more comprehensive view of the total environment. They highlighted the socio-economic and political facets of the environment, and acknowledged the interrelatedness and interdependence of all aspects of the environment. This

view depicts a critical environmental consciousness, which is fundamental for interpreting the environmental crisis as a one of unsustainability (Fien and Trainer 1993; Huckle; 1993; Orr 1992).

Table 5.1 The interviewees' perceptions of the environment

Six categories of environmental perceptions	Direct quotes as examples of responses
1. People are viewed as separate from the total environment, (view held by six interviewees).	"The environment is everything outside of the person" (interviewee C2); "It is the physical area around you" (interviewee E3).
2. Focusing on the natural environment only, (perception of one interviewee).	"It is the physical space which contains all the organisms, including the air they breathe, habitat, etc." (interviewee A2).
3. Placing humans as the focal point of the environment, (view of one interviewee).	"The environment is the total world of man, it is related to man, and has no meaning apart from man" (interviewee F1).
4. Acknowledgement of the natural and the social environment, without mentioning the interactions, interdependence or the interrelationships, (view of nine interviewees).	"It is the surrounding circumstances of organisms, including physical conditions that affect the development of organisms. This implies the social and cultural conditions of an individual or community" (interviewee B1); "Where people live is one aspect of the environment, then there is nature - reserves, parks, etc." (interviewee E2)
5. Linking the interactions and interrelationships' facets to both the natural and social environments, (view of five interviewees).	"The physical space that you live in, and the interrelationships that you have with the people and the physical environment (interviewee D3); "Whatever is around you, the natural, the buildings, the interpersonal relationships taking place" (interviewee H1).
6. More encompassing view of the total environment, where the political, economical, social and biophysical facets are overtly mentioned, (view of three interviewees).	"The environment is that in which we live and interact, it includes the physical, social, economical, political; -on microscale [the] home and community, -mesoscale [the] country, -macroscale [the] global (interviewee K1).

While it was encouraging that most of the interviewees did not equate the environment merely with the natural, only three of the interviewees had a perception of the total environment, which suggests that the philosophical underpinnings of perceiving the environmental crisis in terms of unsustainability did not occur to most of the interviewees. The reasons for this widespread myopia amongst teacher educators regarding the environment, as well as the implications thereof, will come into sharper focus as their overall understanding of environmental education is clarified against the backdrop of their practices in relation to education for sustainable living.

5.1.2.2 Interviewees' understanding of environmental education

An analysis on the interviewees' perceptions of environmental education, based on the question: *"How would you define environmental education?" (Question 11)* is summarised in **Table 5.2**. The diverse perceptions of environmental education of the interviewees were analysed to ascertain the environmental and educational ideological orientations which underpin their approaches to environmental education (see section 1.3). Furthermore, the ideological perceptions of the interviewees were analysed to ascertain whether it may advance or impede the realisation of the macro level changes necessary for education for sustainable living. Included in the analysis are examples of their subjective opinions regarding their environmental ideological positions (Fien 1992; Frankel 1990; O'Riordan 1981; 1987; 1989; 1990), and their orientations to education (Kemmis, Cole and Sugget 1983; Kemmis 1988). Where their responses were too vague, more than one possible ideological position is specified.

Their responses yielded eleven categories of environmental education perceptions. The first five categories (fifteen interviewees) included responses that encompassed key features (called the 'properties' of a category - see section 3.5) of education for sustainable living (see sections 1.2.2.1 and 3.1.4). Only one interviewee (K1) included two such properties, while the other interviewees included only one property, implying that education for sustainable living was not the dominant practice at these institutions at the time when the research was carried out. Implicit here is that, despite the fact that these interviewees mentioned one property that underpins education for sustainable living, the more uncritical and apolitical approaches to environmental education were favoured at many of the institutions. However, the positive aspects implicit in the responses in these categories include the notion of advancing ecological sustainability (IUCN, UNEP, WWF 1991), social justice (Fien 1992; Huckle 1993), critical inquiry skills (Greenall 1991; Huckle 1991; 1993; 1995) and a critical environmental consciousness (Fien 1992). The perceptions of these teacher educators concur with the recommendations proposed for the reconstruction of the environment, as

Table 5.2 Interviewees' understanding of environmental education

Categories on environmental education perceptions	Examples: Direct quotes as examples of responses	Environmental ideological positions	Educational ideological orientations
1 To foster a harmonious co-existence with the environment. (five interviewees)	"It is the education to enable all people to live in harmony with their environment" (interviewee C1).	Ecocentric, Red Green: Development of an environmental ethic including values for ecological sustainability - 'living lightly on the earth'.	Liberal
2 The process that will promote sustainable life styles (one interviewees)	"Process which provides a population with an understanding of problems and issues which affect the community and provides the opportunities to develop the skills and values needed for responsible life styles (formal and informal)" (interviewee K1).	Ecocentric, Red Green: Development of critical thinking skills, (Inquiry skills of 'analysis and explanation') and the development of an environmental ethic for ecological sustainability 'living lightly on the earth'.	Socially-critical
3 Improvement of the quality of life (three interviewees)	"The education dealing with the environment and the important environmental issues involved, leading to a better quality of life for all" (interviewee A2).	Ecocentric, Red Green: Development of an environmental ethic that include values for social justice, ensuring 'basic human needs'.	Socially-critical
4 The education that focus on the Interrelatedness and interactions between people and the environment (four interviewees)	"Perspective running parallel to the skills of weighing up information of issues relating to the daily lives of organisms on earth. Environmental education is concerned with looking at different interactions, whether it is between humans and the environment, facets of the biosphere, and the study of implications of such interactions" (interviewee H1).	Ecocentric Red Green: Development of a 'critical environmental consciousness', based on eco-socialists beliefs, acknowledging that the environment is socially constructed.	Liberal/ Socially-critical
5 Appropriate decision making in favour of the environment (two interviewees)	"Provision of skills and knowledge to effect the attitudes of people in making decisions in favour of the environment" (interviewee E1).	Ecocentric, Red Green: Development of critical thinking skills (Inquiry skills) of 'decision-making'.	Liberal/ Socially-critical

Table 5.2 (continued)

Categories on environmental education perceptions	Examples: Direct quotes as examples of responses	Environmental ideological positions	Educational ideological orientations
6 Environmental education for conservation (two interviewees)	"To enable the child to appreciate and understand nature, in the environment, so that they want to conserve the environment" (interviewee G1).	Technocentric, Light Green, to Ecocentric, Red Green. Emphasis is placed on the individual, who, by understanding the situation, will see the need for conservation.	Liberal
7 Issue-based education (two interviewees)	"The education about the environment that deal with important environmental and social issues" (interviewee D3).	Technocentric, Light Green. The emphasis is placed on knowledge about environmental issues.	Neo-classical/ vocational
8 Positive attitudinal changes towards the environment (two interviewees)	"Knowledge about the environment and environmental matters that will lead to people having positive attitudes towards the environment" (interviewee E3).	Technocentric, Light Green. The belief that knowledge about the environment will bring about changes in attitudes.	Neo-classical
9 Emphasising the educational facet. (one interviewee)	"Environmental education is simply good education (interviewee M1).	Vague response. 'Good' education can be interpreted in different ways.	Neo-classical/ Liberal or socially critical
10 Education in, about and for the environment (one interviewee)	"Education about the environment, in it and for it; "about" includes the urban environment"(interviewee I1).	Vague response.	Neo-classical/ Liberal/ Socially critical
11 To lead to environmental problem solving (two interviewees)	"Education about the natural and built environment and its interrelationships that would enable the learners to solve current environmental problems and prevent future ones" (interviewee H2).	Technocentric, Light Green. Reformist belief that knowledge about the environment will lead to the resolution and prevention of environmental problems.	Liberal/ Neo-classical

outlined in the *Reconstruction and Development Programme.*(ANC 1994 section 2.10: 38 - 41). The *White Paper on Education and Training* reiterates these sentiments and proposes that environmental education be charged with the development of "environmentally literate and active citizens", who will have a "decent quality of life through the sustainable use of resources" (No. 16312: Department of Education 1995: 22)[8].

For the other categories outlined, environmental education is viewed as conservation education, education *about* the environment and behaviouristic approaches[9]. The perceptions of these interviewees depict that they embraced the uncritical and 'safe' approaches to environmental education which are naïve since they add to the 'rhetoric reality gap' (Fien 1992; Huckle 1987; Stevenson 1987), where there is a marked separation between theory and practice. Because of this gap, often the true nature of the roots of the environmental crisis is not unpacked, a dominant feature at present[10] for many practitioners of environmental education, an opinion supported by, for example, Greenall (1987).

The development of the understandings, values and skills of political literacy (Huckle 1993; 1995) and skills for ideological critique (Huckle 1993; 1995; Fien 1992; Stevenson 1987), fundamental for education for sustainable living (Huckle 1993), were not included by any of the interviewees in their perceptions of environmental education. Several environmental educators (Huckle 1993; Maher 1986; Stevenson 1987; Walsh 1984) argue that political neutrality in environmental education does not enable the learner to take up the necessary action needed to resolve the environmental crisis. Instead, it is argued by the researcher that education for sustainable living challenges the way that uncritical education practices accept and reproduce the hegemonic ideology of those who hold and control the political power. This view is echoed in the sentiments of, for example, Fien and Trainer (1993) and Huckle (1993).

In South Africa, this hegemonic ideology of those who hold and control the political power took the

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[8] These positive proposals in the RDP and the *White Paper* do not, however, render these documents unproblematic. Whilst the rhetoric of these documents may be progressive - even liberal - it is the modernistic assumptions which underlie this very progressiveness which need to be problematised (see sections 3.2.2; 3.3.2).

[9]The eighth category related to the acquisition of positive attitudes towards the environment, a typical behaviourist perception of environmental education, where the belief is when there is an intervention (knowledge about the environment), there will be a change in one of the 'predictors of responsible environmental behaviour', in this sense, attitudes (Hungerford and Volk 1990; Sias, Hungerford and Tomera 1985).

[10] This assertion holds for the interviewees in multisited case study two as well (see section 6.1.2).

shape of Fundamental Pedagogics which, it is widely argued, depoliticized and neutralised education and has, therefore, been a vital element in the hegemony of Apartheid education (see sections 3.1.1; 3.3.2). Since the teacher educators in this study are, by and large, 'products' of an educational system driven by Fundamental Pedagogics, perceived as the foundations of the Christian Nationalist education system, it is not surprising that most of them overlooked the political dimensions of their practices[11]. Thus, the ideological persuasions of the majority of the interviewees, as depicted by their perceptions of environmental education (and the environment), have adverse implications for the realisation of the changes which are necessary for education for sustainable living.

5.1.2.3 The interviewees' perceptions of curriculum

To gain further insight into the interviewees' ideological persuasions, their perception of curriculum was examined through the data gained from the following question: *"What do you understand by the concept of a curriculum?" (Question 8)*. Analysis of the responses of the interviewees yielded three categories of responses, as illustrated in **Table 5.3**.

Their perceptions ranged from viewing curriculum in a restricted, narrow sense, focusing on the syllabus content, to a broad, 'inclusive' view which include the hidden curriculum (see section 3.4.1). This diversity is not surprising, since the curriculum is a complex, debatable concept defined differently in terms of varied ideological positions (Hamilton 1990; Kemmis and Stake 1988; King and Van den Berg 1991 see section 3.4.1). Three categories of responses emanated from the analysis of the data:

- category one encompassed responses that reflected a narrow view, which perceived the curriculum as syllabus documentation (with some variations in the properties);
- category two included responses which depicted a broader view, where the total learning experiences of the student were emphasised; and,
- category three included responses that encompassed the hidden curriculum, which suggests an 'inclusive curriculum'.

The responses of twelve interviewees, grouped in category one, and underpinned by three properties, portrayed variations in the narrow perception of curriculum. First, seven of the

[11] More research into the area of teacher educators' ideological positions is needed, a view supported by Grundy and Hatton (1995). This is particularly true in South Africa, in the light of the harm wrought by Christian Nationalism and Fundamental Pedagogics (Van den Berg 1994).

Table 5.3 Interviewees' perceptions of the curriculum

Categories (and properties) of perceptions of the curriculum	Direct quotes as examples of responses
1. Narrow perceptions of the curriculum: Syllabus documentation	"The content, according to the syllabus that students have to learn" (interviewee D1).
All the courses or subjects offered (four interviewees)	"It is the entire range of subjects taught at an institution" (interviewee A2).
Syllabus content, and teaching strategies (one interviewee)	"It involves everything with which the child will be taught, and what the child learns" (interviewee G1)
2. Broader view of the curriculum: Total learning experiences in an educational setting (six interviewees)	"Basically it is broader than the content that you are lecturing, it goes beyond this and include the learning experiences" (interviewee H2).
Planning, implementation and evaluation of educational activities (two interviewees)	"It is the entire education programme that includes planning material, including practical implementation and evaluation" (interviewee M1).
Philosophy and policy of institution reflected in the curriculum (one interviewee)	"Very broad description of what the institution aims to achieve. It is a reflection of the education philosophy and policy of the institutions which one implements in the structural frameworks" (interviewee H1).
3. Inclusive view of curriculum: Incorporating the hidden curriculum (four interviewees)	"In the broadest sense it includes everything that is done at a school, both the hidden and the general curriculum. In a narrower sense it is a framework upon which the entire curriculum for a subject is developed; it is not a syllabus, it is the aims, objectives- that are influenced by the social, political and economical facets within a society. These in turn, are related to the paradigms of learning/ education theory" (interviewee K1).

interviewees (first property) equated the curriculum with the syllabus, associated with the course content only. This perception concurs with the widely-held view that the curriculum is a 'product' (Grundy 1987; Meerkotter and Van den Berg 1994: 4). Four interviewees (second property) held a slightly broader view of the curriculum. While still associating it with the content, their perceptions

of curriculum focused on an array of subjects or courses that make up an institutional programme. This is the general perception of curriculum for many parents, student and teachers (Kemmis and Stake 1988), grounded in the belief that 'the curriculum is a product'. In South Africa, this is the most widely held view of the curriculum as was reported in the NEPI Report (1992b: 19)

> The curriculum is content-led: core syllabuses are defined mainly in terms of content to be learnt

Thirdly, within this 'restricted view', one interviewee (the third property), perceived the curriculum as broader than the content, and added the specific teaching strategies employed. This view is typical of the *Lehrplan* where the content (with its aims and objectives) is linked to the teaching methods (Stenhouse 1983 in Hamilton 1990). Many syllabuses currently in use at schools and colleges of education appear in this format.

Nine interviewees' perceptions of curriculum, that focused on the total learning experiences of the learner, were grouped in category two (underpinned by three properties). Of these interviewees, six stipulated specifically that the curriculum is the 'total learning experiences of the learner' within an educational setting. By focusing on the 'total learning experiences', their perceptions transcended the level of content and syllabus documentation. The 'total learning experiences' includes the planning, implementation and the evaluation of all activities within an educational setting, (specified by two of the interviewees), and the inclusion of the philosophical positions and policy of the institution (specified by one interviewee). This interpretation of curriculum resonates in NEPI (1992b: 1-2) as "the curriculum-in-use" that encompasses the ways of teaching and learning, pedagogy, planning, assessment, evaluation and policy. However, although this interpretation is broader than the aforementioned, it ignores the social, economic and political dimensions of the curriculum. When these dimensions are disregarded, the perception of the curriculum as a product rather than a process is strengthened, an opinion which is widely endorsed (Grundy 1987; Giroux 1990; King and Van den Berg 1991; Meerkotter and Van den Berg 1994).

Finally, within category three, four of the interviewees perceived the curriculum in the broadest sense, incorporating the social, economic and political contexts into their perceptions. Their view encompassed the hidden curriculum (see section 3.4.1) which recognises the value-laden nature of schools and society manifest within schooling (see section 3.4.2). The hidden curriculum is powerful in maintaining the values and vested interests (hegemonic ideology of the ruling class that becomes part of the 'false consciousness' of those who control the political power within schools

(Beyer 1987; Lacy 1987). Also called an inclusive curriculum, (QED 1993), it endeavours to redress various inequalities necessary to foster social transformation, which lies at the core of a curriculum in the light of education for sustainable living .

Nevertheless, the narrow conceptualisation of the curriculum, portrayed by most of the interviewees, holds negative implications for realising the change at meso level, since it impacts on their practice. The curriculum, when perceived as a product, has a great potential to perpetuate the uncritical and neutral practices that are counter to the realisation of change. Furthermore, these narrow perceptions of the curriculum are interlinked with the content (embedded within the challenges for change at micro level), which may be oversimplified as a body of unproblematic facts. This facet is subsequently discussed.

5.1.2.4 The perceptions of the interviewees on what should be included in a curriculum framework for environmental education at initial teacher education level

To enable the researcher to gather information on what the interviewees believed should be incorporated into a framework for an environmental education curriculum at initial teacher education level, the following question was posed: *"Which key concepts/ topics/ components etc. (in your opinion), should be incorporated into a framework for an environmental education curriculum?" (Question 9)*. An analysis of the interviewees' responses revealed a number of properties which grouped themselves into three categories reflecting their approaches to environmental education (see section 1.3). These, broadly, were:

- education *about* the environment;
- education *in* the environment; and,
- education for sustainable living.

Properties intrinsic to all three approaches to environmental education (see section 1.3) were mentioned by the interviewees, and are represented in **Table 5.4**. The responses provided by some interviewees included properties that were spread across more than one category. This strengthens the view, shared by many, (Fien 1990; Greenall-Gough 1990; Huckle 1983; Maher 1986; Tilbury 1993) that all three approaches should be employed for environmental education to be successful. What should not be ignored is that for the realisation of education for sustainable living, learners also need critically to engage in true, meaningful, problem-solving activities, a requirement that is endorsed by, for example, Fien and Trainer (1993) and Huckle (1991; 1993). There were also those responses categorised more than once. For example, the inclusion of skills and the

Table 5.4 Summary of analysis of the interviewees' perceptions on what needs to incorporated into a curriculum framework for environmental education

Properties depicting education *about* the environment	**Properties depicting education *in* the environment**	**Properties depicting elements of education for sustainable living**
Inclusion of ecology (three interviewees) Theoretical Ecological concepts: • energy transfer, food-webs, pyramids etc.(one interviewee); • interrelationships (two interviewees); and, • interdependence (one interviewee).	Aesthetic and sensory education, for creativity and imagination (one interviewee). Conservative education in the environment, for example Adventure Education (one interviewee).	Roots of environmental crisis lies in social, political and economical systems: • why the degradation of the 'homelands' ? (one interviewee); and, • hunger, greed and poverty (one interviewee).
	Including fieldtrips with the study of ecological concepts (two interviewees).	Sustainable: • utilisation of resources (six interviewees); • development (five interviewees); and, • management of natural and human environment (one interviewee).
	Inclusion of real life issues/ relevance in environmental education (one interviewee).	
Skills how to restore the biosphere (one interviewee). General skills (two interviewees).	Skills: • general (two interviewees); and, • problem-solving (two interviewees).	• Curriculum in environmental education should include the social, economical and political facets (three interviewees). • Social: squatter settlements in the urban environment including the social contexts on how people live (two interviewees). • Distribution and redistribution, the issue of wealth (one interviewee). • Participation: obtain students' ideas on environmental education (one interviewee). • Holistic view of environmental education, in all subject areas (two interviewees). • Redefine education for change (one interviewee). • Environmental ethics (one interviewee). • Problem-solving skills (two interviewees).
Conservation (six interviewees).	Need for conservation is underpinned by values education (nine interviewees).	
Bio-physical issues: • deforestation (one interviewee); • overpopulation (four interviewees); • pollution (ten interviewees); • ozone depletion (one interviewee); • water (one interviewee); and, • soil erosion (one interviewee). Other issues: • global and local (two interviewees).	Consideration of issues: • global and local issues (two interviewees) • urban environment (six interviewees) • perceive the environment holistically, broader than nature (one interviewee).	
	• Balance between theory and practice, and, Hands on activities (one interviewee).	

consideration of local and global issues, which were categorised into both education *about* and education *in* the environment approaches. Similarly, problem-solving skills were categorised into both education *in* the environment and education for sustainable living.

Concerning the interviewees' ideological positions in terms of education for sustainable living, the analysis of the data for this question reinforced what has been outlined for section 5.1.2 (interviewees' understanding of environmental education), but it also provided further insight into the interviewees' understanding of environmental education. Only four institutions (I, K, L and M, representing three universities and one college of education) stand out as having engaged on a more critical level with the environmental education debate. The responses from all the interviewees at these institutions included more than one property underpinning education for sustainable living. Furthermore, the interviewees' responses for this question encompassed most of the properties that underpin education for sustainable living, including political literacy and the skills required to critique ideology. Although the responses from all the interviewees from institution C and three of the interviewees from institution E were grouped within the education for sustainable living approach, their responses related specifically to the property of sustainable development (see section 3.1.4). Sustainable development, however, is a contentious issue which is open to diverse interpretations (Huckle 1991; Orr 1992; Smyth 1995), and hinges on the term 'development' which needs to be interrogated and clarified. A distinction has to be made between the sustainable 'growth mode' concept, indicative of the position adopted in the United Nations World Commission on Environment and Development Report (WCED 1987) and that of ecologically sustainable development (Fien and Trainer 1993; Huckle 1993; 1995; Orr 1992)[12] .

Encompassed within the collectively proposed framework by the interviewees for environmental education in teacher education, were some principles of education for sustainable living that concur with the recommendations that emanated from a review of this terrain in chapter three (Huckle 1995; NIER 1993; UNESCO 1993; UNESCO-ACEID 1994; Huckle 1995 see section 3.4.3.4). Included in the interviewees' suggestions were aspects of ecological and social foundations, professional competencies and personal qualities. Their recommendations included that student teachers ought to have an understanding of:

- ecological principles, which include various ecological concepts, to enable them to understand the environmental crisis and acquire the necessary skills to solve it;
- interrelationships and interdependence between people and the natural world;

[12] The distinction between sustainable development and sustainable living is explored in section 3.1.4.

- a variety of local and global environmental issues;
- social issues;
- how the social, economic and political systems impact on the environment, and that the roots of these problems are centred within these systems; and,
- political literacy, for example, distribution and redistribution, power and decision making.

Also included within the interviewees' framework is for students to:

- develop an environmental ethic to enhance ecological sustainability and social justice;
- develop skills for inquiry, evaluation and problem-solving;
- become competent in outdoor education and fieldwork; and,
- develop personal qualities, for example, positive attitudes towards conservation.

As optimistic as this collective interpretation may be in terms of providing a starting point for education for sustainable living curriculum reform at initial teacher education level[13], the fact that interviewees from only four of the thirteen institutions mentioned more than one property that underpins education for sustainable living is a matter for concern. Thus, a reconceptualisation of the curricular content is necessary in order to realise the micro level changes for education for sustainable living. This is especially so in the light of the argument, endorsed by many environmental educators (Fien 1992; Greenall-Gough and Robottom 1993; Huckle 1991; 1993; Maher 1986), that only when the intention is to educate *for* the environment, in a critical manner, that 'true' environmental education for transformation can take place.

This position, however, is for a number of reasons not surprising. In the first instance, it reflects the reality on the international front where environmental education for transformation is not widely practised either (Greenall-Gough 1991; Hart 1990a; b; Huckle 1987; Stapp 1983). Greenall-Gough (1991: 97) ascribes the dearth of socially-critical environmental education (in Australia) to its political nature in that it aspires to transform society, which is in contrast to the Western "economy-driven, scientific rational approaches to environmental education". Huckle (1991: 54) concurs with Greenall-Gough (ibid) and contends that socially-critical environmental education might not be the most popular approach in Britain, but that its great value lies in its striving to "empower pupils to democratically transform society" by means of "praxis". In the second instance, the incorporation of education for sustainable living in the formal curriculum for colleges of education in South Africa is especially difficult, since it is in conflict with the conventional social

[13] This issue will be deliberated on in chapter seven.

reproduction rationale of the curriculum (Van den Berg 1994).

5.1.2.5 Conclusion

Key factor one resonated the influence of the teacher educators in the domain of environmental education at initial teacher education level. Held up against education for sustainable living, and the macro, meso and micro level changes necessary for this transformation, an analysis of these practitioners' practices in this realm exposed serious flaws and shortcomings in terms of:

- formal qualifications in environmental education;
- insufficient supplementing of knowledge base via involvement in environmental education organisations;
- lack of experience in primary education; and,
- absence of adequate professional development.

In addition, the exploration of their environmental education ideological positions, analysed within the same parameters[14], underpinned the fact that:

- most teacher educators have a very narrow view of the concept of environment;
- only a tiny minority of teacher educators acknowledge that the roots of the environmental crisis are centred in the interconnectedness of the social, economical and political bases of society, a view that is widely supported (Huckle 1993; Di Chiro 1987; Wals 1990; Weston 1986; Wynberg 1993);
- the majority of teacher educators are inclined to towards the neo-classical educational (thus failing to unpack the hegemonic ideology entrenched within CNE) and technocentric environmental (politically neutral) ideological persuasions; and,
- the curriculum was by and large perceived as a product, rather than a language and a discourse of possibility (see section 3.4.1), a conceptualisation that falls short in terms of redressing the inequalities.

In short, the more critical perceptions that underpin education for sustainable living, and which are essential to redress the inequalities of the past in South Africa (ANC 1994; DE 1995), were

[14] It was difficult to obtain an in-depth understanding of the interviewees' environmental education ideological orientations by means of one interview but several responses have been analysed to gain some understanding.

virtually non-existent. Thus, upon consideration of the four facets[15] employed to gain some insight into the environmental education ideological orientations of the interviewees, it is suggested that while there is some scope for optimism, the general orientation on the ground in teacher education institutions is characterised by a narrow technicism which has misconstrued the meaning of environmental education, in the light of education for sustainable living. Therefore, to realise the changes (macro, meso and micro) necessary for education for sustainable living in South Africa, much professional development of teachers (and thus of teacher educators) needs to be undertaken.

5.2 KEY FACTOR TWO: THE ENVIRONMENTAL EDUCATION COURSES

The next cluster of common elements emerging from the analysis of the data pertained to the environmental education courses functioning at these institutions and constituted the second key factor. Three sub-factors underpinned this key factor:

- the infrastructure of these environmental education courses;
- facets of the development of the environmental education courses; and,
- an evaluation of these courses.

These three sub-factors, viewed against the backdrop of the changes necessary for the realisation of education for sustainable living, illustrate the micro level structural challenges in terms of the infrastructure of these environmental courses, and the meso level challenges in terms of the development and evaluation of the course. While these sub-factors are perceived as areas that warrant change at micro and meso levels, they are grounded within the challenges for realising change at macro level. The interplay and interrelatedness between the macro, meso and micro level challenges that confront environmental educators, are subsequently discussed, in terms of key factor two.

5.2.1 The infrastructure of the environmental education courses

The first sub factor reflected the infrastructure of the environmental education courses in terms of the:

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[15] Perceptions of the environment (which underpin the perceptions of the environmental crisis), understanding of environmental education (depicting their environmental and educational ideological positions), perceptions of a curriculum and suggestions of a framework for a curriculum for education for sustainable living within teacher education.

- number of years that the course had been functioning;
- status of the course; and,
- amount of time employed for the course presentation.

(This data is summarised in **Table 5.5**).

Additional aspects related to infrastructure considered:

- whether these courses were structured to enable students to progress in environmental education at different year levels; and,
- other forms(s) of evaluation criteria required for progression.

5.2.1.1 Course extent (in terms of the number of years)

The analysis of the extent of the environmental education courses (see **Table 5.5**) was based on the data obtained from *Question 16: "How long - number of years - has the environmental education course been functioning at this institution?"*. The data revealed that environmental education was a relatively new field within teacher education at the institutions in multisited study one. The lifespan of the courses ranged from six months to eleven years, with only three institutions having offered any form of environmental education for ten years or more (i.e. at mid 1992). The relatively recent introduction of environmental education into the area of initial teacher education can be ascribed to a number of reasons. Included are the challenges for change at macro level, for example, the failure of the former government to secure formal policy for environmental education in South Africa. Although they managed to compile a *White Paper on Environmental Education* (DEA 1989 see section 3.2.2), the legitimacy of this document was challenged due to the lack of participation by all stakeholders in its formulation. The fragmented education system, organised along ethnic lines and controlled by fifteen different ministries under different acts (see sections 3.1.1; 3.3.2), complicated this matter further, since the decision to incorporate initiatives like environmental education would have had to be taken by the different ministries. Furthermore, challenges for change at the micro and meso levels include conceptual and educational barriers (see section 3.6), that prevented the incorporation of environmental education since, for many, it was perceived as an extension of the natural sciences, centred within outdoor education, conservation and ecology, and incorporated into the geography and biology curriculum (see also chapter six section 6.1.1). All the reasons outlined above are indicative of impediments which have dominated educational practice in South Africa since at least 1910.

There were, however, the few teacher education colleges (mentioned in **Table 5.5**) which had implemented environmental education despite the lack of formal policy. It was easier for colleges of

Table 5.5 Aspects of the infrastructure of the environmental education courses: June 1992

Institutions where environmental education is practised		Years of course existence	Position of environmental education at the thirteen institutions	Time factor
COLLEGES OF EDUCATION	Hebron	Five	Elective/ ancillary from first year though to third year at all five of these colleges: • Hebron • Strydom • Moretele • Marapyane • Thlabane	Two hours per week
	Strydom	Six months		One hour forty five minutes
	Moretele	Three		One hour forty five minutes
	Marapyane	Three		One hour forty five minutes
	Thlabane	Ten		Two hours per week
	Cape Town	Ten	Biology course is environmental education	Two hours (1st to 3rd years); six hours (4th years)
	Boland	Five	Integrated into history, geography and science from first year to fourth year	It varies, (but at least an hour per week) for all year levels
	Johannesburg	Five	Part of biology and geography from year one to year four	It varies (part of biology and geography subject areas)
			Part of Foundations Course for first years	One full week for 1st years
	Edgewood	Eleven	Part of biology and geography	It varies (part of subject areas)
			Module in Further Diploma	Two hours per week
UNIVERSITIES	Cape Town	Six months	Module of B.Ed course	Two hours for eighteen weeks (36 hour course)
	Rhodes	Four	Modules from second and third year at Bachelor of Primary Education (B.Prim.Ed)	Three hours per week
			HDE: Biology and geography methods	Varies (component of methods courses in subject areas)
	Durban-Westville	Five	The second year Science education course	Three hours per week
	Stellenbosch	Two	HDE: module	Year long module (about an hour per week)
			B.Prim. Ed	Six months module (about an hour per week)

education governed by the Ex-House of Assembly (and the universities) to incorporate innovations like environmental education, due to their greater degree of autonomy and curriculum freedom. Despite the obstructions of being subjected to prescribed syllabuses of the ex-Department of Education and Training (DET), many colleges of education in the North-West Province (former Bophuthatswana) managed to implement environmental education. At these colleges, the University of Bophuthatswana played a major role in determining the curricula that were then in place (Irwin 1993).

5.2.1.2 Status of the environmental education courses

Information on the position/ status of the environmental education courses (see **Table 5.5**) was obtained by means of the following questions: *Question 17: "Is the environmental education course presented at this institution / faculty an elective course, or is it compulsory for all student teachers?"* **and** *Question 18: "Does the course form part of another course, i.e. biology/ geography?"*

Regarding the position of the environmental education courses[16] between the various colleges and the universities, four strands of course variations were evident:

- where environmental education was incorporated into the natural sciences (biology), and/or earth (geography) sciences;
- where environmental education was a separate subject, or were electives/ ancillaries;
- where modules in environmental education were offered in specific curricular options; and,
- where specialised environmental education programmes were offered.

As far as progression in the area of environmental education was concerned (established via *Question 19: "Does the course allow for a progression from first year through to final year?")*, there was the option of progression for students at the colleges of education of Cape Town, Johannesburg and Boland in the courses where environmental education was included. In the North-West Province Colleges of Education, students could progress in environmental education from first year through to their third year of study if they selected the course as part of their curriculum. At Rhodes University, (unlike the situation at the Universities of Cape Town, Durban Westville and

[16] Outlines of the environmental education courses from all the Colleges of Education in the North-West province, Cape Town College of Education, Johannesburg College of Education (Foundations Course outline), Edgewood College of Education (Further Diploma), Rhodes University (B.Prim. Ed), Stellenbosch (HDE) and the University of Cape Town were made available to the researcher.

Stellenbosch), there was a progression for environmental education where it formed a part of the B. Prim. Ed. course, as an essential component for the second to fourth year of study. This course was offered in the Education Department. The criteria employed for progression in the area of environmental education were based on the data established from the responses to *Question 20: "Do the students write examinations in environmental education, for progression to the following year level/ attainment of teachers diploma / degree?"*. At all institutions examinations, assignments and project work formed part of the course evaluation.

In summary, although environmental education is functioning at these tertiary education institutions for initial teacher education, the actual impact of these courses in the schools is largely unknown. In the North-West Province, Shongwe (1992a; b) evaluated aspects of the influence of these courses on teachers who had studied the environmental education elective at some of the colleges in this region. His work suggests that the environmental education courses offered at the colleges did not prepare students adequately for the realities that they may face in the classroom situation. The implications of these findings are twofold. First, the assertion that teacher education institutions do not prepare students adequately for their functioning in the schools, specifically relates to the challenges embedded within the notion of schooling (see section 3.4.2). By neglecting to incorporate the notion of schooling into teacher education programmes, which is widely recommended (Beyer 1989; Freer 1993; Iredale 1993; Van den Berg 1994; Meerkotter and Van den Berg 1994; Verma 1993), teacher educators fail to confront the challenges for realising change at all levels. Second, a barrier in the way of change at macro level can be ascribed to a lack of policy for environmental education for all levels of the education system (see section 3.2). Without a formal policy, it is unlikely that environmental education will be included in the school curricula (for various reasons - see section 3.4.2), despite the fact that environmental education is practised at teacher education institutions. Further research is necessary in this area.

Furthermore, also evident from the data is that few students are actually introduced to environmental education at the colleges of education, since, often it is linked to specific subjects, like biology/ science/ geography, or is offered as an elective/ ancillary (North-West Province). Only students who select any of these courses, or combinations of them, are afforded the opportunity of gaining insight into this area. Finally, the risk exists of perpetuating the equating of environmental education with science and outdoor education, when environmental education is linked exclusively to the natural and earth sciences[17], or to the methods courses for natural and

[17] Which is the situation at four colleges and one university.

earth sciences (the situation at two universities). This is a perceived conceptual barrier to environmental education (see section 3.6), the danger of which is outlined by Robottom (1991: 21) who views it as furthering "technocratic rationality":

> ...if environmental problems are described only in scientific terms...important factors like vested human and state-related interests are overlooked.

5.2.1.3 The time factor

This section considered the time allocated to the presentation of the environmental education courses at the various institutions involved in this study. Upon an analysis of the data obtained from the following two questions, *Question 21: "How many periods per week are allocated for the presentation of environmental education?"* **and** *Question 22: "What is the duration of a single period?",* it was found that the lecture period at these institutions varied between thirty minutes and two hours, while the time allocated for these environmental education courses varied between one and six hours a week.

Established from the data obtained from the analysis of *Question 23: "Do you feel that the time allocated for the presentation of the environmental education course at all year levels is sufficient? (Please comment),* twenty of the interviewees commented that more time was needed for environmental education. Three interviewees commented that the time was insufficient when viewed in the light of the syllabus requirements (interviewee E1), and restricted more innovative teaching strategies. Twelve interviewees specified that more time was needed to do fieldwork, practical work and for excursions, while one interviewee (B1) commented that more time was needed to include more content.

Although the lack of time available for presenters to participate in environmental education programmes has been previously listed as a micro level logistical barrier (Ham and Sewing 1988; Spork 1992), it is, in reality, the constraints within the institution and the broader education system (see section 5.5) that create this time restriction for the course presenters. Included are the macro level challenges that might be ascribed to the rigidity of the institution (and education department) on examination prescriptions and on syllabus requirements. Intensification (Popkewitz and Lind 1989), a barrier where the precious time of the course presenter is taken up by menial tasks and unnecessary administrative work, can also be perceived as an impediment regarding the time of the teacher educators. This is even more so in the present climate of rationalisation, where institutions

are operating with fewer staff, and often, bigger classes. Additionally, the dearth of suitable resources (materials and other) to support the practitioner also impacts on their time. Furthermore, that teacher educators tend to work in isolation, with little or no collaboration, referred to as privatisation (Little 1990), seems another well-established impediment.

Viewed from the perspective of education for sustainable living, underpinned by participative and collaborative approaches to curriculum development, these time barriers can be regarded as products of the autocratic and technocratic educational management, entrenched within the maintenance paradigm (see section 2.3), that has been at the root of the South African education system for endless decades. Both the results and the pervasiveness of this ideological position will become more apparent as further aspects of the environmental courses at teacher education institutions in South Africa are explored.

5.2.2 Course development

The second sub factor relating to the environmental education courses explored how these courses had been developed. In this regard, questions relating to the formulation of the objectives were considered first, to find out whether there had been any participation from the teacher educators themselves in the formulation of objectives for the course, its content and its project component. Secondly, this sub factor examined whether there was any student (i.e. student teachers), local school or community involvement in course development.

Regarding the development of the objectives for the course for the year, the following question was put to the interviewees: *"Who decides what the specific objectives for a group during a particular year will be?" (Question 55).* All but three interviewees said that the objectives were externally decided, either by the Education Department or the syllabus committee. The explanations of the interviewees who responded differently included that the objectives for the course were formulated by the lecturers in consultation with students, (two interviewees), or that there were no fixed objectives in that these varied, since several needs of the students were addressed (one interviewee M1).

Responding to *Question 56: "Do the students contribute towards the formulation of the objectives?"* the interviewees commented that students were not involved in the development of the objectives, for they were not normally confident enough (two interviewees). However, two of the interviewees mentioned that a limited degree of student participation was forthcoming, in that students evaluated

the course twice per year as part of the college programme (interviewee G1), and that consideration was given to the needs of the students (interviewee K1).

Regarding the planning of the course-work, interviewees were asked : *"Who decides on the course-work for a particular year group in environmental education?" (Question 57)* **and** *"Are local schools consulted in any way for suggestions pertaining to the course work?" (Question 58)*. An analysis of the interviewees' responses suggested that the course-work for environmental education was decided largely without student or local school involvement. Five interviewees said that students were consulted, while six said that schools visited during practice teaching were consulted (two of these eleven interviewees asserted that they involved both students and local schools).

Analysis related to decision-making regarding project work was based on the following questions: *"Who decides on the themes and the nature of the projects?" (Question 33)* **and** *"Are students involved in determining which projects to become involved with?" (Question 34)*. Although the responses suggested that more participation was allowed from students relating to project-work, a typical approach mentioned by the interviewees was where the course presenter listed a few options from which the students had to choose. Evident here is what Grundy (1987: 123) describes as a "pseudo-sharing of power", where student decision-making only operated at the level of choice within options.

In summary, the analysis regarding the development of the environmental education courses established that:

- The course objectives were developed in a manner that was either:
  - externally controlled;
  - steered by the course presenters; and,
  - largely excluded student participation.
- The decision on course-work was:
  - pre-determined;
  - decided by the course presenters; and,
  - involved students and local schools only to a limited extent.
- The area of project work:
  - fostered more student involvement, but,
  - the prescriptive nature of a syllabus at certain colleges (e.g. North-West Province) was restrictive.

For the majority of the interviewees, these courses were developed either by the course presenters, or by outside structures (education department).This is restrictive in terms of the realisation of education for sustainable living, which proposes the curriculum as a discourse of possibility (Giroux 1990; Giroux and Simon 1984 see sections 3.4.1; 3.4.3.1). Impediments to realise the changes[18], necessary to secure education for sustainable living need to be considered, in order to work towards the transformation for education for sustainable living. At macro level, the lack of participation by the various stakeholders, though deeply embedded in teacher education practice in South Africa, is not unique to the South African context, and has long been subject to debate between educators over the issue of developing course objectives and the course-work in a curriculum (Eisner n/d; Giroux 1988a; Goodman and Kelly 1988; Goodson 1987; Grundy 1987).

Furthermore, educational institutions generally function hierarchically, which invariably deepens the technologizing, disempowering determinant (Apple and Teitelbaum 1986; Giroux 1983; Wood 1984). Centred on the division of labour facet, that includes the hierarchical nature of the education system, technologizing furthers control and authoritative practices and adds to the lack of participation of all staff members, and worse still, of students. This is a direct antithesis to viewing curriculum as a possibility (language and discourse) to further the transformation of society towards the attainment of sustainable democracy, a process which demands the participation of, and negotiation by, all stakeholders. A move in this direction will not be easy since

> the traditions of the division of responsibility and the distribution of power...are strongly embedded in the histories of both teachers and learners (Grundy 1987:124).

However, such a shift is of particular importance for the education of teachers (King and Van den Berg 1991), and involves the nurturing of, for example the inquiry oriented paradigm (see section 3.3.1) for teacher education:

> We shall have to change the content of what we teach, and we shall have to create processes through which we and our students can become empowered to assist in the task of social and educational transformation...We cannot cultivate critical, democratic processes in the classroom if those classrooms are located in institutions where decision-making is limited to the few people at the top...(Van den Berg

[18] Included are the macro level challenges, i.e. the bureaucratic nature of the education system. The autocratic nature of curriculum development impacts negatively on the realisation of change at meso level, since the voices of the teacher educators (and students) are ignored. This exclusion adversely affects the practice on the ground, standing in the way of realising change at micro level.

1994: 42-43).

5.2.3 Course evaluation

This sub factor was indicative of the extent to which the presenters of the environmental education courses reflected on their practice. Insight in this respect was gained from an analysis of the data obtained from two questions: First, *"Is the course content reviewed from time to time?" (Question 59),* to which all the interviewees responded that their courses were evaluated from time to time; and second, *"If yes, who does the reviewing?" (Question 60)* - to discover whether there was participation of other stakeholders in the review of the courses. Their responses showed that the reviewing was done by the:

- syllabus panel/ committee (interviewees in North-West Province);
- course presenters (three interviewees);
- course presenters and students (eight interviewees); and,
- course presenters and outside networks (one interviewee).

To gain further insight into this aspect of participation, the following question was put to the interviewees: *"Are the students involved in the reviewing process?" (Question 61).* Fourteen of the interviewees (at six institutions) said that students were not involved in this process, or that they were only involved in a limited way, where they were asked to evaluate the course and to make recommendations (eleven interviewees at seven institutions).

Although student participation was present in the evaluation of the environmental courses, it was somewhat insignificant. Evaluation procedures should be inclusive (Kemmis and Stake 1988) to favour forms of evaluation which permit a greater degree of participation of all stakeholders in the evaluation process. To realise the meso and micro levels of change, it is recommended by the researcher that evaluation should not be regarded as a separate aspect, or as something that is 'extra' or 'outside' of the normal functioning of the course. It ought to be ongoing, and include students and teacher educators to review, and critically reflect on the quality of their interactions, a view supported by many (Angus 1986; EEPI 1994; Giroux 1988a; Grundy 1987; Wood 1984). Regarding the challenges posed for the realisation of education for sustainable living, the failure of the teacher educators to incorporate critical reflection (Beyer 1991 see section 3.3.1) into their practice is a definite impediment in the way of realising change in the light of transformation.

5.2.4 Conclusion

Key factor two reflected the functioning of the environmental education courses at the teacher education institutions involved in this multisited case study. While the incorporation of environmental education into the curriculum for teacher education is positive, it is recent for South Africa, for reasons that can be ascribed to impediments in the way of change at macro level, which includes the:

- failure of the previous government to secure a policy for environmental education; and,
- fragmented, apolitical and uncritical nature of the Apartheid education system.

These challenges (for the realisation of education for sustainable living) at macro level are interlinked with those at meso and micro levels, which pertain to the status of the courses:

- few students are afforded the opportunity to include environmental education in their teacher education courses; that has negative implications in terms of environmentally literate citizens, advocated by the COTEP (1996) document and the *White Paper on Education and Training* (DE 1995);
- environmental education is often linked to the natural and earth sciences, which perpetuates the technocratic rationality;
- the impact of the courses is largely unknown, but research indicates that students are ill prepared for the realities in the schools; and,
- while time constraints are viewed as a micro level challenge for change, this impediment is rooted in the bureaucratic nature of the education system on the one hand, and can also be ascribed to the powerlessness of the teacher educators.

Additionally, the development and evaluation of many of these environmental education courses portrayed further deficiencies. Held up against education for sustainable living, and the macro, meso and micro level challenges necessary for transformation, there are glaring gaps in the functioning of these courses, in relation to the:

- epistemological (that critically analyses what knowledge is most valuable);
- ideological (that critically scrutinises what knowledge is most worth, why this is so, and whose knowledge it is);
- political (that critiques who is in control of the selection and the distribution of knowledge);
- economic (that interrogates who is in control of the selection and the distribution of knowledge);
- aesthetic (that searches for ways to link the curriculum to the students' reality);
- technical (that explores the most appropriate ways to enable students to access knowledge

more effectively);

- ethical (the investigates the advancement of responsible and just ways of interaction); and,
- historical (that critically analyses the past, and moves beyond it to reconstruct and transform the present) dimensions (Van den Berg 1994: 36 - 37).

These 'absences' all require redressing if environmental education at initial teacher education level is to realise its transformative potential, in effect, for the realisation of education for sustainable living. In addition, if the 'functioning' of education for sustainable living is viewed in the light of contributing towards the democratisation and social transformation of society, then these environmental education courses fail to address the macro level challenges, in terms of objectives, referred to as the macro-objectives (Giroux 1988a: 49 - 51) that:

- question the purpose of what is being learnt,
- unpack the hidden curriculum, and,
- foster the development of a political consciousness.

Establishing a link between the macro-objectives (Giroux ibid) and micro-objectives (the specific objectives for the courses of study, that includes the acquisition of knowledge, skills, the methods and the structure of a course), provides educators with a powerful tool to further the goals of education for sustainable living.

5.3 KEY FACTOR THREE: THE PRAXIS OF ENVIRONMENTAL EDUCATION AT THE INSTITUTIONS

Key factor three brought into focus the issue of praxis (see sections 3.1.4; 3.3.1) of the environmental education courses and was underpinned by three sub-factors:

- the interviewees' approaches to their courses, including their teaching styles (section 5.3.1);
- an examination of the projects and project work built into the courses (section 5.3.2); and,
- the aspect of practice teaching (section 5.3.3).

Regarding the curriculum as a form of praxis, Grundy[19] argues that

[19] Encompassed within the curriculum as a form of 'praxis' is the inclusion of action and critical reflection (Beyer 1991). Praxis takes place in real learning situations, and, in the world of interaction (social and cultural). Praxis acknowledges that knowledge is socially constructed (Grundy 1987: 115 - 116).

> ...it is not simply a set of plans to be implemented, but rather...a process in which planning, acting and evaluating are integrated...(1987: 115).

This key factor therefore resonates the functioning of the environmental education courses at the various tertiary institutions, and cannot be seen in isolation from the first and second key factors in that 'praxis' refers to theoretically informed practice (Beyer 1991; McTaggart 1991). In terms of the more critical approaches fundamental to education for sustainable living, critical praxis is the central thread that underpins the other four properties of this approach to environmental education (Fien 1992; see also sections 3.1.4 and 3.3.1). Furthermore, critical praxis is essential for the realisation of education for sustainable living, since it underpins the challenges at

- micro level (what knowledge and experiences are most worth);
- meso level (practice of the teacher educators); and,
- macro level (it acknowledges that education is not neutral and value-free, and therefore challenges the false consciousness).

In terms of approaches to initial teacher education, critical praxis, fostered by critical reflection, is a fundamental dimension of the inquiry oriented paradigm (Beyer 1989; 1991), which was identified by the researcher (see section 3.3.1) as an appropriate paradigm for initial teacher education programmes in order to realise the changes necessary for education for sustainable living.

5.3.1 The practice of the course presenters

Sub-factor one functioned as a revelation of the strategies employed by the interviewees in their environmental education practice. It emanated from an analysis of the data obtained from the following question that was put to the interviewees: *"Briefly indicate a few methods/ strategies employed in the presentation of the environmental education course" (Question 62).* A host of teaching strategies were mentioned by the interviewees. From the analysis of the data, it was evident that all the course presenters employed the lecturing method and ventured into projects[20]. Most of the interviewees (twenty) ventured into student-centred activities such as group work, where collective meaning and interactive learning strategies were attempted. Similarly, six interviewees mentioned that they included discussions in their practice strategies while two interviewees ventured into workshopping strategies. Both strategies hold the potential for students to link their experiences with the macro-objectives (section 5.2.4) central to the idea of critical praxis, and, thus, for realising meso (and macro) level changes.

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[20] Except one interviewee (J1), where the course was offered on a part-time basis, fieldwork and practical work were employed by all interviewees.

Notwithstanding the positive features, considering the interviewees' overall perception of curriculum as mere syllabus documentation (see section 5.1.2.3), it is quite likely that the majority in fact embarked on teaching strategies which are centred on means-end criteria, rather than advancing students' understanding concerning the macro-objectives, and thus to realise change at macro level. Furthermore, the data analysis regarding a lack of participation in the development and evaluation of the courses strengthened this speculation (section 5.2.2 and 5.2.3)[21]. Education for sustainable living in teacher education, however, requires students to develop the necessary professional competencies, which includes environmental investigation, evaluation and action skills (see **table 3.1**) that will enable them to expand their insights and understanding in regard to the quality of the environment, and to resolve environmental problems. In this regard, it is necessary for teacher educators to employ a wide range of teaching methods/ strategies in their courses, and actively involve students in these, so that they will feel confident to embark on them when they teach. This view concurs with what is outlined in many environmental education documents (EEPI 1994; NIER 1993; QBTR 1993; UNESCO 1992 a; b; UNESCO-ACEID 1994). However, it is recommended by the researcher that these strategies should not exclusively be introduced to students in the didactics component of their courses, as is the current situation at many colleges of education. In this manner it is perceived in the light of crafts to be mastered, which renders it as behaviouristic (see section 3.3.1). Instead, students should be afforded the opportunities actively to engage and critically reflect on which experiences were most worthy in the particular contexts of the schools.

5.3.2 Projects

An exploration of what student teachers' project work entailed was included by the researcher, based on the assumptions (from her own experience) that this was an area that created opportunities to transcend the prescriptions of the syllabus. The reasoning was that if the syllabus did not allow for critical praxis to be furthered then, by embarking on projects, (based on problem-solving, local relevance, which included community participation and collaborative interaction with other institutions), important facets of praxis could become part of their environmental education courses. The interviewees were therefore firstly asked: *"Are your students involved in any environmental educational projects? (If not, briefly mention the constraints which prevented you from venturing into projects" (Question 28).* All the interviewees responded that their courses incorporated project

[21] A shortcoming of this research, however, is that it did not engage in participant observation to gain first hand experience of what these activities involved (see section 4.8).

work. They were then asked to respond to the following question: *"If yes, mention the nature of the projects in which the different year groups are involved" (Question 29)*. A summary of the projects embarked on for the different year groups at the various institutions appears in **Table 5.6**[22].

Further analysis of the data resulted in five categories of projects which:

- were biophysical/ ecological in nature;
- focused on resource (materials) development;
- encompassed an action component;
- had the potential to generate active problem-solving; and,
- focused on the development of students' environmental education practice in the classroom.

As in the previous section (5.3.1) since participation observation was not part of the research, the researcher cannot comment on the actual functioning of these projects. The assumptions made about the projects are based on the interviews, and verified (where it was possible to do so) via documentation (for the scrutiny of the documentation, see sections 4.4.3; 4.5.4). Many institutions included more than one of the above types of projects.

In response to the following question: *"Do any of these projects involve the local community?" (Question 30)* most of the interviewees, except those from four institutions (C, D, E, J) suggested that their projects did involve the local community. While this might be true, it is the nature of the projects which is of greater significance, since community involvement in cleaning-up campaigns (two institutions) does not unpack the true causes of the environmental problems facing them. However, these interviewees' responses suggest how they perceive the environmental crisis, which disregarded the social, political and economic facets. Similarly, an oversight of the interviewees from institution E (the study of the refuse dump) who asserted that this project did not involve the local community, while it is very relevant to the poverty-stricken communities who rely on these dumps for their survival, totally oblivious to the health hazards existing in them, suggests that the interviewees (from institution E) ventured into this project from a science/ ecological perspective, largely ignorant of the social, political and economic dimensions.

Except for the interviewees from three institutions, (C, D, J), all the others (in response to *Question 31: "Are these projects related to local environmental problems?"*) argued that their

[22] No distinction was made between the projects that students were involved in for the different year levels, since there was no clear progression in this regard.

Table 5.6 The nature of the projects which students ventured into at the tertiary Institutions

Biophysical Nature	Resource Development	Action Component	Active Problem-solving	Develop students' practice
Trail studies (institutions A, C, D and E).	Scrapbook files (institution A).	Cleaning up campaign (two (institutions A and D).	Planting of local vegetation (institution E).	Focusing on environmental education across the curriculum (institution E).
Ecology of local environment (institutions A, C, D, E, F and H).	Development of worksheets and charts and other resources (institutions C and I).	Introducing students to participate in Lengau Conservation Clubs (institution D).	Study of a Refuse Dump (degradation process, and circulating results) (institution E).	Students devise a set of appropriate materials, or outline a specific strategy for one week's work. The theme/ topic selected should promote environmental education principles. A rationale has to be included, that makes the students' environmental education choices explicit.(institution J).
Observing interactions within an ecosystem (institution F).	Devise weather instruments (institution D).	Litter Project (institution G).	Water Project via action Research (institutions L, M, K).	
Research Report on alien plants in a Nature Reserve (institution H).	Involvement in the ongoing development of a resource "We Care" (institution M).	Investigate an issue (decline of oak trees) and make recommendation to the City Council (institution G).		
River studies (institution G).	Write a book 'My World' of students' personal perspectives of their world, from their home, to the city, country, continent, to include the world (institution F).	Explore local environment (recreation areas, roads, etc. to establish hazards, and make recommendations to improve it to the City Council (institution B).		
Study of Artifacts of local Town (institution G).				
Examining flora and fauna in a conserved area (institution G).		Case Study of the role of a Trust to incorporate environmental education (institution I).		

students' projects were related to local environmental problems. The problems, of local relevance, listed by them included:

- littering;
- replanting of local vegetation and the problem of refuse dumps;
- investigation of the decline of oak trees;
- ethnobotany project: effects of alien plants in a nature reserve;
- soil erosion and the pollution of the area; and,
- water as an environmental problem in many areas.

When viewing the type of projects mentioned by the interviewees, the water project (institutions L, K, M) may be one of the few projects where students were actively involved in local, relevant problem-solving activities, necessary for realising change. For most of the other projects, students were engaged in fieldwork-related activities largely of a biophysical nature (based on the analysis of questions forty to forty-eight). Projects that involved, for example, cleaning up campaigns, might be perceived as solving local problems; however, in reality, these merely treat the symptoms of the problems, rather than unpack their real causes. Notwithstanding the importance of doing fieldwork of an ecological nature for students teachers, (since it encompasses the development of necessary skills and insight), what is lacking in many of these projects is the development of critical skills that might enable student teachers to link their projects to socio-political forces which form their genesis. Implicit in true problem-solving activities, in the view of the researcher, should be the permanent reconstruction of the degraded environmental conditions where many South Africans reside. However, the appalling conditions of overcrowding, informal settlements, and the host of health hazards that are associated with these depressing conditions in the areas where most South Africans reside cannot be isolated from the social, political and economic injustices of the past (see sections 1.1; 1.2). These are issues that future environmental education teachers need to address, and projects are conducive for this. This vision is echoed in one interviewee's (L1) views on the significance of project work: "Use existing curricula for change as a starting point, the idea is for innovation, and it is context bound", an aspect that did not occur to most of the interviewees.

Finally, in response to *(Question 39: "Do you collaborate with other colleges/ universities regarding common projects? If yes, comment on a few examples. If not, mention why not")*, only the interviewees from four institutions (G, H, J, K), which included two colleges and two universities, said that they did network on a formal basis with other tertiary institutions on common projects. Of concern, however, was that there was absolutely no collaboration between the different colleges; even these interviewees at the two colleges (who said that they did embark on common

projects) fostered their links with the universities. One interviewee (G1) gave a possible reason why this was so: "...collaboration has been hindered as a result of the numerous education departments, even within the Cape Education Department [ex-HoA] there is little collaboration between the colleges, since lecturers are scared and sceptical of evaluation". This lack of collaboration is widely acknowledged (Hofmeyr 1991; NEPI 1992a; Siebörger and Kenyon 1992; Van den Berg 1994) and links up with what has been discussed in terms of the privatisation of the teacher educators (see section 5.2.1.3), reiterating the urgent need for networking and in-service programmes that need to be established to promote collaborative practices between the teacher educators (specifically those operating at colleges of education).

5.3.3 Practice teaching

To ascertain whether students were given the opportunity to put the theory gained (from the course) into practice (necessary for realising change at meso level), and to explore what the interviewees' perceptions of an 'environmentally educated teacher' (see also sections 3.4.3.2; 3.4.3.4) entailed, the area of practice teaching was included in the research framework.

The first question put to the interviewees was: *"Are the general principles of environmental education evident in the students' approaches to teaching when they are out practice teaching at the schools?" (Question 49)*. Four categories of responses emerged after data analysis:

- principles of environmental education are evident in the approaches of students during practice teaching;
- principles of environmental education are evident, but with certain reservations;
- principles of environmental education are not evident in students' approaches; and,
- interviewees who were not able to respond to this question.

Only two interviewees (K1 and G2) said that the general principles of environmental education were evident in students' approaches during practice teaching. Three interviewees (I1, I2 and K2) gave positive, but conditional responses. Included was the response from interviewee I2, who commented: "It [environmental education principles] tend to vary, it is more evident for students with biological/ geographical backgrounds", and interviewee K2 who argued that it might be forthcoming (in students' teaching during practice teaching), but that "the host teacher plays an important role". A third category of responses applied to four interviewees who indicated that it was difficult for them to comment, for practical reasons. Some of their comments included: "This is the first year the that the course is presented, and students only observe" (interviewee B1).

In the final category, sixteen interviewees said that the general principles of environmental education were not evident in the students' approaches during practice teaching, for reasons linked to the inhibiting influences at the schools (see section 5.5). Included was that environmental education was not part of the formal school curriculum, which restrained students from venturing into environmental education whilst practice teaching (nine interviewees). Consequently, students did not get much practice in the area of environmental education (interviewees A1 and E4). Further impediments included that schools are very sceptical of any influence that impacted on the normal day-to-day curriculum (interviewees C1 and E1), and that student teachers had to conform to the setting at the schools (interviewee F1), since the "schools determine what students have to do" (interviewee G1).

From the analysis of the interviewees' responses it was established that practice teaching in the area of environmental education was neglected, for the reasons outlined by the interviewees. The dearth of practice teaching in environmental education adversely affected further responses to other questions that were put to the interviewees in this section, since not many of the students were afforded the opportunity to practice teach in this area. However, the question that was put to the interviewees can also be viewed as a 'loaded' question, since 'the general principles' are many and multifaceted. In retrospect, this question could have been broken up into a number of different questions (pertaining to the nature, scope, aims, objectives and different principles of environmental education), that might have resulted in a more comprehensive data base for this study.

Notwithstanding the weakness in the formulation of the question, it has generated a reasonable degree of responses from the interviewees, since there has been an ongoing debate on the area of practice teaching in South Africa (COTEP 1996; Hofmeyr et al. *IPET, TSUD Report* 1994; IPET, CEPD Report 1994; Kenyon and Siebörger 1992; NEPI 1992a). In this regard a number of pitfalls in the way of realising change have been identified in the system of practice teaching.

- Two constraints, at macro level, included:
    - The conservative nature of schools, and the impediments associated with the notion of schooling, which leaves little room for innovative experimentation; and,
    - The problem (for some of the interviewees) that environmental education has not been incorporated into the formal school curriculum.
- Meso level constraints included the short periods of practice teaching that denied students the opportunity to reflect critically on their practice, a view supported by, for example, Kenyon and Siebörger (1992).

- Micro level areas of concern related to the style of supervision where the course presenters did not have the opportunity to supervise all their students, for reasons which include a lack of time, distances involved in travelling to the schools, shortage of staff and large numbers of students.
- Finally, the lack of cooperation between institutions involved with the initial education of teachers, and the schools where students to their practice teaching has been noted (Kenyon and Siebörger 1992; NEPI 1992a; Hofmeyr et al. *IPET, TSUD Report* 1994), which was also established earlier in this chapter (see section 5.2.2).

The second question that was put to the interviewees: *"What do the lecturers look for, in terms of application of environmental education, when they evaluate students during practice teaching?" (Question 51)*, gave some indication of what the course presenters perceived as important competencies for an environmentally educated teacher. The analysis of the responses offered by the interviewees (on what they would regard as important when environmental education is presented by students) shed further light on what they perceive to be important in a framework for environmental education for teacher education (section 5.1.3). Unfortunately, not all the interviewees responded to this question. A summary of the responses from those who offered some comments indicated that an environmentally educated teacher had to show conceptual foundation competencies that included :

- the incorporation of local relevant issues within their course structures (six interviewees);
- the utilisation of the environment as a stimulus and as a resource (interviewee I2); and,
- the understanding of concepts, for example, conservation (interviewee A1).

Other competencies mentioned by the interviewees included professional competencies of the environmentally educated teacher as having the ability to:

- link the theory gained to practical situations (interviewee I1);
- analyse and evaluate environmental problems in a critical manner, from a social and political perspective and to take the necessary action (interviewee L1); and,
- to alter the attitudes of the pupils in a positive manner (interviewee I2).

Like the afore-mentioned question, this question can also be interpreted as a 'loaded question' (despite the responses that were provided by the interviewees). The question could have been simplified into a number of more direct questions, (rather than being phrased in such a broad manner) that might have provided a more comprehensive indication of specific outcomes of an environmentally educated student teacher, in terms of a conceptual foundation (covered in section 5.1.2.4), professional competencies and personal qualities. Some of these were, however, outlined

by the interviewees in section 5.1.2.4.

To ascertain whether there was any form of interdepartmental/ subject communication and collaboration between the interviewees and the rest of the staff, the following question was put to the interviewees: *"Is there any liaison between the lecturers functioning in the environmental education departments and the other subject departments?" (Question 52).* All of the interviewees (except for at two institutions - B and J - where there was no practice teaching due to the nature of the courses) responded that there was some form of communication between the course presenters and other members of staff at their institutions. For interviewees from three institutions (D, E, K) these links were established informally:

- through seminars and workshops (institutions A and F); and,
- between specific subject departments (six institutions C, G, H, I, L, and M).

At institution G, contrasting views were relayed by the two interviewees. One interviewee said that there was some form of interdepartmental interaction, "... environmental education has now a subject head at college, and there is a good liaison between history, sciences, geography and mathematics departments" (interviewee G1), while the other interviewee (G2) responded that there was no collaboration. From the responses from these two interviewees, the researcher validated the view of interviewee G1, since environmental education does form part of the subject areas listed by the interviewee. It was therefore logical that close links would exist between those departments that were mentioned.

These responses indicate that although there was some form of interdepartmental communication at these institutions, collaborative networking was not part of the ethos of many of these institutions. This has adverse ramifications in terms of integrating environmental education into all areas of the curriculum for initial teacher education. Furthermore, for the realisation of education for sustainable living, interdepartmental collaboration is necessary for the formulation of an institutional environmental educational policy, to foster what is referred to as a "whole school approach" (Gough 1992; Murdoch 1992; UNESCO 1988; 1990; UNESCO-UNEP 1985; see section 3.4.3.4), outside of breaking through the barrier of privatisation.

The final question concerning practice teaching centred on the receptiveness of the schools for students to include environmental education during practice teaching. The following question was put to the interviewees: *"Are the environmental education approaches well received in the schools? Any comments". (Question 53).* There were three categories of responses which emanated from the

analysis of this question:

- environmental education was not favourably received by the schools, (all the interviewees from institutions A, B, C, D, E, H);
- environmental education was favourably received at the schools (six interviewees); and,
- that it was favourably received, but with certain reservations (four interviewees).

Most of the interviewees (fifteen) commented that schools showed a negative inclination towards environmental education. More than half of these interviewees attributed this negative inclination firstly, to environmental education not having been incorporated into the formal curriculum, and second, to the suspicion surrounding new innovations, centred within the notion of schooling and the powerlessness of the teachers. Additionally, the syllabus-driven nature of the educational system (centred on prescribed content), was included as one of the major reasons why schools are reluctant to venture into new initiatives (see section 5.5.1). These impediments provided by the interviewees concur with the views of many writers and researchers (both internationally and in South Africa) who highlight the difficulties associated with schools to foster innovations and transformation (Angus 1986; Bates 1988; Beyer 1989; Giroux 1992; Huckle 1994; Motala 1993; Siebörger and Kenyon 1992; Van den Berg 1994).

Notwithstanding the reasons provided by the interviewees (on why schools were not receptive to environmental education during practice teaching), six interviewees commented on why schools were receptive to environmental education during practice teaching. The comments made by these interviewees were based on their particular rapport with certain schools, as expressed by interviewee K1 "...[environmental education] is extremely well received...when environmental education happens, the teachers who are inadequately equipped welcome students to take the initiative". This response indicates that it is important for teacher education institutions to foster closer links with the schools. In so doing the necessary mutual trust might develop, that can lead to collaborative undertakings between these institutions, that might, in time, bring these two 'worlds' together.

Some of the interviewees' reasons for the non-receptiveness of environmental education at schools (outlined above) resurfaced in their responses to the following question: *"What is your opinion on the future of environmental education in South Africa as far as teacher education is concerned?"*

(Question 77), and the responses obtained from the analysis of data[23] of questions, not included in this discussion. The analysis of the above-mentioned question resulted in four categories of responses, each underpinned by a number of properties[24].

Suffice it to say that although the importance of environmentally educated teacher educators and teachers has been repeated at most international and national conferences, the situation remains unsatisfactory (see section 3.5). In an attempt to review the state of teacher education, the National Institute for Educational Research in Japan (NIER 1993) identified that there was a lack of environmental education at both initial teacher education level, as well as at INSET. As an outflow of this seminar (and the Seminar held at Griffith University in July 1993) to address this barrier, a project (joint undertaking of UNESCO Asia-Pacific Centre for Innovations in Education for Development, ACEID, and Griffith University in Brisbane, Australia) has been initiated to further innovations in environmental education in teacher education programmes. The primary goal (UNESCO-ACEID 1994: 8) is to create a network for teacher educators critically to reflect on their practice, while collaborating with each other on various aspects of curriculum development in environmental education. This project is functioning, and several seminars were conducted during 1995 (Heck 1995: personal communication).

Projects like these have the potential to overcome a few impediments in the way of realising the challenges necessary for education for sustainable living. In the opinion of the researcher, such endeavours might break the misconception, (which many teacher educators, particularly at some colleges of education still firmly believe), that research is confined to the domain of the universities. In short, it might result in developing teacher educators as researchers, to further critical praxis. Secondly, it has the potential to break through national barriers, that can only enrich the discourse of environmental education. Moreover, it has the potential to further the principle of fostering the aspirations of a global alliance (IUCN, UNEP, WWF 1991). The proviso, however, is that such projects need to be founded on the principles of true collaboration and participation, facets that might further a sense of ownership. Also, the necessary infrastructure to sustain its continuance needs to be secured (see section 2.6).

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[23] The data referred to include the analysis of questions five (opinion of interviewees how environmental education should be incorporated into the curriculum for teacher education), and fourteen (incorporation of environmental education into all levels of the education system).

[24] These related to a lack of policy and the constraints of the bureaucracy of the education system. While these issues were discussed in sections 3.1.1 and 3.3.1, they are synthesised in section 7.8, since they form part of the foundation for a proposed strategy for environmental education in initial teacher education the Western Cape.

While the value of projects of this nature cannot be denied, and is recommended by the researcher for South Africa, there are a few challenges that stand in the way of such endeavours. First, due to rationalisation, many colleges of education are faced with the daunting realities of staff cuts and closure. This is the envisaged scenario that will confront teacher education to the end of the century. Outside of this demoralising situation with which teacher educators are confronted, the few who remain in this system need to be included in the formulation of any innovations of this kind. Unfortunately, many of the teacher educators were not involved, nor consulted in the formulation of the guiding document for the 'norms and standards' for teacher education by COTEP (1996), the very committee that will have to sanction such endeavours, thereby nullifying true participation and a sense of ownership. As a result, many teacher educators are, like in the past, mere technicians who have to implement what they are told, which might adversely affect the commitment of teacher educators to projects of this nature, irrespective of the projects' worth. To compound matters, established from section 5.3.2, networking among teacher education institutions regarding common projects was lacking, which leaves a void as far as the necessary infrastructure to sustain such initiatives is concerned.

5.3.4 Conclusion

In summary, this third key factor explored the praxis of environmental education at the tertiary institutions. Against the backdrop of realising change for education for sustainable living, an analysis of the practitioner's praxis in this realm revealed the following barriers in the way of change:

- A host of teaching strategies (many being student-centred) were ventured into, a positive feature which, however, is underscored by the manner in which these courses were functioning, outlined in key factor two.
- The powerful potential of environmental education projects was not fully utilised by many of the interviewees.
    - Many of these projects were bio-physical in nature, and did not address the socio-economic and political facets of the environmental crisis.
    - Instead, what was explored, under the disguise of action, were projects that were dressing the superficial 'wounds' of the environmental crisis (e.g. clean-up campaigns) rather than working towards the eradication of local and relevant environmental problems.
- Furthermore, networking among teacher education institutions regarding common projects was lacking, thereby perpetuating the powerlessness of the teacher educators through the

additional privatisation and intensification of their work.

Notwithstanding these negative aspects associated with project work, there were the few that included an action component and active problem-solving strategies (essential for effective environmental education practices - Di Chiro 1987; Greenall-Gough and Robottom 1993; Hart 1990a; Huckle 1991).

- Of notable importance in this regard was the action research water project, a focal point for three universities, where students were actively engaged in an ongoing manner to solve a local environmental problem. Projects of this nature have the potential to bring about the changed necessary for the realisation of education for sustainable living, since it demands critical reflection necessary for the furthering of critical praxis.

Practice teaching was another neglected area in praxis for many of the environmental education courses at the institutions.

- Although there was some form of inter-subject department communication, true collaboration was lacking.
- A major deterrent for practice teaching in the area of environmental education was the lack of formal policy. Policy in this regard is vital to secure the macro levels of change.
- Similarly, the conservative nature of schools (centred in the notion of schooling) obstructed students from furthering critical praxis, and therefore resulting in the failure to take up the challenges to realise the changes necessary for education for sustainable living.

Regardless of the obstacles that may hamper practice teaching in environmental education for student teachers, it is recommended in several documents (EEPI 1994; NIER 1993; QBTR 1993; UNESCO 1993) that students be afforded the opportunities to participate in environmental education whilst practice teaching. for example:

> All students should be required to prepare teaching activities, lessons and units which reflect the objectives and guiding principles of environmental education and to present them to students in teaching practice situations. This will ensure students gain experience in infusing environmental education into existing work programmes, practice their skills in experiential teaching methods, and recognise the professional issues involved in balancing the political nature of environmental education to the expectations of local communities (QBTR 1993: 74 - 75).

Whilst recommendations like these demand priority attention in teacher education, they have limited

worth if the impediments associated with schooling are not built into teacher education programmes, an opinion that is echoed in the sentiments of, for example, Verma (1993) and Beyer (1993). By ignoring the realities of schooling, recommendations are reduced to idealistic rhetoric since schools are largely responsible for perpetuating the educational status quo. Practice teaching experiences could be employed as an ideal 'tool' for students and teacher educators to unpack, together, the powerful forces, (i.e. of the hidden curriculum) that are in conflict with the realisation of real change, in order to prepare them for what they need to struggle against once they qualify as teachers. Nevertheless, it is important for teacher educators and students to engage in the debate regarding practice teaching. Also, to make practice teaching an important process of teacher preparation, where critical reflection by students and teacher educators can lead to an overall improvement in the quality of education for this country. Moreover, critical reflection is vital for the furthering of praxis, thus, to realise the necessary changes (at all levels) for education for sustainable living.

Finally, the interviewees' visions on the future of environmental education within teacher education revealed the following:

- While acknowledging the importance of environmental education as a response to the environmental crisis, some argued that it was important to incorporate it into all levels of the education system[25], and, closely linked to the barriers encountered during practice teaching, that formal policy was needed to direct this.
- The interviewees also acknowledged that the education of the teachers and teacher educators within environmental education needed to receive priority attention.

From the perceptions of the interviewees, a concern raised was the need for teacher educators (and practising teachers) to gain an understanding of environmental education before it became part of the formal education system, which is explored in chapter seven. The other concern centred on the need for formal policy to secure the incorporation of environmental education into the formal education system. The latter concern is receiving attention at government level, since the importance of (and the need for) environmental education has been stipulated in important formal documentation, including the:

- RDP (ANC 1994) document;
- IDRC document (1994);

[25] In this regard, the interviewees acknowledged that student teachers might be confronted with difficulties to incorporate environmental education into their practice at schools if it is not part of the school curriculum, which can be attributed to the notion of schooling.

- *White Paper on Education and Training* (DE 1995: 22); and,
- COTEP (1996) document.

These important policy documents all acknowledge the need for environmental education within the formal education system. Of particular importance is the Committee on Teacher Education Policy (COTEP 1996) document (which is currently the 'guiding document' for the education of teachers see sections 3.2.2; 3.3.2; 3.4.3.2 for critique on this document) that reiterates this need, specifically for teacher education. However, the COTEP (1996) document is primarily concerned with initial teacher education programmes, and does not explicate on the need for creating the infrastructures for INSET (professional development programmes) for the practising teachers (and teacher educators).

Nevertheless, whilst policy is important to secure a place for environmental education within formal education, it needs to be accompanied by INSET programmes for practising teachers and teacher educators. Given the impediments that arose from the first three key factors, the prospects for the realisation of the challenges posed by education for sustainable living at initial teacher education level in the Western Cape, is bleak. A possible area to further the goals of education for sustainable living, may be in the area of INSET professional development programmes, to remedy the shortcomings of the practising teacher educators (and teachers in the schools). A synopsis of the current status quo regarding professional development for teacher educators is subsequently presented.

5.4 KEY FACTOR FOUR: PROFESSIONAL/ STAFF DEVELOPMENT FOR ENVIRONMENTAL EDUCATION

The importance of ongoing professional development[26] programmes for educators is widely recognised (CEPD 1994; Grundy 1987; Hofmeyr 1991; Robottom 1987a; Grundy 1987; NEPI 1992a). The fourth key factor therefore explored the professional development of the teacher educators in environmental education, and consequently lays the basis for a strategy for teacher educators to follow when they engage in environmental education (see chapter seven). The concept 'professional development' implies 'growth' of the practitioner, the type of growth that will lead to the transformation of their practice (Grundy 1987). In addition to the ongoing nature of professional

[26] Professional development, also referred to as staff development, explores what support structures exist at the different institutions to keep the teacher educators abreast of changes in environmental education.

development programmes, Robottom (1987a: 114-115) argues that professional development programmes to further environmental education practice (in a socially critical sense) should be:

- enquiry-based, in that they should stimulate environmental educators to adopt a research stance to their practices;
- participatory and practice-based;
- critical, in that they ought to critique the values and assumptions that inform environmental education policies, activities and practices;
- community-based, linked to the specific, local environmental and educational problems; and,
- collaborative, in that collaboration assists practitioners to recognise and counter "false consciousness" and can further collective action necessary to resist the forces, often political in nature, which hamper environmental transformation.

This vision for professional development for environmental education is supported by other environmental educators, for example Fien (1993), Greenall-Gough (1993) and Huckle (1995), and is in line with the agenda of realising the challenges posed by education for sustainable living.

In South Africa, teacher educators are faced with the challenge of equipping future teachers with the skills and values necessary to transform the dominant, uncritical and often disempowering patterns of current school (particularly primary school) practices (Van den Berg 1994). This implies that teacher educators need to reflect, in a critical manner, on their own practices, so that these are exemplary and worthy of emulation by their student teachers when they enter the field. Such critical reflection (for transformation) is central to professional development for environmental education, especially if environmental education is incorporated into the formal curriculum, as proposed in the *White Paper on Education and Training* (DE 1995).

5.4.1 The existence of, and participation in, professional development programmes

To determine whether there were any forms of professional development (referred to as staff development) programmes in environmental education at their institutions in which the course presenters participated, the following question was put to the interviewees: *"Do the lecturers who present the environmental education courses participate in any staff development programmes in this regard? If not, briefly comment". (Question 64).* The interviewees (sixteen, from nine institutions) responded that they were involved in some form of professional development programmes, while nine interviewees from five institutions declared that there were no such

programmes for environmental education at their institutions; the interviewees from one institution (I) gave conflicting responses[27]. The reasons provided by the interviewees for not participating in any professional development programmes in environmental education mostly centred around time constraints. One of the interviewees (D2) recommended that opportunities for professional development programmes should be scheduled into the time-table, otherwise, as suggested by interviewee C2, the teacher educators would regard such programmes as extra work.

The lack of time has been previously identified as a logistical barrier (see sections 3.6 and 5.2.1.3) for environmental education. However, the lack of time cannot be viewed in isolation from the general absence of INSET policy for teacher educators, specifically at colleges of education (NEPI 1992a). Since there was (and still is) no clear policy in this regard, such programmes were viewed as extra-curricular, rather than being part of the ongoing education of the educators (Hofmeyr 1991; NEPI 1992a). In addition, since initial teacher education (particularly at colleges of education) is largely centred within the behaviouristic paradigm (Zeichner 1983 see section 3.3.1), it favours a teacher educator-centred, content-driven curriculum, with the student teacher frequently being a passive recipient of a body of facts, transmitted in an uncritical, time-consuming manner. Notwithstanding the constraints associated with the change at meso level (the approaches to initial teacher education), time constraints, however, cannot be viewed in isolation of intensification (see section 5.2.1.3), and other challenges for realising change at macro level that adds to the powerlessness of the teacher educators.

5.4.2 The extent of the professional development programmes

It is acknowledged that professional development programmes need to be ongoing, in an enquiry-based, collaborative, participative and critical manner (Fien 1993; Greenall-Gough 1993; Robottom 1987 a; b). In this regard, the responses that emanated from the following question: *"How frequently does staff development in environmental education occur?" (Question 65)*, showed that for eleven of the interviewees (at six out of the nine institutions), who asserted that professional development programmes were in place, these were infrequent. The other five interviewees from three institutions asserted that they had ongoing professional development programmes in environmental education. Of the three institutions, two were universities, where prospects for

[27] One interviewee (I1) asserted that there were professional development programmes for environmental education, whereas the other interviewee (I2) said that there was no such programmes at their institution. Since they operated within different subject departments (Geography and Biology respectively), the researcher assumed that professional development was only confined to Geography department, and not for all staff members.

professional development programmes are greater, granted the autonomy bestowed on these institutions. The third institution was a college that was governed by the ex-House of Assembly, where there was a greater degree of autonomy, in comparison to the colleges governed by the ex-House of Representatives and the ex-Department of Education and Training (see sections 3.1.1; 3.3.2; 5.2.1.1). In the light of education for sustainable living, the infrequent nature of these professional development programmes fell short in terms of practitioners adopting a research stance to reflect, in a critical, collaborative and participative manner, on their practices. Thus, underscoring the potential for the furthering of critical praxis, fundamental for the realisation of the change necessary for education for sustainable living.

To determine whether any planning went into the formulation of these programmes, the interviewees were firstly asked: *"Do you have clearly formulated objectives for each staff development programme?"* (*Question 68*). Fifteen (of the sixteen) interviewees responded negatively, indicating that these programmes were deficient in terms of most of the 'criteria' that have to be met (outlined in section 5.4) in order for environmental education to aspire to the goals of education for sustainable living. Additionally, regarding the planning of the programmes, the interviewees were also asked to comment on their co-ordination, outlined in the question: *"Who co-ordinates staff development programmes in environmental education?" (Question 66)*. An analysis of their responses showed that the responsibility to initiate such programmes was largely left to the individual, adding to the sporadic and opportunistic nature of most of these professional development programmes.

5.4.3 Conclusion

This fourth key factor examined the situation pertaining to professional development in environmental education for teacher educators. The responses of the interviewees suggested that, except for three institutions, the professional development programmes for teacher educators in environmental education fell short in terms of most of the criteria necessary to further the changes required for realising education for sustainable living, which is subsequently summarised:

- The reasons provided by the interviewees for not participating in any professional development programmes in environmental education mostly centred around time constraints. However, this impediment to change at micro level is interrelated with the intensification, (and other challenges for realising change at macro level), that adds to the powerlessness of the teacher educators.
- The infrequent nature of these professional development programmes failed to afford the

teacher educators the opportunities to adopt a research stance critically to reflect, in a collaborative and participative manner, on their practices, thus underscoring the potential for the furthering of critical praxis, fundamental for the realisation of the change necessary for education for sustainable living.

- Additionally, the opportunistic nature of many of the programmes listed by the interviewees casts doubt as to whether most of these programmes can be referred to as 'professional development programmes'.

In the opinion of the researcher, the lack of sustained professional development programmes for teacher educators in environmental education has adverse ramifications for the education of student teachers in this area. Internationally, (Fien 1992; Selim 1977; Robottom 1987a; b; Tilbury 1992; Wilke 1985; Wilke et al. 1987; UNESCO-UNEP 1990), and in South Africa (Ballantyne and Aston 1990; Irwin 1993; Leketi 1992) the education of teacher educators is acknowledged as a vital area to secure this. Furthermore, the government's acknowledgement that environmental education has to become part of the education of all citizens (DE 1995), makes the education of the teacher educators (whilst not disregarding the thousands of practising teachers) in this area a priority. Collaboration and networking are important points to consider, not only to share resources, but to provide a forum where teacher educators can reflect, in a critical manner, on their practice. Participation in such forums may engender innovative curriculum and resource development initiatives, which might liberate teacher educators from the ills of privatisation, and generate a spirit of collegiality that is needed.

In the absence of a national policy for professional development (Hofmeyr 1991; Van den Berg and Meerkotter 1994), teacher education in South Africa is perceived in terms of initial teacher education (PRESET). It is recommended by the researcher that INSET policies for teacher educators in environmental education need to be developed in the light professional development that provides room for critical reflection on their practice by the teacher educators. Critical reflection might encourage them to transform their practice that was shaped by uncritical and politically neutral Fundamental Pedagogics, towards the realisation of the changes required for education for sustainable living.

5.5 BARRIERS OBSTRUCTING THE REALISATION OF THE CHANGES NECESSARY FOR EDUCATION FOR SUSTAINABLE LIVING

Several impediments may obstruct the realisation of change (at macro, meso and micro levels), required for education for sustainable living within initial teacher education. These are identified in this component of the first multisited case study (see also section 3.6), and brings to fruition objective four of the research project. The constraints that may inhibit education for sustainable living have been noted for each of the key factors that underpins this multisited case study, as well as from the analysis of the following question: *"What, in your opinion, might be the constraints that may restrict environmental education from being incorporated into teacher education?"* (*Question 7*), that was put to the interviewees. The responses provided by the interviewees for this question were analysed, resulting in the emergence of three broad interrelated categories (each underpinned by properties), which concurred with the barriers that emerged from the key factors. These barriers, however, also resemble those that have been outlined in section 3.6. This implies that many of the impediments in the way of change (for the realisation of education for sustainable living), identified internationally, may also be applicable to South Africa - notwithstanding the unique historical baggage of the South African context, and the contextual nature of these impediments, which will be deliberated on. The constraints included:

- Barriers centred within the formal education system. Within this category, two properties were distinguished:
  - the broader formal structures (and agenda) that steer the educational processes, which encompass the changes required at macro level, i.e. that of policy (and governance) and the recognition of the ideological and value-laden nature of education; and,
  - the curriculum for teacher education that is a manifestation of the broader formal structures and processes, but, which also encompass the changes required at meso level (i.e. the practice) and micro level (i.e. the content).
- Barriers related to the teacher educators. This category contained three properties:
  - barriers that are rooted within the 'notion of powerlessness' (of the teacher educators), which encompass the barriers that can be ascribed to the 'privatisation' of their work. These impediments are centred within the challenges to realise change at macro levels;
  - educational barriers, which encompass the changes required at meso level; and,
  - attitudinal barriers, which become manifested at micro level, but, are actually entrenched within the macro level challenges for change.

- Logistical barriers, (third category), that included the following properties:
  - lack of funding,
  - lack of resources; and,
  - time constraints, all of which can be viewed as challenges in the way of change at micro level (not withstanding the impact of the broader issues).

5.5.1 Barriers centred within the formal education system

The first category above considered those barriers that can be ascribed to the formal education system. Within this category, the broader formal "established structures" (interviewee M1) were perceived to generate resistance against the incorporation of environmental education into the area of teacher education, as interviewee K1 argued: "[the incorporation of environmental education] depends on the ethos of the new government". This comment has to be viewed in terms of the former government that did not consider the incorporation of environmental education into the formal education system as a priority (see sections 3.2.2 and 5.2.1.1). The formal education system in South African was one of the most valuable tools of that government. Rooted within the ideology of Christian Nationalism, and secured by fundamental pedagogics (see sections 3.1.1; 3.3.2), it was characterised by power, control and authoritative practices that portrayed the parameters specified by the Nationalists who controlled the political power. Considering this, it is not surprising that environmental education as a response to the environmental crisis, (that encouraged critical thinking, broad-based participation and the advancement of a democratic and socially just society), in the opinion of the researcher, was never considered since it was in direct conflict with the former government's agenda.

Added to this, one interviewee (D2) perceived the centralised nature of the formal education system as a barrier. Encompassed within a centralised system, was a centralised (externally developed and prescribed) curriculum, where control over the content (and the learning environment) was strengthened, and reinforced via Fundamental Pedagogics. However, while the present restructuring of education places primary and secondary education under the new Provincial Education Departments, (with technikons and the universities falling under National Education) the position of the colleges of education is presently still unresolved (DE 1996c). Colleges are currently administered by Provincial Education (college/ school sector), but the Ministry of Education is of the opinion that its place is within National Education. The National Commission on Higher Education is investigating the matter (DE 1995: 29 - 30). Irrespective of the decentralisation of schools, (Provincially based), the ills of the authoritative control measures of the past are still part

of the historical 'baggage' of the teachers (and teacher educators), and the 'old' prescriptive curricula (and hidden curricula) are currently still in operation (and will be for some time). It is the view of the researcher that an alternative for teacher educators (and teachers) might be found in establishing a spirit of collegiality, via collaborating and networking with each other.

Further impediments included the "ethos of the school and the leadership of some principals [that] may lead to a breakdown of environmental education" (interviewee G2). The argument of this interviewee ties in with the notion of schooling (previously discussed; see also section 3.4.2). It is argued that schools are likely to foster the values, views and agenda of the dominant classes, and consequently reproduce their social, economic and political order (Meerkotter and Van den Berg 1994; Siebörger and Kenyon 1992; Taylor 1993; Wagiet 1996). Often, (due to the technologizing - see section 5.2.2), order and control are reinforced by those in senior management positions which retards creative and more progressive innovations (such as environmental education practices), especially if it challenges authority and power relations. This barrier highlights the need for INSET (professional development) in the area of environmental education of key personnel operating at all levels of the school and education system in order to transcend the confines of the maintenance paradigm (see section 2.3), towards the realisation of transformation. Lastly, six interviewees argued for formal policy (see also 5.3.4) on the part of the education authorities to secure the incorporation of environmental education into the formal education system. In this regard, the need for environmental education has been expressed in a number of key documents (COTEP 1996; IDRC 1994; RDP 1994), including the crucial *White Paper on Education and Training* (DE 1995), notwithstanding the critique that has been levelled against some of these policy documents.

The second property considered those facets of the curriculum for teacher education that might hamper the incorporation of environmental education into teacher education. One of the constraints listed by two of the interviewees was that environmental education was excluded from the mainstream of the curriculum, (which is linked to the former property - the exclusion of environmental education from formal education system). As was outlined above, the *White Paper on Education and Training* (ibid.) acknowledges the important role of environmental education, but what is now required is a definite commitment to incorporate it as part of the education for everyone in this country. While such a commitment emanates from COTEP (1996), for teacher education one should not lose sight of the fact that this document is conceptually flawed in regard to realising the changes necessary for education for sustainable living (see sections 3.3.2; 3.6). Another impediment (perceived by two interviewees) related to the overcrowded teacher education curriculum. Interviewee (K2) argued that by adding environmental education, it might be perceived

as "more work". This is a definite barrier in our content-driven curriculum, especially for colleges of education, where there is an emphasis on academic content, to the detriment of more critical and experiential learning strategies necessary for securing change at meso level.

Further impediments to the teacher education curriculum (closely linked to the preceding constraints) were mentioned by six interviewees, who argued that the fragmented nature of environmental education, divided into separate subjects with distinct boundaries, was contrary to the interdisciplinary character of environmental education. Implicit within this argument is that the integrated approach might not be attainable. However, close collaboration with all subject departments will be vital, particularly for project work, but more so to ensure that the holistic nature is not lost. However, to resist these barriers in the way of realising the changes for education for sustainable living, colleges need to reconstruct the traditional curriculum with its three separate components, (academic professional and practice teaching), towards a curriculum as a language and discourse of possibility (see sections 3.4.1; 5.2.4).

5.5.2 Barriers relating to the teacher educators

The second category (that encompasses three properties) deliberates on the barriers that pertain to the teacher educators. The first property considers the barriers that result from the powerlessness of the teacher educators (and teachers), centred within the challenges for realising change at macro level. Critical theorists and researchers identified several underlying causes (regarding the disempowerment of teachers and educators), including the following facets of the teacher educators' work:

- Intensification (see section 5.2.1.3), that is deepened (in South Africa) as a result of rationalisation, where several staff members have been retrenched, with the result that educators have to work extra hours with much larger numbers of students.
- Privatisation, where teacher educators operate in isolation, without collaborating with their colleagues (see also sections 5.2.1.3 and 6.3.3).
- Technologizing, which is grounded, for example, within the hierarchical nature of the education system, that strengthens the tight control and authoritative practices emanating from the division of labour of bureaucratic practice (see section 5.2.2).
- Deskilling - this cause of disempowerment is closely linked to the technologizing impediment, and includes the separation between curriculum development (by outside experts) from its implementation (Grundy 1987; Tanner and Tanner 1987).

- Low status[28] (Carlson 1987; Rury 1989; Shanker 1986) and poor working conditions (Goodlad 1990; Sachar 1991).
- Feminization - women constitute about seventy percent of the teaching corps (NEPI 1992a), and when any field becomes a women's field its prestige lowers (Apple 1988).

As a result of some, or a combination of these causes that underpin the disempowerment of the educators, there is resistance to change, identified as barriers by five interviewees. Three interviewees identified some of the barriers resulting from the privatisation of the teacher educators' work. These constraints include what one interviewee (J1) perceived as "teacher educators are complacent about their work". This is typical of the South African education system (Hofmeyr 1991), where no structures have been created for teacher educators (and teachers) critically to reflect on their practice. One of the results of working in isolation, may include, "dishonesty" (interviewee C1) or "the fear of not knowing" (interviewee B1). Encompassed in these barriers is how educators perceive knowledge. While some writers (in other countries) attribute this to the high level of competitiveness between educators (Bullough 1987; Carlson 1987), others (Flinders 1988; Popkewitz and Lind 1989; Sachar 1991) argue that educators may fear that they are under constant surveillance by administrators, so that by showing that they are incognizant might be perceived as a weakness. This, in turn, links up with the manner in which they are evaluated.

Traditionally, the major form of teacher evaluation in this country has been inspection by outsiders, who were (and still are) directed by the Education Department. Coupled with inspection is that educators are judged on their students' examination results. Nationally there has been a recognised need for a reconceptualisation of the whole notion of evaluating teachers and teacher educators (Hofmeyr et al. *IPET, TSUD Report* 1994; NEPI 1992a; Pym 1993). Central to this reconceptualisation is for teachers/ educators to become more accountable. However, there are serious ramifications for evaluative processes, if these are to move beyond the form of inspection and examination results. Evaluative practices need to refocus and inspire the educators toward restructuring and transforming their practice, in order to realise the changes at meso level. Opportunities for collective reflection need to be established within and between institutions to enable educators to engage in genuine collegial collaboration which might help them uncover the common causes of their anguish, and empower them to resist these.

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[28] Historically, since the teaching profession attracted individuals from lower to middle classes, teaching was never viewed with the same respect as professions like medicine or law. One of the reasons for this is the relatively low renumeration.

A second property in this category (teacher educators as barriers), related to the teacher educators' lack of knowledge in the area of environmental education (a constraint that needs to be resisted to realise change at meso level), was identified as a barrier by four interviewees. Although only four interviewees listed the educational barrier for this question, in triangulating their response to the following question: *("How informed do you think teacher educators (at this institution) are on environmental education?" Question One),* twenty-one of the interviewees remarked that, in their opinion, teacher educators were not very knowledgeable in the area of environmental education. The comments provided by these interviewees (established from the analysis of question one) contained explanations which included that environmental education was new to many (one interviewee), and, that most teacher educators are not formally educated in environmental education (one interviewee). The interviewees' responses (that teacher educators are not well informed in the area of environmental education) once again point to the urgent need for INSET for teacher educators (and for practising teachers) if education for sustainable living is to become a reality.

Finally, five interviewees regarded the negative attitudes of teacher educators towards environmental education as the third property. Negative attitudes toward environmental education or to change in general, cannot be viewed in isolation of the causes that underpin the disempowerment of the teachers, outlined at the beginning of this section. Educators are confronted with the impediments of bureaucracy, authority and control which stem from the power relations that are firmly entrenched within the educational institutions, the education system, and society at large. Moreover, these impediments are in place to maintain the status quo. To resist these broad constraints is to go against the grain, which is not easy for most. Consequently, the majority conform, rather than taking up the challenges to become transformative intellectuals. A possible avenue to resist these constraints might, once again, be found in professional development programmes where critical reflection, for praxis, can be engendered.

5.5.3 Logistical barriers

The last category of the barriers that were listed by the interviewees encompassed logistical barriers (see section 3.6), which include the constraints (in the way of realising the changes necessary for education for sustainable living), at micro level. Three properties were included within this category. In this regard, four interviewees argued that a shortage of funding might impede the implementation of environmental education. That money is not readily available is a fact. The diminished budget for education and rationalisation, resulting in large scale retrenchments, are facing many institutions. The acknowledgement by the Department of Education of the need for

environmental education is no security for obtaining the extra funding that is needed to incorporate a new initiative. In this regard the sharing of resources, (human and materials) can alleviate some of the costs involved, thereby making institutional collaboration and networking all that more vital. This is linked to the other logistical barrier, the shortage of suitable resources (that was perceived by two interviewees). While networking and collaborative practices might curtail some of the costs involved, it will not solve the problem, and additional institutional fundraising measures have to be considered. Finally, a lack of time was perceived to be an obstacle by five interviewees. This barrier (as argued in section 5.2.1.3) should not be viewed in isolation from the wider formal education system that was structured on centralised control, reinforced by prescriptive syllabuses and externally controlled examinations, aspects responsible for the powerlessness of the teacher educators.

5.5.4 Conclusion

In summary, the barriers that the interviewees perceived as obstacles to the implementation of environmental education included those ascribed to the formal education system (the first category of barriers). These barriers, (embedded within the macro level of change) have to be viewed against the backdrop of the former government's education policies which, despite the technical dismantling of apartheid, are still almost just as pervasive as they were prior to 1990, at a structural level and in the ideological consciousness of the majority of educational role-players. The pervasive influence of Fundamental Pedagogics cannot simply be wished away, and should not be underestimated as an impediment in the way of realising change at macro level. Teacher educators (the second category of barriers) consequently need to work hard to transform their 'lecturer dominated' and conservative styles of functioning that are currently still entrenched within teacher education institutions and within their own consciousness (DE 1996b; Salmon and Woods 1991; Van den Berg 1994). Thus, for the realisation of the changes to secure education for sustainable living, macro level changes are necessary for teacher educators to overcome their powerlessness on the one hand, which, in turn, might further critical praxis.

The disempowerment of the teacher educators and their lack of knowledge in environmental education both have far-reaching, adverse implications for realising the changes necessary for the incorporation of education for sustainable living into the formal education system. The same applies to the logistical barriers (lack of funding resources and time) that were identified by the interviewees. A heavy leaning needs to be placed on professional development programmes for teacher educators (including practising teachers, administrators and other key personnel) to remedy

the situation on the one hand, while also ensuring that education for sustainable living becomes part of the agenda for the teachers of the future (initial teacher education). Notwithstanding that such conservative and autocratic practices still occur beyond our borders (Grant and Zeichner 1984; Grundy and Hatton 1995), South African education, through the radical transformation of teacher educator practices, needs to refocus its orientation towards the attainment of a democratic and just society (Van den Berg and Meerkotter 1994).

5.6 CONCLUSION: PUTTING THE PIECES TOGETHER

In exploring the status of environmental education at teacher education institutions nationally (objective one), as well as those aspects at these institutions which may facilitate the implementation of education for sustainable living at teacher education colleges in the Western Cape (objective two), the possible barriers that might obstruct this implementation were identified (objective four). Advised by the grounded theory approach, that was developed through the case study method, the analyses of the data obtained from the interviews in this first multisited study resulted in the emergence of four key factors which underpinned these three objectives. From the data embedded within each key factor (and their concomitant sub-factors), inferences were drawn during data analysis in terms of the realisation of the challenges posed for education for sustainable living. These challenges were discussed in terms of the changes (macro, meso and micro levels) that are necessary for the realisation of education for sustainable living. This procedure ascertained the extent to which current teacher education practices in environmental education facilitate, or impede, the realisation of education for sustainable living. In doing so, and in attempting to explain the reasons for the impediments, alternative guidelines for education for sustainable living in initial teacher education manifested themselves.

The influence of the teacher educators in the domain of environmental education at initial teacher education level was portrayed in the first key factor. Held up against education for sustainable living, and the macro, meso and micro level changes necessary for this transformation, an analysis of these practitioners' practices in this realm exposed serious flaws and shortcomings. Of major concern amongst these was the absence of formal environmental education qualifications amongst senior primary teacher educators, coupled with their virtual lack of any primary school teaching experience. Student teachers, who are educated by teacher educators who themselves neither have adequate formal qualifications nor the requisite grass roots experience of these specialised and formative years of education, essentially become 'trained' in the didactic components of their

courses to 'transmit', in uncritical and pre-determined ways, a body of unproblematised facts to the children. In so doing, they unwittingly perpetuate the reproduction of the apolitical and uncritical legacies (Giroux 1990) inherited from the apartheid era (see sections 3.1.1; 3.3.2). This reality is articulated by Van den Berg (1994: 34) who argues that

> ..the primary school has been largely the forgotten frontier, and yet it is very likely that at this level of the schooling system that apartheid has had its greatest triumph. It is here that millions have failed and left, it is here that millions, at a most impressionable age, have received an education that I believe has been essentially limiting rather than empowering.

Thus, with these deficiencies as a backdrop, the limited knowledge base of the teacher educators is restrictive (rather than facilitative) in regard to the changes that are necessary for realising education for sustainable living.

The second major impediment to the realisation of the changes necessary for education for sustainable living at senior primary teacher education level at institutions in the Western Cape which multisited case study one identified, was the environmental education ideological orientations of teacher educators. Essentially, teacher educators had a narrow view of what comprises the environment, and generally failed to recognise the interrelatedness and interdependence of the natural, social, economic and political systems as making up the environment. This failure to understand the environment in a more holistic sense was largely due the conservative environmental and educational ideological positions held by the majority of the teacher educators interviewed in the study. Their ideological positions were predominantly Technocentric (see section 3.1.3) and neo-classical/ vocational (see section 3.1.2). The ideological positions of the majority did not reflect a critical environmental consciousness and a critical eco-socialist environmental ethic, (necessities to advance change at macro level), which has negative implications for the incorporation of education for sustainable living into the curriculum.

Much blame for the outmoded ideological orientations of teacher educators must lie with the 'training' they received under apartheid structures, which was mainly divisive, autocratic and mechanistic (Van den Berg and Meerkotter 1994). However, they too must shoulder some of the blame since they have not sufficiently seized the opportunities for innovation and experimentation afforded by the interregnum that has been in place in education since 1990. No doubt, this failure has to a large extent been due to the vicious circle in which they are entangled, where their own uncritical training has left them without the skills to interrogate and transform their own practices.

Therefore, to realise the changes (macro, meso and micro) necessary for education for sustainable living in South Africa, much professional development of teachers (and thus of teacher educators) needs to be undertaken.

However, a positive feature of the interviewees' environmental education ideological positions was a fledgling awareness of the need for education for sustainable living. This is important in the South African context, but has to be taken further to incorporate the notion of sustainable living, underpinned by social justice, critical inquiry skills and a critical environmental consciousness. This view is supported by many environmental educators (Fien 1993; Fien and Trainer 1993; Greenall-Gough 1991; Huckle 1987; 1991; 1993; Orr 1992).

A further stumbling block to the successful implementation of education for sustainable living at senior primary teacher education level at institutions in the Western Cape identified by multisited case study one was the interviewees' perceptions of curriculum. It was established that for the majority the curriculum was perceived in terms of a 'product'; a narrow, apolitical ideological perspective, with some degrees of variation in between (in terms of syllabus documentation to include the total learning experiences of the learner). Only four interviewees conceptualised the curriculum in terms of inclusivity, (acknowledging the hidden curriculum) that is essential to embark on the issue of redressing the inequalities of the past, as argued in the NEPI *Teacher Education and Curriculum* document (1992b), the RDP (ANC 1994) and the *White Paper on Education and Training* (DE 1995). Thus, many of the teacher educators' perceptions of a curriculum fall short in terms of the macro challenges necessary for realising education of sustainable living.

Also discerned was what the interviewees proposed to include in a framework for a curriculum for environmental education in teacher education. A positive feature was that many interviewees listed elements common to all three approaches to environmental education (see sections 1.3.1-1.3.3), that concurs with the views of many environmental educators who argue that all three approaches are necessary for environmental education (Fien 1988; 1992; Maher 1986; Tilbury 1992; 1993). Encompassed within the collectively proposed framework by the interviewees for environmental education in teacher education were some principles of education for sustainable living (Huckle 1995; UNESCO 1993; UNESCO-ACEID 1994) that included aspects of ecological and social foundations, professional competencies and personal qualities. As optimistic as this collective interpretation may be in terms of providing a starting point for education for sustainable living curriculum reform at initial teacher education level, adversely, however, only interviewees from

four institutions included more than one of the properties that underpin education for sustainable living (see section 3.1.4), which many environmental educators argue is the approach that might advance the transformation towards democracy, sustainability and justice (Fien and Trainer 1993; Greenall-Gough and Robottom 1993; Huckle 1991; 1993; 1995). Thus, a reconceptualisation at macro level, of the curricular content, is necessary in order to realise the micro level changes for education for sustainable living. In summary, key factor one revealed that the more critical perceptions that underpin education for sustainable living, essential to redress the inequalities of the past in South Africa, were virtually non-existent, which is restrictive in terms of incorporating education for sustainable living into the initial teacher education curriculum in the Western Cape.

Emerging from the establishment of the second key factor, obtained from an analysis of the data, were three main barriers (pertaining to the infrastructure; functioning/ status; and, development and evaluation of the environmental education courses) in the way of the successful implementation of education for sustainable living at senior primary teacher education level at institutions in the Western Cape. First, regarding the infrastructure of these courses, the recent introduction of environmental education into initial teacher education for South Africa can be ascribed to impediments in the way of change at macro level, which includes a lack of policy for environmental education, and the fragmented, apolitical and uncritical nature of the Apartheid education system. These barriers in the way of realising the changes necessary for education for sustainable living have been deliberated on in section 5.5 (see also section 3.6). Against this backdrop, the challenges for the realisation of education for sustainable living at macro level are interlinked with those at meso and micro levels, which pertains to the status/ functioning of the courses (second barrier). Impediments in this regard included that few students were afforded the opportunity to include environmental education into their teacher education courses, that has negative implications in terms of developing environmentally literate citizens as proposed in the recent key education policy documents (COTEP 1996; DE 1995). Furthermore, environmental education was often linked to the natural and earth sciences, which perpetuates the technocratic, uncritical and apolitical approaches, and, thus fails to uncover the true roots of the environmental crisis. A final constraint in the functioning of the environmental education courses was the perceived lack of time. While this impediment was viewed as a micro level challenge for change, it is, in fact, rooted in the macro levels of change, for example, the bureaucratic nature of the education system, that adds to the powerlessness of the teacher educators.

The third barrier revolved around the general lack of participation of students (as well as schools and the community) in the formulation and evaluation of many of the courses. Impediments in the

way of realising the changes necessary for education for sustainable living at meso (and macro) level included deficiencies in relation to the epistemological, ideological, political, economic, aesthetic, technical, ethical and, historical dimensions (Van den Berg 1994: 36 - 37) regarding the functioning of these environmental education courses. The lack of participation, exacerbated by a scarcity of critical reflection, failed to engender critical praxis, which is a fundamental 'pillar' of education for sustainable living. Thus the infrastructure, functioning, development and evaluation for many of the existing environmental education courses revealed a number of impediments in the way of change at macro, meso and micro levels, which adversely affect the incorporation of education for sustainable living into the curriculum at initial teacher education level in the Western Cape. Without a policy for environmental education at all levels of formal education, a concerted effort to put education for sustainable living on the agenda will not be forthcoming. However, policy in isolation cannot bring about the necessary changes; it needs to be accompanied by professional development programmes (in a collaborative, participative, critical and ongoing manner) for (and by) teachers and teacher educators, to foster the transformation towards the realisation of education for sustainable living. Whilst the disempowerment of the teachers and teacher educators can be a retarding factor in such programmes, a planned strategy to realise the changes for sustainable living needs to be developed, jointly, with the practitioners. This discussion will be further explored in chapter six.

The third key factor explored the praxis of environmental education at the tertiary institutions. Against the backdrop of the realisation of the changes necessary for education for sustainable living at senior primary teacher education level at institutions in the Western Cape, an analysis of the practitioner's praxis (required for realising change at all levels) revealed several barriers in the way of change. While a number of teaching strategies were ventured into, this positive feature (for realising change at meso level) was underscored by the dearth of participation, and, by the uncritical nature of many of the environmental education courses, outlined in key factor two. Furthermore, the powerful potential of environmental education projects[29] was not fully utilised by many of the interviewees, since many of these bio-physical projects did not address the socio-economic and political facets of the environmental crisis. Moreover, networking among teacher education institutions regarding common projects was lacking, thereby perpetuating the

[29] Project work has the potential to further changes at all levels. At macro level, students can unpack the true nature of the environmental crisis, by developing a critical environmental consciousness, underpinned by ecosocialist ideological orientations. By employing critical problem-solving strategies, they can become actively involved in local, relevant projects to further the challenges posed for securing the changes at meso (and micro) level.

powerlessness of the teacher educators through the additional privatisation and intensification of their work. Finally, student teachers did not really have a voice in determining the content being dealt with, and therefore true praxis was not possible.

Notwithstanding these negative aspects associated with project work, there were the few that included an action component, and active problem-solving strategies. Of notable importance was the action research water project, (for three universities), where students were actively engaged in an ongoing manner to solve a local environmental problem. Projects of this nature have the potential to bring about the changes (at all levels) necessary for the realisation of education for sustainable living, since it demands critical reflection necessary for the furthering of critical praxis.

Practice teaching, especially in environmental education, was severely neglected for several reasons, all of which adversely affected the attainment of critical praxis. First, the mistrust and suspicion from schools regarding this domain, largely ascribed to the conservative nature of schools, (centred in the notion of schooling), obstructed students from furthering critical praxis. Additionally, true collaboration between the different subject departments on issues regarding practice teaching was lacking, which impacted negatively on the attainment of critical praxis. Finally, a major deterrent for practice teaching in the area of environmental education was the lack of formal policy, which is vital to secure the macro levels of change. Thus, the virtual non-existence of praxis (theoretically informed practice which is crucial to transformative teaching) adversely affects the incorporation of education for sustainable living into the curriculum at initial teacher education level in the Western Cape.

The fourth key factor explored the area of professional development (referred to as staff development) for the interviewees. Except at three institutions, there were no on-going professional development programmes. At the other institutions (where interviewees indicated that such programmes did take place), these were infrequent and opportunistic. Furthermore, there were no established structures (except at one institution) that coordinated professional development programmes. If professional development is viewed in terms of the interventions that lead may to the growth of teacher educators (Grundy 1987; Kelchtermans and Vandenberghe 1994), then the on-going and sustained nature of such programmes is of central importance. There is a desperate need for professional development programmes where teacher educators can reflect critically (and collaboratively) on their practice:

> ...a central feature of the work of teacher educators should be some form of collective professional development in which matters such as appropriate goals and practices for teacher educators are publically debated (Grundy and Hatton 1995: 22).

In the absence of a national policy for professional development, teacher education in South Africa is perceived in terms of initial teacher education. INSET policies need to be developed in the light of professional development that provides room for critical reflection on their practice by the teacher educators. Critical reflection might encourage educators to transform their practice that was shaped by uncritical and politically neutral Fundamental Pedagogics, towards the realisation of the changes required for education for sustainable living. Without policy for continuous teacher and teacher educators' professional development, the necessary infrastructure is also wanting. In this regard other avenues, for example, subject and staff associations, etc. need to be consulted to develop the infrastructures necessary for setting in motion professional development programmes that can further the goals of education for sustainable development.

In summary, objective one has been realised in that the standing of environmental education has been reported. Objective two has dealt with the identification of those aspects that will facilitate the implementation process, thus complementing objective four which has identified barriers to the implementation of education for sustainable living. All three objectives, which informed the investigation of multisited case study two (described in the next chapter), now form the foundation, together with the findings of the second multisited case study, for outlining a strategy for the implementation of education for sustainable living at senior primary teacher education level at institutions in the Western Cape (see chapter seven).

CHAPTER SIX

MULTISITED CASE STUDY TWO: WESTERN CAPE COLLEGES OF EDUCATION WHERE ENVIRONMENTAL EDUCATION HAS NOT BEEN FORMALLY IMPLEMENTED

6.0 INTRODUCTION

Pivotal to multisited case study two was the endeavour to gain a composite understanding of how teacher education institutions in the Western Cape, where environmental education programmes did not exist, were positioned in relation to the potential implementation of such programmes in the light of education for sustainable living. To achieve this understanding, objectives three and four were engaged to underpin data collection. Objective three explored the major influences that impact on the realisation of the challenges posed for the possible incorporation of education for sustainable living at these colleges. Objective four, on the other hand, attempted to identify and deliberate on the barriers[1] that might impede the successful incorporation of education for sustainable living into the initial teacher education curriculum for senior primary student teachers at teacher education institutions in the Western Cape. A critical interpretation of the data gathered via engagement with objectives three and four informed objective five, and laid the foundation for the articulation of a strategy for the incorporation of education for sustainable living into initial teacher education at teacher education institutions in the Western Cape[2].

The employment of objectives three and four as the basis for realising a detailed comprehension of the situation at the institutions regarding the possible inclusion of education for sustainable living in their teacher education curricula yielded four key factors (see section 4.5.3). Guided by the grounded theory approach (see section 4.1.4), that was developed through the case study method (see section 4.2), these key factors emerged from the analysis of the data (see section 4.5). The relationship between the objectives, the key factors and the underlying aim of the research is outlined in **Figure 6.1**. The questions, put to the interviewees, appear in interview schedule B in

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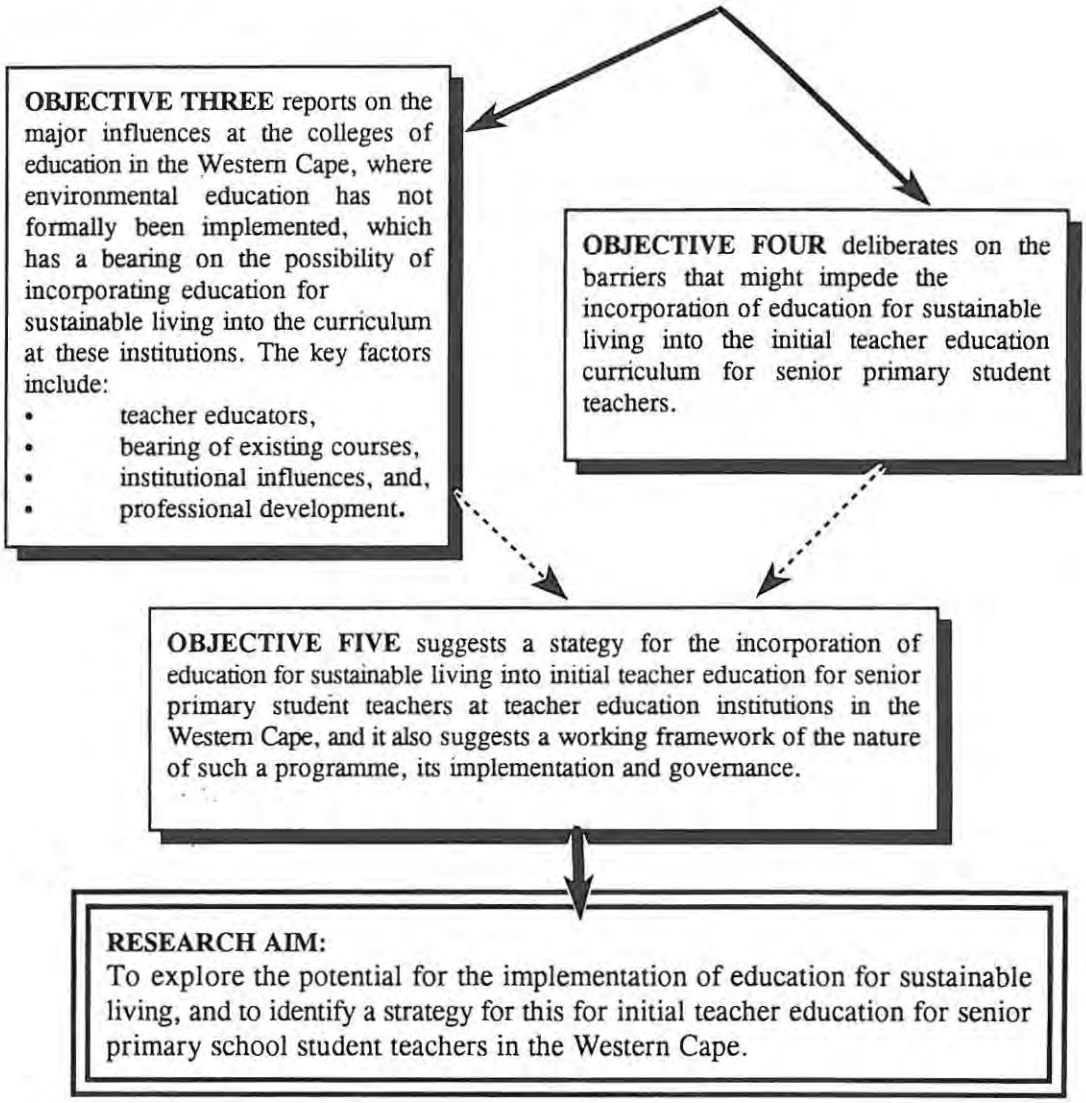
[1] The barriers identified by the interviewees in this multisited case study, in addition to the barriers identified by the interviewees in case study one (section 5.5) are considered in chapter seven, where guidelines for a framework in environmental education is deliberated on.

[2] See chapter seven for how the identification of these guidelines translates into a suggested strategy for the nature, implementation and governance of education for sustainable living at initial teacher education level in the Western Cape.

the Appendix section.

Figure 6.1 Multisited case study two: The relationship between the objectives, key factors and the research aim.



The data obtained from the interviewees in relation to not only the key factors which emerged but also their consequent sub-factors, were analysed against the backdrop of the interplay and interrelatedness between the macro, meso and micro level changes necessary for the realisation (and implementation) of education for sustainable living. This process was driven by the need to gain insight into current teacher education practices in order to identify both the potential for realising the changes necessary for education for sustainable living, and the barriers obstructing the implementation of education for sustainable living at initial senior primary teacher education level. The philosophical framework for education for sustainable living, grounded in socially critical

educational and ecosocialist environmental ideological positions, forms the foundations which underpin this investigation (see sections 3.1.4 and 5.0).

6.1 KEY FACTOR ONE: THE INFLUENCE OF THE TEACHER EDUCATORS

The forty interviewees in this multisited case study were teacher educators responsible for internal policy matters at their respective colleges of education (see section 4.7.2), and thus important stakeholders in teacher education (ANC 1994; Hofmeyr et al.- *IPET, TSUD Report* 1994; CEPD 1994). This was an important factor to consider, given the fact that teacher education institutions

> are located in the school sector and fall under the direct control of their departments of education...[therefore]...colleges are severely constrained from shaping their own policies and practices with regard to governance...The authoritarian nature of the relationships at colleges of education is reflected...in the dominance of departmental functionaries and in the top-down leadership style within the institutions (NEPI 1992a: 16)[3].

An analysis of the data obtained from these most senior and influential personnel identified their influence on the potential incorporation of education for sustainable living at their institutions as the first key factor, from which emerged three underpinning sub-factors:

- the potential knowledge base of the teacher educators in environmental education (see section 6.1.1), which includes their formal qualifications in environmental education, their affiliation to environmental education organisations, their familiarity with policy documents in this field (the latter two facets are an index of their ongoing support and interest in this field) and the extent of their primary school teaching experience;
- their environmental education ideological positions, including their understanding of environmental education, analysed in terms of their environmental and educational ideological persuasions (section 6.1.2.1), as well as their perceptions on curriculum (section 6.1.2.2), especially regarding what needs inclusion in a curriculum framework for environmental education within teacher education (section 6.1.2.3);
- their views on the need to incorporate environmental education into the curriculum for teacher education (6.1.3.1) in tandem with an exploration as to how they perceive

[3] This status quo is still unchanged since, as outlined in the *White Paper on Education and Training* (DE 1995), colleges are currently still placed within the school sector and do not yet have any autonomy. However, the future of college governance is receiving attention at present (see sections 3.3.2 and 5.5.1).

environmental education should be incorporated into the teacher education curriculum (6.1.3.2).

Considering the changes required for the realisation of education for sustainable living, a solid knowledge-base and the related experiences in the area of environmental education may advance critical reflection, (a pre-requisite for critical praxis), to secure the changes at meso level. These meso level changes are interlinked to those changes necessary at macro level, where the potential employment of socially critical educational orientations and ecosocialist environmental ideology may facilitate the realisation of education for sustainable living. The macro level changes, in turn, demand a reconceptualisation of practitioners' perceptions of the curriculum, which are embedded within the challenges to realise change at micro level. The interplay and interrelatedness between the macro, meso and micro level challenges are subsequently discussed, in terms of key factor one, underpinned by its three sub-factors.

6.1.1 What do teacher educators know? Exploring qualifications and experience

This sub-factor examined the interviewees' formal qualifications in environmental education, their ongoing interest in this field and their experience within the area of primary school teaching. An analysis of their responses to biographical data question five: *"Was environmental education included as part of your formal education?"* indicated that only four of the forty interviewees had formal qualifications in environmental education:

- MSc. (Zoology) degrees for two of the interviewees;
- MA (Language teaching) degree, for one; and
- M Ed. degree for another.

This dearth of formal education in the area of environmental education might impose severe constraints on the potential incorporation of education for sustainable living within a curriculum for teacher education (see also section 5.1.1). This situation is further aggravated by the fact that only six of the interviewees had experience in the area of primary school teaching[4], despite the fact that the majority of them had acceptable academic qualifications.

This tension between academic qualifications and experience raises an important issue which

[4] This assertion is based on biographical data question Four: *Previous employment* and question Seven: *Formal qualifications*.

underlies the distinction between being qualified according to official criteria[5] and being suitably qualified in terms of experience is an important one. Salmon and Woods (1991: 32) cogently articulate the ramifications of this practice:

> Fundamentally, what is at issue, is the difference between college staff who can take students beyond mere texts and syllabi, and staff for whom the course consists solely of those texts and syllabi.

Relating to the teacher educators' interest and support in the area of environmental education, the analysis of question Twenty-six: *"Do you belong to any organisations involved with the promotion of environmental education?"* and question Twenty-seven: *"If yes, mention these organisations"* reveals that only two of the teacher educators were affiliated to such organisations[6]. Furthermore, only ten of the interviewees indicated familiarity with the *White Paper on Environmental Education* (DEA 1989). The inference that can be drawn here is that the interviewees had little intrinsic interest in the area of environmental education[7], despite the fact that such interest has been identified as an important determinant in the efficacy of environmental education practice (Spork 1992; Stone 1990; Tilbury 1992). Considering that these interviewees held senior positions at the colleges, their lack of both formal qualifications and interest in environmental education can be regarded as major impediments to the potential incorporation of education for sustainable living into the curriculum for teacher education.

This scenario is further exacerbated by the current schism between theory and practice in teacher education, a view that is echoed in the sentiments of, for example Davidoff and Robinson (1992) and Siebörger and Kenyon (1992). Since the pedagogical framework in which many teacher educators operate is embedded in the behaviouristic paradigm (see section 3.3.1), this schism is not surprising. However, in the opinion of the researcher, it is in direct conflict not only with the manifestations of the goals of education for sustainable living in teacher education practice, but also with the ideological underpinnings, necessary to realise change at macro level.

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[5] Teacher educators require a standard ten plus four years post-matric studies to qualify for a lecturing post at a college of education (NEPI 1992a). With regard to the staff admissions criteria that are generally applied, teacher educators require academic qualifications (at least a Bachelor's degree or an equivalent), professional qualifications (recognised teaching qualification - for many an HDE diploma) and a few years teaching experience (Salmon and Woods 1991). No emphasis, however, is placed on any of these criteria.

[6] Social Welfare and Youth Organisation for one interviewee, and the Land Service Movement for the other.

[7] This facet is based on their participation in environmental education organisations, and their familiarity with the *White Paper on Environmental Education* (DEA 1989) which was the most influential document on environmental education in South Africa at the time of the interviews (i.e. 1992).

6.1.2 The teacher educators' understanding of environmental education

The second sub-factor reflected the environmental education ideological positions, (which, in terms of realising the potential implementation of education for sustainable living, impacts on the macro challenges) of the interviewees, and highlighted three major insights (see also sections 3.1.1; 3.1.2; 3.1.3; 3.1.4 and 5.1.2):

- their understanding of environmental education which informed both their environmental ideological perspectives (Fien 1992; Frankel 1990; Milbraith 1989; O'Riordan 1981; 1987; 1989; 1990) and their educational ideological orientations[8] (Kemmis et al. 1983; Kemmis 1988);
- their perceptions of curriculum in terms of inclusivity (QED 1993), which also shed further light on their ideological inclinations; and,
- what they believed should be incorporated into a framework for environmental education.

These insights were then employed to construct the meaning of the interviewees' understanding of education for sustainable living (see section 3.1.4). Furthermore, also, to ascertain whether these insights are facilitative or restrictive in regard to the macro level challenges for the potential incorporation of education for sustainable living into the initial teacher education curriculum.

6.1.2.1 Interviewees' understanding of environmental education

An analysis of the interviewees' understanding of environmental education, based on their responses to question one: *"What, in your opinion, is environmental education?"* resulted in six broad categories of responses (see **Table 6.1**).

Seventeen of the interviewees fell into category one with environmental education being equated with conservation. This category spawned five properties (see section 4.5.2). The first three properties reflected interviewees' perceptions of environmental education as a vehicle for the inculcation and development of awareness (property one) and for attitudinal changes (property two) which would foster conservation of both the natural and social environment (property three). These perceptions, that knowledge about the environment would bring about an awareness and attitudinal changes which, in turn, would promote conservation, are centred within the behaviouristic realm, that concur with the views of, for example Hungerford and Volk (1990) and Ramsey et al. (1992).

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[8] i.e. vocational, liberal or socially critical.

Table 6.1 Interviewees' perceptions of environmental education

Categories of environmental education perceptions	Examples: Direct quotes as examples of responses	Environmental ideological positions	Educational ideological orientations
1 Education for conservation: (eight interviewees).	"Education leading to all learners becoming aware of the importance of the environment, and a need to conserve and manage it wisely" (interviewee D1).	Technocentric, Light Green. The opinion that awareness of the environment will foster conservation.	Neo-classical
attitudinal changes for conservation (one interviewee)	"Environmental education, I think, is the education about the environment that aims to instill positive attitudes in the learners on the environment, leading to the conservation of the environment" (interviewee C3).	Technocentric, Light Green. The belief that knowledge about the environment will lead to attitudinal changes in favour of conservation.	Neo-classical.
conservation of the natural and social environment (three interviewees)	"Central to Environmental education is the notion to preserve the planet. There are various facets to environmental education and the environment. These can be seen as local, as the home, the city to the country - to the world" (interviewee F3).	Technocentric, Light Green. The opinion that environmental education involves the conservation of both natural and the social environments.	Neo-classical.
responsible life-styles for conservation (two interviewees)	"Information about the environment and how to conserve it, and to adopt responsible life styles to conserve its well being" (interviewee F5).	Ecocentric, Red Green. Responsible life-styles, that depicts 'living lightly on the earth'.	Liberal
acknowledging the interdependence of all facets of the environment, a factor needed for its conservation (three interviewees)	"Environmental education is concerned with the promotion of an awareness of and concern about social, political and economical interdependence and to provide persons with the opportunities to gain knowledge, skills, values and attitudes needed to protect the environment" (interviewee B6).	Ecocentric, Red Green. To acquire all that is necessary to 'live lightly on the earth'.	Liberal

Table 6.1 (cont)

Categories of environmental education perceptions	Examples: Direct quotes as examples of responses	Environmental ideological positions	Educational ideological orientations
2 Knowledge about the environment leading to environmental awareness (two interviewees).	"Environmental education is making students aware of their environment from the local area to the global one. Hopefully, this knowledge would lead them to become concerned about the destruction of the environment. One have to stress the inclusion of knowledge and information about the urban environment" (interviewee A2).	Technocentric, Light Green. The belief that knowledge about the natural and social environment will bring about the desired awareness and concern for the environment.	Neo-classical
Knowledge about environmental issues (one interviewee).	"Environmental education is the study of the environment and issues concerning the environment" (interviewee C6).	Technocentric, Cornucopian. This interviewee regarded the natural environment as being more relevant to environmental education in question two.	Neo-classical
Knowledge about the biophysical environment (one interviewee).	"The education of plants, animals, nature reserves, nature, and the soil" (interviewee D6).	Technocentric, Cornucopian. There is an emphasis on the natural sciences.	Neo-classical
Knowledge about the social and biophysical environments (one interviewee).	The education which gives an understanding of the environment. The environment may be the home, the country or the entire planet" (interviewee A5).	Technocentric, Light Green. Here knowledge about the social environment is included.	Neo-classical
Knowledge about the environment that focuses on the interrelationships between people and the environment (six interviewees).	"It is the study about the environment and how people relate to it, and interact within it" (interviewee D3).	Technocentric, Light Green. Notwithstanding that interrelationships are considered, no mention is made of the impact or implications thereof.	Neo-classical

Table 6.1 (cont)

Categories of environmental education perceptions	Examples: Direct quotes as examples of responses	Environmental ideological positions	Educational ideological orientations
3 Development of observational skills (one interviewee).	"Environmental education aims for learners to develop observational skills in their environment" (interviewee E6).	Technocentric, Light Green. Education in/ through the environment, focusing exclusively on observation.	Neo-classical
4 Education that fosters a harmonious co-existence with the environment (two interviewees).	"Environmental education is the education which raises the awareness of students on matters in their natural environment, and which assists them to develop ways to live in harmony with the environment" (interviewee B1).	Ecocentric, Red Green. Striving towards 'living lightly on the earth'.	Liberal
5 Education leading to an improvement of the quality of life (two interviewees).	"It is an education geared towards the improvement of the quality of life, [affected by the quality of the environment]. Included here is the acquisition of skills and positive attitudes to enable the learner to make informed judgements on environmental issues. It encompasses the socio-political and economical facets, which have a direct influence on the quality of the environment" (interviewee B2).	Ecocentric, Red Green. Development of an environmental ethic that includes values for social justice, ensuring 'basic human needs'.	Socially-critical
6 Education that leads to environmental problem-solving (six interviewees).	"Environmental education is a study area that focuses on the total real environment of the individual, group or community [social, political, economical and cultural environments] with a view to changing or restoring it and, to interact with it" (interviewee B4).	Ecocentric, Red Green. The development of a 'critical environmental consciousness, based on eco-socialists beliefs, acknowledging that the environment is socially constructed.	Socially-critical

These perceptions are criticised by the researcher for perpetuating the uncritical approaches to environmental education that do not bring about meaningful change, and finds support in the critique levelled by environmental educators both internationally (Huckle 1993; Robottom and Hart 1993), and in South Africa (O'Donoghue 1993a; b). The two other properties (four and five) reflect perceptions of environmental education which, while focusing on conservation, embraced some of the elements of education for sustainable living. Within property four, the need for environmental education to foster responsible life styles necessary for conservation was outlined. This is in line with the concept of 'living lightly on the earth' (IUCN, UNEP, WWF 1991 see section 3.1.4), which involves the fostering of an environmental ethic (i.e. how people interact with nature) to attain ecological sustainability. The fifth property outlined that a recognition of the interdependence of all facets of the environment was required to further the goals of conservation.

The incorporation of some of the principles of education for sustainable living in properties four and five can be viewed as a positive feature in regard to the aim of the research. However, the fact that environmental education was simplistically equated with conservation by a relatively large percentage of the interviewees (including two of the four interviewees who asserted that environmental education was part of their formal education) is a matter for concern. While conservation education is undoubtedly an element of environmental education, the misconception of equating the two is misguided for two reasons, both fundamental for the realisation of education for sustainable living. Firstly, this superficial equation has failed to bring about any meaningful change in terms of the environmental crisis, an opinion of the researcher that has wide support (Greenall 1987; Huckle 1985; Robottom 1991; Stevenson 1987; O'Donoghue 1993a; b). Secondly, the uncritical nature of this perception largely ignores the political dimension of the environmental crisis, an opinion of the researcher that is supported by several environmental educators, for example, Di Chiro (1987); Fien (1992); Huckle (1995); and Robottom (1991).

Having knowledge about the environment formed the basis of the second category relating to perceptions of environmental education (a view of eleven interviewees), and included five different properties. The first comprised perceptions equating environmental education with knowledge about the environment as the basis for creating a greater awareness of the environmental crisis in the learner. The other three properties of environmental education perceptions encompassed different aspects of knowledge, for example, those of environmental issues, the bio-physical environment, and of both the social and biophysical environments. The fifth property included responses from interviewees who viewed environmental education as knowledge about the interrelationships between humans and the environment.

All of these perceptions, in the opinion of the researcher, supported by environmental educators, for example (O'Donoghue 1993a; b; Robottom 1991) are indicative of a technicist view, typical of the top down 'message' which implies that knowledge will instill greater awareness in the learner, eventually altering attitudes and behaviour. This is a naïve view (Huckle 1991); education purely *about* the environment does not bring about any meaningful changes to the environmental crisis since it lacks the critical elements that may lead to the action, which is imperative to further the meso and micro challenges posed for realising education for sustainable living.

The other categories comprised varied perceptions of environmental education. In category three, environmental education was perceived as the development of observation skills during education *in* the environment encounters. This view depicts a conservative approach to education *in* the environment that is closely linked to ecological fieldwork, where there is an emphasis on the 'show-and-tell' activities still so prevalent at many institutions (see section 1.3.2). Category four included the perceptions of environmental education as an area that would lead to learners living in harmony with the environment. These interviewees[9] perceived environmental education as the vehicle for fostering an environmental ethic of 'living lightly on the earth' (IUCN, UNEP, WWF 1991) centred within the principles of education for sustainable living. Similarly, in the fifth category, environmental education was perceived as the means to improve the quality of life of the learner; it therefore encompassed the development of an environmental ethic which articulates how people interact with others to secure basic human needs in the pursuit of social justice. Finally, within the last category, environmental education was viewed as a response to the environmental crisis, where learners are actively engaged in solving environmental problems (see section 3.1.4). The responses of two of the interviewees, who indicated that environmental education was part of their formal education, as well as those of one rector, were grouped in this category.

The potential for the inclusion of education for sustainable living in the teacher education curricula hinted at in categories three to six outlined above is misleading, since the environmental education ideological orientations of the majority of the interviewees, in the researcher's view, were in conflict with (and therefore restrictive) the philosophical underpinnings of education for sustainable living. In reality, in terms of education for sustainable living, the environmental education perceptions of most the interviewees[10] may be perceived as apolitical and neutral, and invariably placed environmental education within the realm of the sciences, a locus which perpetuates the

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[9] Included amongst these were the perceptions of a rector at one college.

[10] i.e. thirty-two out of forty.

current 'technocratic rationality' assigned to environmental education (Robottom 1991). In addition, this majority made no mention of the other important properties underpinning education for sustainable living, for example, critical environmental consciousness, ideology critique or environmental politics (see section 3.1.4). Their uncritical perceptions of environmental education, rooted in their skewed ideological orientations, would appear to indicate that teacher educators generally lack the necessary insights fundamental to proactive engagement with the environmental crisis, a view that is echoed in the sentiments of, for example, Huckle (1995); Trainer (1990); and Walsh (1984). The narrow view of environmental education for the majority of the interviewees is restrictive in terms of realising the macro level challenges, and consequently might have adverse implications for the potential establishment of education for sustainable living programmes within initial teacher education at senior primary level in the Western Cape[11].

6.1.2.2 Interviewees' perceptions of curriculum

To ascertain how the interviewees perceived the curriculum, the following question was put to them: *"What do you understand by the term curriculum?"* (Question 14). This question was included[12] to attempt to gain further insight into the interviewees' ideological persuasions. The latter, however, are either facilitative or restrictive in terms of the potential incorporation of education for sustainable living into the initial teacher education curriculum. The interviewees' perceptions of curriculum are summarised in **Table 6.2**.

An analysis of the interviewees' responses yielded three categories which found correspondence in multisited case study one (see sections 3.4.1 and 5.1.2.3). Of significance here was that while more than half of the interviewees (in multisited study two) held a perspective of the curriculum that is 'broader than content', only two of them perceived curriculum in terms of inclusivity (Kemmis and Stake 1988; QED 1993). This implies that all the interviewees, excluding the two in category three, viewed curriculum in terms of a 'product' (Grundy 1987), a position which is contrary to the kind of inclusivity required to bring to fruition the vision expressed for education in the *White Paper on Education and Training* (DE 1995: 22):

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[11] The researcher acknowledges, however, that one interview is limited in determining conclusively the ideological positions of these teacher educators, and recommends that more research be conducted in this area (see also section 5.1.2).

[12] In the context of their understanding of environmental education (see also section 5.1.2.2), and what they considered as important within a framework for environmental education (see also section 5.1.2.4).

The realisation of democracy, liberty, equality, justice and peace are necessary conditions for the full pursuit and enjoyment of lifelong learning. It should be a goal of education and training policy to enable a democratic, free, equal, just and peaceful society to take root and prosper in our land, on the basis that all South Africans, without exception share the same inalienable rights, equal citizenship, and common national destiny, and that all forms of bias (especially racial, ethnic and gender) are dehumanising.

Table 6. 2 Interviewees' perceptions of a curriculum

Categories (and properties) of perceptions of curriculum	Direct quotes as illustrations of perceptions
1. The curriculum as a syllabus and content (ten interviewees)	"It is the content of a course" (interviewee A6).
All the courses (subjects) offered (eight interviewees)	"It is all the courses offered at an institution as opposed to the specific syllabus in a particular confined area of study" (interviewee B3).
Content and the teaching strategies (three interviewees)	"It is the learning programme, together with the method of teaching the information" (interviewee C7).
2. Total experiences of the learner (thirteen interviewees)	"All the learning experiences which students are exposed to at an institution" (interviewee E7).
Total learning experiences in addition to the planning and implementation of these experiences (four interviewees)	"The totality of the planned learning and teaching experiences as well as its manifestation" (interviewee A7).
3. Inclusive view of the curriculum which includes the hidden curriculum (two interviewees)	"The educational framework, formally and informally, necessary to educate the learner; this includes the hidden curriculum" (interviewee D3).

Notwithstanding the critique[13] levelled against the current realities in education (Chisholm 1995; Chisholm and Motala 1995), and particularly against this document (Parker 1995; see also section 3.3.2), the Department of Education has committed itself to a fully participatory process of curriculum development, in which the teaching profession, teacher educators, subject advisors as well as other stakeholders and role-players will play a leading role. This curriculum development process, they contend, should be participatory, open and transparent (DE 1995: 27), thus reflecting practices which are widely recognised as essential for education for sustainable living in teacher education (NIER 1993; UNESCO 1993; UNESCO-ACEID 1994). Yet, the practitioners' do not have the necessary tools to further this vision. Thus, in the researcher's opinion, the need for professional development programmes for education for sustainable living becomes imperative, to foster a new way of thinking and doing, if education for sustainable living is to become a reality.

In summary, it is the opinion of the researcher that the majority of the interviewees' conceptualisation of the curriculum is restrictive in regard to the potential incorporation of education for sustainable living into the initial teacher education curriculum. Their narrow conceptualisation of the curriculum as a product is in conflict with the macro level challenges required for education for sustainable living, where inclusivity aspires to redress inequalities, thus aspiring to further democratic and social just practices. Furthermore, the narrow perceptions of the curriculum may reflect how the curriculum is enacted, thus negatively impacting on the advancement of critical praxis, which is vital for realising the meso level challenges for education for sustainable living.

6.1.2.3 The interviewees' perceptions of what has to be included in a framework for a curriculum for environmental education in initial teacher education

To gain further insight into the interviewees' environmental education ideological positions, their perceptions regarding a framework for environmental education within the curriculum for initial teacher education was explored by posing the following question: *"Name a few key concepts/ topics/ anything (in your opinion) that should be included in a curriculum framework for environmental education in initial teacher education"* (Question 18). Many of the interviewees made more than one suggestion; these, however, have been collapsed into the particular category. A summary of the interviewees' collective responses appears in **Table 6.3** which outlines three

[13] Chisholm and Motala's (1995) critique relates to the fallacy of, for example, the rhetoric of participatory democracy (see section 7.8), while Parker (1995) critiques the *White Paper* for falling into the trap of modernism.

Table 6.3 Interviewees' perceptions of what needs to be included in a framework for environmental education in teacher education

Properties depicting education *about* the environment	Properties depicting Education for sustainable living	Other properties
CONSERVATION (twenty-seven interviewees) LOCAL ENVIRONMENTAL ISSUES (six interviewees)	TRACING THE ROOTS of the ENVIRONMENTAL CRISIS to the social, political and economic systems: • poor quality of life (five interviewees) • the land question (two interviewees) • homelands question (one interviewee)	SKILLS: Problem-solving (four interviewees). Evaluative, Investigative and Action Research (one interviewee).
BIO-PHYSICAL ISSUES: • pollution (sixteen interviewees) • overpopulation (seven interviewees) • water (three interviewees) • ozone depletion (two interviewees) • population dynamics (two interviewees) • acid rain (one interviewee) • deforestation (one interviewee) • soil erosion (three interviewees)	PEOPLE-PEOPLE RELATIONSHIPS: Human rights: • injustice (one interviewee) • democracy and democratic practices (one interviewee) Basic human needs: • housing and the squatter issue (two interviewees) • primary health (one interviewee) • hunger (two interviewees) PEOPLE-NATURE RELATIONSHIPS: Biodiversity (one interviewee) Sustainable development (five interviewees)	PERSONAL QUALITIES: • Positive attitudes towards the environment (two interviewees). • Sensitivity towards the environment (two interviewees). • Values in favour of the environment (one interviewee).
ECOLOGICAL CONCEPTS: • energy (two interviewees) • ecosystems (one interviewee) • interrelationships in ecosystems (three interviewees) • broad study of ecology (nine interviewees)	POLITICAL LITERACY: Unequal distribution of wealth: • poverty (twelve interviewees) Resources and production: • waste production (four interviewees) • consumerism (one interviewee) • resources mismanagement (four interviewees) Skills for critique of the dominant ideology: • oppression (one interviewee)	FIELDWORK (one interviewee) CLEANING CAMPAIGNS (two interviewees) Urban environment (four interviewees). History of local environment (one interviewee). History of harmful effects of atomic bomb (two interviewees).

categories of responses.

Category one contained properties typical of education *about* the environment (see sections 1.3.1 and 5.1.2), largely encompassing the study of ecology, ecological concepts and bio-physical issues which had a strong focus on pollution as the most widely recognised 'risk' to contend with (Beck 1992). The need to include the concept of conservation was acknowledged by most of the interviewees (twenty - seven), which correlates with their misconceptions of environmental education (see section 6.1.2.1). From this it can be deduced that most of the interviewees regarded the inclusion of ecological foundations as central to a framework for environmental education within teacher education, which, notwithstanding the importance of this facet, is incongruent with the critical and holistic underpinnings of education for sustainable living.

The second category comprised properties which reflect on the requirements of education for sustainable living. The interviewees' responses in property one indicate the extent to which they linked the need for students to develop an understanding of the poor quality of life of many South Africans with issues related to the land and 'homelands' question. The centrality of these factors, and their impact on the quality of life for the majority of South Africans, is outlined by Claassens:

> There are millions of black 'squatters' in occupation of so-called 'white' land in both the rural and urban areas. White agriculture is in crisis, and the population in the Bantustans is sinking deeper and deeper into poverty and malnutrition, which is the inevitable consequence of the establishment of such patently unviable economic 'units' (1991: 43)[14].

Also included in this property were responses related to the need to link aspects such as injustice, democracy and democratic practices into a framework for environmental education to explore the property of human rights, one of the properties encompassed within the development of an environmental ethic that furthers the aims of social justice. Likewise, the issues of housing, primary health and hunger can be employed to explore the element of satisfying basic human needs, an integral aspect of education for sustainable living. None of the interviewees, however, placed these issues firmly within the context of environmental education. This oversight might have adverse

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[14] These issues might develop a critical environmental consciousness, based on ecosocialist beliefs within students. They portray that the roots of these issues lie within the social, political and economical systems (Di Chiro 1987; Huckle 1995). Although attempts are being made to redress the question of ownership of the land, Albert Luthuli's question: "Whose is South Africa?", and his argument that "one cannot separate the issue of race from this argument because one race [whites] insists on exclusive ownership" (1962: 78) is still valid today, since the economic realities prevent the majority of South African from owning their own piece of land.

implications for realising the macro challenges posed by education for sustainable living, and, thus, for the introduction of education for sustainable living in initial teacher education[15].

Represented in property two are the responses which underpin the development of political literacy, one of the cornerstones of education for sustainable living (Fien 1992; Huckle 1985; 1995; Martin 1990). Included are the issues of poverty, (which can be employed to develop an understanding of the unequal distribution of wealth), waste production, consumerism and resource mismanagement, (that can lead to the development of an understanding of resources and production). Finally, also mentioned by the interviewees, was the issue of oppression, a factor which can be employed to develop the necessary knowledge and skills required by students to embark on a critique of ideology. Issues like these can highlight the link between past unjust policies and the manner in which the attempt to redress these impacts on the well-being of the environment, a reality underscored by Cowling's observation that

> [T]he history of South Africa reveals a tragedy of racial and economic oppression. The apartheid era witnessed the refinement of ideologically motivated social engineering initiated by colonial authorities. No attempt was made to consider the ecological consequences of these policies. There is every reason to believe that the well-being of all Southern Africans will depend very much on economic growth as well as environmental health (1991: 20).

In linking the well-being of all South Africans with economic growth, Cowling's perception ironically undercuts the possibility of environmental health. Thus, there is a need to call into question the establishment of grand narratives that make a totalizing claim on emancipation and freedom, as argued by Giroux (1991: 5)

> The events taking place in Eastern Europe and in other places like South Africa represent part of a broader struggle of oppressed peoples against all totalizing forms of legitimation and cultural practice that deny human freedom and collective justice. What the West may be witnessing...is the emergence of a new discourse, one that does not put socialism against capitalism, but democracy against all forms of totalitarianism.

Intrinsic to the realisation of this concept were a number of suggestions for a framework for environmental education that could not be grouped into the first two categories. Represented in the first property of this third category are skills that student teachers need to develop for problem-

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[15] It is the researcher's view that these issues can be employed to develop this property underpinning education for sustainability.

solving, (and action research) while the second property depicts personal qualities that ought to be nurtured within students for effective environmental education practice. The third property, the development of strategies needed for fieldwork, is indicative of professional competencies that student teachers need to develop. Finally, the fourth property within this category relates to the incorporation of issues pertaining to the urban environment. These responses, too, are typical of education *in* the environment approach. Excluding valuable suggestions to incorporate action research (outside of one interviewee) into a framework for environmental education, the actions/ attitudes expressed in these responses (cleaning up campaigns, which are popular activities, for example) are indicative of uncritical and apolitical practices. In the view of the researcher, such practices, in attempting to provide solutions to environmental problems, merely treat the symptoms of the problems rather than delving into their deeper, underlying structural causes (see also section 5.3.2).

In essence thus, much that was suggested reflects an apolitical and uncritical bias, incongruent with the challenges posed by education for sustainable living. However, it is within this deficiency, coupled with the rare insights into a more holistic perception of environmental education expressed by a minority of the interviewees, that a foundation for a new approach to environmental education for the realisation of education for sustainable living can be forged. Included in such a foundation would be:

- ecological and social foundations (Huckle 1995);
- evaluative, investigative and action skills (NIER 1993; UNESCO 1993);
- professional competencies (NIER 1993; UNESCO 1993; Huckle 1995); and,
- personal qualities (ibid).

6.1.3 The interviewees' perceptions of environmental education in the teacher education curriculum

The third sub-factor raised two facets of the interviewees' perceptions regarding environmental education in the curriculum for teacher education. Firstly, it indicated the interviewees' perceptions regarding whether environmental education should be included in the curriculum for teacher education. Secondly, their perceptions on how environmental education should be included emerged.

6.1.3.1 The interviewees' perceptions on whether environmental education should be incorporated into the teacher education curriculum

To ascertain whether the interviewees saw the need for the incorporation of environmental education into the teacher education curriculum, the following question[16] was posed: *"What is your view on the idea that environmental education should be incorporated into the curriculum for teacher education?"* (Question 4). While all of the interviewees agreed that environmental education had to be incorporated into the teacher education curriculum, eleven raised some reservations in this regard. The interviewees (twenty-nine) who agreed that environmental education should be incorporated into the curriculum (without any reservations) provided three categories of responses, each encompassing a number of properties. These are represented in **Table 6.4**.

Included in the first category were properties pertaining to why environmental education had to become part of a curriculum for teacher education. Represented in property one were responses suggesting that environmental education was charged with the task of creating environmentally literate teachers able to inform pupils at schools about issues pertaining to the environment. This view has been reiterated at all major conferences (see sections 3.2.1; 3.2.2) to such an extent that it has been referred to as the 'priority of priorities' (UNESCO 1990). Many writers (Fien 1988; 1991; Mishra et al. 1985, Neal 1985; Robottom 1987a; Sterling 1987; Tilbury 1992) echo these sentiments, and argue that teacher education has a pivotal role to play in equipping student teachers with the skills necessary to educate learners effectively in environmental education. Furthermore, since 1970, many intergovernmental organisations and agencies have identified environmental education within teacher education as vital and urgent, and this has been documented at numerous conferences where guidelines to facilitate the implementation of environmental education have also been addressed (NIER 1993; UNESCO 1977a; b; 1978a; b; 1980; 1988; 1992a; b; c 1993; UNESCO-ACEID 1994). Nonetheless, the situation in this regard is far from satisfactory (NIER 1993).

In South Africa, a commitment to include environmental education into the curriculum for teacher education is manifested in the COTEP (1996) document. However, this positive aspect is underscored since the vision portrayed for environmental education is conceptually flawed in regard to education for sustainable living (see sections 3.3.2; 3.4.3.1 - 3.4.3.4). To complicate matters

[16] Triangulated by question 8.

Table 6.4 Perceptions on the incorporation of environmental education into teacher education

Interviewees who agreed that environmental education had to be included in a teacher education curriculum without raising any reservations.		Interviewees who agreed, with reservations, on the inclusion of environmental education in a curriculum for teacher education	
CATEGORY	Quote	CATEGORY	Quote
1 WHY ENVIRONMENTAL EDUCATION HAS TO BE INCORPORATED: • To reach the pupils at the schools (ten interviewees)	"It is vital for environmental education to become part of the teacher education curriculum so that pupils in the school can become informed in this regard" (interviewee A2).	Teacher educators need to be educated first (four interviewees)	"Before this can be done, we need to educate the lecturers first" (interviewee C7).
• For the survival of the planet (five interviewees)	"If we want our planet to survive it should be become part of the education of all teachers soon" (interviewee D7).	The incorporation of environmental education must be sanctioned through formal structures (six interviewees)	"Environmental education should be done formally, otherwise it will not be taken very seriously. Only things that form part of the formal curriculum get the necessary regard and commitment" (interviewee B3).
• To resolve the environmental crisis (three interviewees)	"Education is the best avenue to try and solve this [environmental] crisis. Teachers are the central agents that can make it work" (interviewee A7).		
• To further the aims of conservation (five interviewees)	"To conserve the environment means that we have to have knowledge about it; it is important to include it into the college curriculum" (interviewee C2).		

Table 6.4 (continued)

Interviewees who agreed that environmental education had to be included in a teacher education curriculum without raising any reservations.		Interviewees who agreed, with reservations, on the inclusion of environmental education in a curriculum for teacher education	
CATEGORY	Quote	CATEGORY	Quote
2 HOW IT OUGHT TO PROCEED: • Environmental education needs to be part of all subject areas (two interviewees)	"Environmental education should be specifically mentioned as being a part of each and every area of the curriculum, and a concerted effort should be made by all lecturers to address it in their subject areas" (interviewee A1).	Restructuring of the present curriculum needs to precede the incorporation of environmental education (one interviewee F2)	"There are some problems with this that I can foresee. Firstly, the restructuring of the curriculum should precede this since we teach separate subjects, whilst environmental education requires integration" (interviewee F2).
• Environmental education must be introduced in a gradual manner (one interviewee D3)	"Yes, it should be done as soon as possible, but step by step; we should start at first year level, then move to second year..." (interviewee D3).	National objectives have to be identified (one interviewee B7)	"The incorporation of environmental educations is not straightforward. It is dependent on a host of other factors, the most important ones being the establishment of a set of national objectives in this regard" (interviewee B7).
3 OTHER FACETS THAT HAVE TO BE CONSIDERED: • Environmental education must also be incorporated into primary and secondary schools (one interviewee)	"Environmental awareness needs to be introduced from a young age and it should be ongoing from primary to secondary to tertiary education, which includes teacher education (interviewee B1)		
• INSET courses are needed for practising teachers (two interviewees)	"Train the teachers who are now at college... But we must not neglect the teachers who are now teaching (interviewee B2).		

further, policy to put environmental education on the agenda for the other levels of formal education (pre-primary, primary and secondary) is still lacking. This is restrictive for furthering the goals of education for sustainable living, particularly for the advancement of critical praxis since student teachers will not receive the full cooperation of the schools to put the theory into practice (as was uncovered in multisited case study one - see section 5.3.4).

The other three properties in this first category comprised ecologically related responses, suggesting that teacher educators felt that environmental education within teacher education was needed:

- for the survival of the planet (property two);
- to address the environmental crisis (property three); and,
- to further the aims of conservation (property four).

These sentiments, which reflect the ecologically-oriented nature of the perceptions of environmental education that the interviewees have, find an echo in the Tbilisi Principles (UNESCO 1977a; b; c; 1978a; b) and Agenda 21 (UNESCO 1992a; c). Notwithstanding the importance of these sentiments expressed by the interviewees, but, by ignoring the other dimensions (i.e. social, political, economical) these perceptions depict a restrictive, one-sided view of environmental education, in contrast to the holistic vision necessary for education for sustainable living.

The second category includes two properties which illustrate teacher educators' perceptions on how environmental education ought to function within a teacher education curriculum. It covers, for example, the notion that environmental education should be cross-curricular (property one) and that it has to be implemented gradually to secure its rightful place within the curriculum (property two). While acknowledging the need to incorporate environmental education into teacher education, these interviewees' responses (category two) show slightly more insight than those placed within the first category, since they elaborated on how environmental education had to become incorporated into teacher education. The cross-curricular approach is acknowledged as the ideal strategy (UNESCO-UNEP 1985) but has inherent difficulties[17] (Greenall 1987) when viewed in the light of a curriculum that is compartmentalised into separate subject areas (see sections 3.4 and 5.1.2.3).

The third category includes two properties comprising suggestions regarding the incorporation of

[17]In section 3.4.3.3 four possible strategies, emanating from the literature, in conjunction with the recommendations of COTEP (1996) have been outlined. While these routes are open for consideration, ultimately a strategy best suited to the needs of the institution needs to be considered.

environmental education within the formal primary and secondary school curricula (property one), as well as the need for INSET for practising teachers (property two). These concerns were also raised in multisited case study one, (see section 5.3.3) and have been acknowledged by the Education Department in its *White Paper on Education and Training* (DE 1995).

Eleven interviewees raised four categories of reservations related to the incorporation of environmental education into a teacher education curriculum. Within category one was the argument that such incorporation has to be preceded by environmental education courses for the teacher educators, corresponding to the sentiments expressed by interviewees in multisited case study one (see sections 5.3.3 and 5.5). The second category relayed sentiments that environmental education needs to be implemented formally to ensure its necessary regard and status, as well as the concomitant commitment from practitioners. This argument also surfaced in multisited case study one (see section 5.3.4), and is currently being addressed by formal structures as reflected in many important formal documentations, for example, RDP (ANC 1994), COTEP (1996), IDRC (1994) and in the *White Paper on Education and Training* (DE 1995).

However, this has implications as far as the current teacher education curriculum is concerned, mirrored in category three with its suggestion that there is a need for the restructuring of the current teacher education curriculum, since environmental education requires integration, (while the present curriculum is fragmented and compartmentalised (see section 3.3.2). In the view of the researcher, supported by, for example, Meerkotter and Van den Berg (1994) this is a valid reservation in that it portrays the realities of the reproductive nature of the current teacher education curriculum. Any restructuring of the curriculum has to address the still pervasive ideology of Christian Nationalism, rooted in educational practice by Fundamental Pedagogics (see sections 3.1.1; 5.5.1).

In summary, all the teacher educators who were interviewed at the colleges of education in the Western Cape where environmental education has not been formally implemented saw the need for introducing environmental education into teacher education. Furthermore, they also regarded the incorporation of environmental education into all levels of the formal education system as important. This was ascertained from the analysis of question eight: *"If environmental education is introduced into formal education, it should be introduced into all levels of education: pre-primary,*

primary, secondary and tertiary. What is your opinion?"[18]. While these acknowledgements are a reason for optimism, the elaboration by the interviewees on why they felt the incorporation of environmental education was important is a matter for concern, since it revealed their deeply-seated apolitical and uncritical perceptions of environmental education, which are restrictive in terms of realising the changes necessary for education for sustainable living.

6.1.3.2 The perceptions of how environmental education should be incorporated into the curriculum for teacher education

Question ten, which read as follows, formed the basis for insight regarding teacher educators' perceptions around the incorporation of environmental education into the curriculum for teacher education: *"If environmental education is introduced into teacher education, how should it be done? Please comment on each of the following:*

- *on a cross-curricular basis*
- *as an independent subject*
- *linked to specific disciplines, for example biology or geography*
- *via formal programmes*
- *on an informal basis*
- *mention your own ideas".*

Twelve categories of responses emanated from the analysis of the data (see **Table 6.5**). The majority (thirty-three) of the interviewees acknowledged the worth of integrating environmental education into the different subject areas (stipulated as one of the guiding principles of environmental education UNESCO 1978a; b) while also realising that this might not be an easy task to accomplish (Greenall 1987). However, given the reality of the fragmented nature of the education system manifested in the curriculum (see sections 3.3.2 and 3.4), it seems that more than one approach needs to be considered for incorporating education for sustainable living into initial teacher education, and that ultimately the particular institution should decide which approach is best suited to its specific needs (see section 3.4.3.3)

Irrespective of the particular strategy adopted at particular teacher education institutions, common elements that are widely recommended for the incorporation of environmental education

[18] This statement was included in Interview Schedule B to triangulate the interviewees' responses to question four.

Table 6.5 Strategies for the incorporation of environmental education into the curriculum for initial teacher education

Cross-curricular approach as the ultimate ideal for environmental education, preceded by the following options		The cross-curricular approach with support programmes		Why environmental education should be cross- curricular		Environmental education as an independent subject	
CATEGORY	QUOTE	CATEGORY	QUOTE	CATEGORY	QUOTE	CATEGORY	QUOTE
An independent subject (four interviewees)	"Cross curricular approach is the answer. However, for it to succeed it could be initiated as a separate subject and, as it establishes itself, it can become cross curricular" (interviewee B2).	Formal programmes (four interviewees)	"It must be cross curricular and this can be substituted with formal programmes (interviewee E5).	Informal programmes are not seriously considered (two interviewees)	"Informal education is not seriously considered. It should be cross curricular, linked to all areas" (interviewee A2).	Presented by knowledgeable teacher educators (four interviewees)	"It is best to have it as an independent subject being presented by people who are knowledgeable in it" (interviewee C6)
Formal programmes (three interviewees)	"A good way is to start off with formal programmes, and then let the environment permeate into all areas of the curriculum (interviewee A5).			Environmental education is not exclusively biology and geography (four interviewees)	"It should only be cross curricular, otherwise it will be mistaken for science or geography" (interviewee A4).		
Incorporated initially into biology and geography (five interviewees)	"Biology and geography are good starting points for environmental education. Thereafter it can be included into the other areas" (interviewee E6).	Formal and informal programmes (five interviewees)	"It should be cross curricular with formal and informal programmes included as well" (interviewee B1)	Promotes the holistic nature of the environment (three interviewees)	"Environmental education should be cross curricular to appreciate the holistic nature of the environment" (interviewee F6).	Presented by knowledgeable teacher educators, and supplemented by programmes (three interviewees)	"It can be introduced as a separate subject [it would stand a better chance of succeeding] and presented by lecturers who have some formal education in this area. Programmes can be added to the course (interviewee D2).
Formal and informal programmes and active project involvement (one interviewee)	"The cross curricular approach is the ultimate objective. It could be a separate subject at the introduction of the course, or at the more senior levels. Any formal/ informal programmes are welcome, but these should be projects and action based (interviewee B4).			Can be realised via the thematic approach (one interviewee)	"Cross curricular approach, via themes related to the environment is the only way to go" (interviewee F1).		

programmes for education for sustainable living (see section 3.4.3.4) include foundations of environmental education, appropriate investigation, evaluation and action skills as well as professional competencies[19] (see **Table 3.1**). Some of these competencies correspond broadly to those outlined for teacher education in the COTEP (1996) document (in terms of specific outcomes). However, given the shortcomings pertaining to the teacher educators (see sections 6.1.1; 6.1.2, and the restrictions of the initial teacher education curriculum (see sections 3.4.1; 3.4.3.1), it is doubtful whether the existing courses can accommodate the principles of education for sustainable living (see sections 3.3.2; 3.4.3.3 for further critique).

6.1.4 Conclusion

Key factor one explored the influence of the teacher educators in the area of environmental education at initial teacher education level. In the light of exploring the potential for incorporating education for sustainable living into the initial teacher education, and the necessary changes that underpin this potential, an analysis of the data obtained via the interviews exposed serious flaws and shortcomings in terms of:

- formal qualifications in environmental education;
- insufficient involvement in environmental education organisations as a means of supplementing their knowledge-base;
- lack of experience in primary education; and,
- absence of adequate professional development.

These shortcomings (resembling those uncovered for multisited case study one) have negative implications for realising the changes necessary for education for sustainable living, and are thus restrictive in terms of the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape.

In addition, the exploration of their environmental education ideological positions (necessary for realising the changes at macro level), analysed within the same parameters, underpinned the fact that:

- most teacher educators have a very narrow view of the concept of environmental education;
- only a tiny minority of teacher educators acknowledge that the roots of the environmental crisis are centred in the interconnectedness of the social, economical and political bases of society, a widely accepted argument (Huckle 1993; Di Chiro 1987; Wals 1990; Weston

[19] This includes personal qualities that a teacher needs to develop.

1986; Wynberg 1993); and,

- the majority of teacher educators are inclined towards the neo-classical educational and technocentric environmental ideological persuasions.

Furthermore, the majority of the interviewees' perceptions of both curriculum *per se* and a framework for a curriculum in environmental education failed to recognise the macro-micro objective interlinkage between the two (Giroux 1988a; Van den Berg 1994). Thus, in the opinion of the researcher, echoed in the sentiments of, for example, Huckle (1991), they failed to recognise the value-laden and political-economy driven nature of their perceptions of knowledge. In the light of the aim of the research (see section 1.6), these insufficiencies point to the need for:

- formal policy to steer the process;
- a restructuring of the curriculum that needs to precede the incorporation of education for sustainable living; and,
- the education of the teacher educators (INSET) to be given serious consideration prior to the implementation.

Also, due to the fact that the knowledge and understanding of the practitioners in this area is wanting, cues must be taken from the central government:

> The Ministry regards teacher education (including the professional education of trainers and educators) as one of the central pillars of national human resource development strategy, and the growth of professional expertise and self-confidence is the key to teacher development (DE 1995: 29).

In other words, the setting up of professional development programmes for teacher educators in environmental education for sustainable living, essential to redressing the inequalities of the past in South Africa (ANC 1994; DE 1996a) demands urgent attention at the level of content, structure, ideology and implementation.

6.2 KEY FACTOR TWO: THE 'BEARING' OF THE EXISTING SUBJECT AREAS (IN THE TEACHER EDUCATION CURRICULUM) ON ENVIRONMENTAL EDUCATION

The bearing of the existing course structures on environmental education was portrayed in the second key factor, underpinned by three sub-factors:

- the opinions of the interviewees on how to incorporate environmental education with their

subject areas with regard to factors like subject matter, volume, time, approaches, aims and objectives (see 6.2.1);

- the subject departments' incorporation of environmental education projects, the nature of these and whether these projects involved the local community and problem solving (see sections 6.2.2);
- the inclusion of activities linked to environmental education (see section 6.2.3).

Given the constraints associated with the curriculum[20], it was important for the researcher to ascertain those aspects of the current teacher education programmes that might facilitate the potential implementation of education for sustainable living into the initial teacher education programmes. Included are the issue of environmental projects or related activities that may serve as a stimulus for furthering change at macro and meso levels, necessary for education for sustainable living. Additionally, the infrastructure of the teacher education programmes comes under scrutiny to explore the potential for realising change at micro level. On the other hand, it was also necessary to identify those areas in which these programmes (infrastructure, projects and other environmental related activities) fall short, in relation to the challenges necessary for the realisation of education for sustainable living. In doing so, and in attempting to explain the reasons for these impediments, alternative guidelines for the potential implementation of education for sustainable living, into the initial teacher education curriculum (in the Western Cape) are identified.

6.2.1 Incorporation of environmental education into existing courses within initial teacher education[21]

To ascertain whether interviewees had given any consideration to incorporating environmental education into their courses, the following question was posed: *"Does the curriculum (in your subject area) allow for the incorporation of environmental education/ principles? If it does not, please mention why not"* (Question 19). Twenty-seven of the interviewees responded positively, while seven said that environmental education could not be incorporated into their respective

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[20] For example, prescriptive, predetermined syllabuses, externally controlled examinations and the behaviourist approaches that were firmly entrenched at these teacher education colleges - see sections 3.3.1; 3.3.2 and 3.4.1 .

[21] Interviewees' opinions on how to incorporate environmental education within their subject areas with regard to factors like subject matter, volume, time, approaches, aims and objectives;

subject areas[22].

The seven negative replies gave rise to four categories. The first category included responses from two interviewees who said that environmental education was not prescribed in their respective subject syllabuses (education and history). The second category included responses of three interviewees who indicated that the syllabuses (education and mathematics) were already loaded, and that the inclusion of environmental education would add to the load, as argued by interviewee D7: "The syllabus is too loaded at the moment - there is too much to be dealt with within a restricted time". The third category contained the response of one interviewee (B7) who asserted that the philosophy of environmental education was in conflict with the dominant ideology and argued that:

> The topics to be dealt with in environmental education, for example, include democracy and democratic practices and the land question. Environmental issues, like poverty, etc. will antagonise the industrial military establishment. If environmental education is included in the curriculum in its present form, it will be counter-productive.

Category four included the response of one interviewee (B4) who was of the opinion that practitioners need to develop an environmental ethic before they could embark on environmental education programmes, and argued the point using geography as an example:

> Not as [geography is] presently constituted. Geography has been concerned with Man versus the exploited environment, and Man has not seen himself as custodian of earth and its resources for future generations.

The reservations mentioned by five of the interviewees, (categories one to three) related largely to the syllabus, and reflected the realities of the content-driven and fragmented curriculum for teacher education, as outlined in the NEPI (1992b) document (see also section 5.2.1.1). These syllabus-related constraints are grounded in the challenges to bring about the changes necessary for education for sustainable living at all levels, which include the impediments in the way of realising change at macro level. The constraints in the way of change at this level include a lack of policy for environmental education within teacher education, and the technicist manner in which the curriculum was developed[23]. The latter, in the opinion of the researcher, is in conflict with the

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[22] This question did not apply to the six rectors.

[23] Primarily via the RDDA approach (see section 3.4.3.1), which excluded participation and consultation of teacher educators and students.

notion of the curriculum in terms of a language and a discourse of possibility (identified as imperative for education for sustainable living - see section 3.4.1). The constraints regarding curriculum development (see section 3.4.3.1) are exacerbated by the irrelevant content, which adversely impacts on the challenges to realise change at micro level.

Furthermore, the uncritical approaches employed by the teacher educators are restrictive in regard to the realisation of change at meso level, which encompass the advancement of critical praxis, fundamental for the success of the potential implementation of education for sustainable living into the curriculum for initial teacher education. These impediments should be viewed with the powerlessness of the teacher educators as a backdrop. While these impediments may contribute to the powerlessness of the teacher educators, their disempowerment may obstruct the realisation of innovations (like the potential incorporation of education for sustainable living). To break this vicious circle is to put those structures in place that will further their professional growth, for example, to secure a policy for professional development programmes that is at present still lacking in South Africa.

The pervasiveness of the hegemonic manifestations of Christian Nationalist ideology, reinforced by Fundamental Pedagogics (see section 3.1.1) underpinned the reservations expressed by interviewee B7 (category three- see also section 5.5). Finally, the fourth constraint articulated the need for teacher education programmes to address the need for the development of an environmental ethic, of how people interact with nature. The latter, however, in the opinion of the researcher, is embedded within the changes required at macro level, which may lead to sustainable living.

The twenty-seven interviewees who responded positively to the previous question (question 19), were presented with this statement: *"If you responded positively to question nineteen, briefly explain how this curriculum allows for the incorporation of environmental education with reference to: subject matter, volume of the content, time available, approaches to your teaching and aims and objectives of your subject"* (Question 20). The interviewees' responses as to how the content of their respective subject areas could accommodate the incorporation of environmental education is summarised in **Table 6.6**.

The areas listed by the interviewees related to aspects of the existing initial teacher education syllabuses, and included the study of ecology as a vehicle for furthering environmental education in the biological and earth sciences, once again reflecting entrenched "technocratic rationality" (Robottom 1991). The inclusion of various aspects of language study (composition, comprehension,

Table 6.6 Suggestions on how the content of the existing subject areas can focus on environmental education

Biology	Geography	Languages	History	Mathematics	Education
The ecology section is important for environmental education (six interviewees)	Geography considers the environment, and is conducive to environmental education (three interviewees) Ecology is included within the geography syllabus and can be employed to further environmental education (one interviewee A3)	Include environmental topics in poems, comprehensions, compositions, reading material and research (four interviewees) Use existing subject matter and focus on the environment (two interviewees)	Emphasise the negative influence of war on the environment (one interviewee A4) The aspect of "development" in the area of community history is an avenue (one interviewee C4) Civics is an area of history that is conducive to environmental education (one interviewee D4) History takes place in the environment, which can form the focus of discussions (one interviewee F4)	The teaching of problem-solving skills can be used to solve environmental problems (three interviewees A7, C7, E7)	Thinking skills are taught with ample opportunity to bridge into environmental education (one interviewee B6) Teaching science is part of Education, and this include the environment (one interviewee E6)

poetry), history, education and mathematics, with the environment as a focus, were also suggested. These suggestions, however, lacked substance in terms of realising the changes (at all levels) necessary for the potential implementation of education for sustainable living, as many of them were somewhat vague. The macro level constraints can be ascribed to the paradigm in which these practitioners were operating, which, in the researcher's view, and which is supported by many educators nationally, (Chisholm 1995; Hofmeyr 1982; Morrow, 1989) and internationally (Goodman 1992; McNeil 1988) had been designed to maintain the status quo, and perpetuate the ideology of those who were in power at the time when it was designed. The approaches embarked on centred on basically to regurgitate what had been outlined in their largely irrelevant syllabuses.

The barriers in the way of change at meso level can be traced to the non-existence of critical praxis, brought about by a lack of collaborative practice, embedded within privatisation and intensification, added to the reproduction of these syllabuses. This was affirmed by the majority of the interviewees who asserted that environmental education could be included in their respective subject areas in the teacher education curriculum, but that the content volume of current method subjects (twenty-two interviewees) in conjunction with severe time restraints (twenty-five interviewees) would adversely affect any integration efforts. Both limitations, they contended, were due to the content-driven curriculum, compounded by the externally set examinations and prescriptive syllabuses.

The interviewees' responses as to how their approaches to lecturing could foster the inclusion of environmental education in the teacher education curriculum resulted in five categories of strategies. The most widely subscribed category comprised responses from fourteen interviewees who asserted that any approach, by merely focusing on the environment, could further the realisation of environmental education. In this regard, four interviewees elaborated on their perceived 'focus', which included two properties. First, two interviewees suggested that by engaging in debates on the environment, reinforced with literature that promotes environmental education, teacher educators can promote environmental education. However, engaging in debates on the environment, regarded as crucial for students to acquire understanding and insight concerning environmental issues, is contingent on the provision that they further the development of:

- a critical environmental consciousness, based on ecosocialists beliefs (Di Chiro 1987; Weston 1986; Huckle 1995);
- critical thinking and problem-solving skills (Greenall 1991; Huckle 1995; Naish et al. 1987);
- an environmental ethic for sustainable living and social justice (Fien 1992; Huckle 1991;

1995); and,

- political literacy (inclusive of the above) grounded in critical praxis (Di Chiro 1987; Fien 1992; Huckle 1995; Martin 1990).

These dimensions, however, were not forthcoming from the interviewees' responses, and therefore cannot be regarded as facilitative in regard to the potential implementation of education for sustainable living.

Secondly, two interviewees recommended that teacher educators should embark on hands-on activities in environmental education. The properties drawn from these recommendations refer to the professional competencies (Huckle 1995; NIER 1993; UNESCO 1993), or, according to the National Qualifications Framework (NQF see section 3.4.3.2) the specific outcomes that student teachers need to develop during their teacher education programme. Notwithstanding the significance of active involvement, care needs to be taken that these activities do not deteriorate into shallow 'clean-up campaigns', which bring about no meaningful change for the environment. Whether the teacher educators have the necessary insight to develop these competencies is doubtful, especially in regard to their limited insight into environmental education, established from the data in the first key factor.

The interviewees' responses that were grouped into categories two, three and four were, like the first two categories, rather vague and unsubstantiated. Category two considered possible outcomes of their approaches, and represented the view of four interviewees who recommended that teacher educators should, via their lecturing, foster positive attitudes towards the environment in students. Articulated in these recommendations were the necessary qualities that students need to develop and embody as a form of 'model' that pupils with which they will engage when they enter the teaching profession can emulate. While this is an accepted vision for environmental education, (NIER 1993; UNESCO 1993), the danger exists that in the absence of critical approaches to advance critical praxis, from the teacher educators, students might take these uncritical 'role-models' forward into their practice.

Category three explored what had to be considered in the teacher educators' approaches. Here the recommendations of two interviewees were represented - that teacher educators need to include the development of environmental problem-solving skills, a perception which has been stressed at all major international and national conferences and forums, and is outlined, for example, in the EEPI (1994). However, in the view of the researcher, problem-solving cannot be viewed in isolation of an ideology critique, a view which is supported by, for example, Fien (1992); Huckle (1995); and

Robottom (1987a). Thus, while problem-solving skills might be viewed as challenges at micro level, it is inextricably interrelated with the macro level challenges for the realisation of education for sustainable living.

In the fourth category, one interviewee recommended that didactics is the most appropriate area within the teacher education curriculum to foster environmental education. Although there is merit in this suggestion, for many teacher educators didactics has become an add-on section to secure, as Siebörger and Kenyon (1992) argue, 'tips for teachers'. Thus, given the content-driven nature of the teacher education curriculum (with its focus on academic content), complicated further by prescribed syllabuses and externally controlled examinations, didactics, which is normally internally examined, is neglected by many teacher educators, and might not be a good area on which to focus. However, other possible strategies, evident from international trends, in conjunction with the recommendations that have been suggested by COTEP (1996), are outlined in section 3.4.3.3.

The fifth category included responses from two interviewees who raised some reservations relating to the insight, understanding and commitment of many teacher educators. They argued that environmental education could only be incorporated into a teacher education curriculum if the lecturers had the necessary expertise. This, once again, points to the question of professional development programmes for the teacher educators (see also section 5.4).

Comments emanating from interviewees' responses as to how their official syllabus documents (see section 4.4.3; and **Table 4.1** for a list of documents collected) translate into environmental education indicated that environmental education is not formally mentioned in any of these. This was verified by an analysis of the documents that were collected during the research process (see section 4.5.4) Further analysis of these documents revealed that all are devoid of directives on guidelines for environmental education. Biology and geography teacher educators asserted that, despite the vague referral to environment in these documents, no further suggestions are given in this regard, nor is there any mention made of environmental education. On a more positive note, however, three interviewees remarked that although environmental education is not mentioned in the official documents, it depended on how the lecturers interpreted and approached their syllabuses. One interviewee (E7) suggested that a policy document, officially introducing environmental education into the curriculum for teacher education was necessary.

In summary, an optimistic facet for the potential implementation of education for sustainable living,

was the fact that the majority of the interviewees asserted that it was possible that environmental education could be incorporated into the different subject areas of the curriculum for teacher education. Having specified where environmental education could be incorporated, the general feeling of the interviewees was that the introduction of environmental education was problematic. These can be ascribed to the impediments obstructing the realisation of the changes necessary for education for sustainable living at:

Macro level, which included:

- the prescribed nature of the syllabuses, complicated further by,
- externally controlled examinations.

Meso and micro level, which included:

- the large volume of the content to be lectured; within a
- confined time frame.

Furthermore, they felt that while it was possible to make environment education a focal point in all lecturing programmes, teacher educators would be reluctant to do so, which are ascribed to the impediments which were centred within the challenges to realise the changes necessary for education for sustainable living at macro level, including:

- a lack of formal policy; and,
- the exclusion in terms of stipulations within syllabus guidelines.

Notwithstanding the validity of these constraints, they cannot be viewed in isolation from the powerlessness of the teacher educators, and the bureaucratization of the education system which lies at its core. Professional development programmes for teacher educators, with the vision to engender critical praxis, may serve as a yardstick to resist both.

6.2.2 Inclusion of project work linked to environmental education[24]

The second sub-factor explored whether the interviewees incorporated any projects, linked to the environment, within their lecturing programme in their respective subject areas. This was determined by ascertaining the responses to: *"Is your subject departments/s involved in any projects which can be linked to the environment?"* (Question 23). Only eight interviewees (the rectors of the institutions were excluded from this question) responded in the affirmative: three who lecture in biology, three who lecture in geography and two who lecture in education. Using the following

[24]The subject departments' incorporation of environmental education projects, the nature of these, whether these projects involved the local community and problem solving

statement and question, these interviewees were asked to give more information regarding the nature of these projects:

(a) *Explain the nature of the projects for the various year groups,*

(b) *Do these projects involve the local community?* (Question 24).

In the light of realising the challenges necessary for the potential implementation of education for sustainable living, environmental projects that are devoted to the transformation of learners' patterns of behaviour and attitudes, through fostering active involvement and participation in real and relevant environmental decision-making and active problem-solving are widely recommended (Huckle 1991; 1993; 1995; NIER 1993; UNESCO 1993). Considering these challenges, the aspect of the community was added to ascertain

- if local expertise was utilised;
- whether the projects involved relevant local issues that could incorporate the aspect of problem-solving; and,
- whether there was participation and collaboration within the college, and between the college and the community.

An exploration of student teachers' project work was included by the researcher, based on the assumptions (from her own experience) that this was an area that created opportunities to transcend the prescriptions of the syllabus. The reasoning was that if the syllabus did not allow for critical praxis to be furthered then, by embarking on projects, (based on problem-solving, local relevance, which included community participation and collaborative interaction with other institutions), important facets of praxis could become part of their teacher education courses. A summary of their responses is included in **Table 6.7**.

Regarding the nature of the projects, established from an analysis of the interviewees' responses, and verified via the syllabus documents (see section 4.4.3), most of these projects fell short of taking up the challenges necessary for the realisation of the potential implementation of education for sustainable living. Document analysis revealed that the courses for final year biology students (third and fourth year levels) prescribe the study of ecological concepts and aspects pertaining to conservation[25]. These institutions were basically involved in education *about* and, to a lesser extent, education *in* the environment activities. The properties of education for sustainable living, for the

[25] It is of interest to note that all three institutions were governed by the same education department at the time of the interviews, and were subjected to the same external examinations.

Table 6.7 A summary of the nature of the environmental projects.

Biology environment projects	Nature of projects	Geography environment projects	Nature of projects	Education environment projects	Nature of projects
Ecology, fieldwork related, for third and fourth year students (two interviewees).	Practical fieldwork during fieldtrips and excursions, largely linked to syllabus.	Fieldwork during fieldtrips (two interviewees).	Practical fieldwork, largely linked to syllabus.	Futurology, which includes environment issues for fourth year students (one interviewee B6).	Theoretical in nature, linked to syllabus.
Projects on pollution, for third and fourth year students (two interviewees).	Theoretical in nature, linked to syllabus.	Effects of industrialisation (pollution pressure on land, drainage and river pollution), and the disturbance of the cyclic nature of the environment, for fourth year students in geography (one interviewee B3).	Theoretical in nature, linked to syllabus.	Greening of Khayaletshia, including cleaning-up campaigns for first, second and third year student (one interviewee F6).	Practical, extra-curricular project work.
Projects on the construction of indigenous gardens, for all students (two interviewees).	Practical project work, extra-curricular.				

advancement of critical praxis, were largely absent.

The deficiencies for many of these projects (in biology, geography and education) included:

- The type of projects (linked to syllabus prescriptions) were unrelated to local environmental problems;
- The nature of the projects were such that they failed to venture into any meaningful problem-solving activities; and,
- The projects were confined to the natural environment, with the focus on pollution, ecology, and the development of gardens. By ignoring the socially-created environment, the interviewees' misconceptions of environmental education are reaffirmed.

Finally, held up against education for sustainable living, it is questionable whether any of these projects mentioned can serve as a stimulus for realising meaningful change. Notwithstanding the importance of doing fieldwork of an ecological nature for student teachers, (since it encompasses the development of necessary skills and insight), what is lacking in many of these projects, in the opinion of the researcher, is the development of critical skills that might enable student teachers to link their projects to socio-political forces which form their genesis. This view finds support in the arguments of, for example, Fien (1988) and Martin (1990). In all instances, the aspects of participation and collaboration were overlooked as was the critical facet of problem-solving. These deficiencies point to the dearth of critical praxis, which is restrictive for realising the challenges that underpin the potential implementation of education for sustainable living into the curriculum.

6.2.3 Incorporation of environmental education into the subject areas[26]

To ascertain whether the interviewees included environmental education in their lecturing programme, the following question was posed: *"Are you, at present, involved in any activities which can be linked to environmental education in your lecturing programme? If you are, please mention these"* (Question 25). Of the forty interviewees, twenty-four indicated that they were not involved in any environmental education activities, while the other ten said that they were[27].

Three categories of environmental education activities were identified. These included

- outdoor education (category one);

[26] The inclusion of activities linked to environmental education.

[27] This question was not applicable to the rectors of the six colleges.

- conservation (category two); and,
- issue-based teaching- mainly bio-physical in nature (category three).

Similar to the outcome of the analysis of the interviewees' perceptions of environmental education (see section 6.1.2), their perceptions engendered responses that included outdoor education, conservation, ecological and social environmental issues. As mentioned in key factor one (section 6.1.2), conceptual ambiguities pertaining to what exactly environmental education entails, were once more evident. Since the interviewees were not totally clear on the nature of environmental education, they misinterpreted particular activities as environmental education, instead of recognising that those activities merely depicted aspects of the whole discipline. These activities can therefore not be considered as appropriate to further the potential implementation of education for sustainable living, since the challenges to bring about this change at macro level (to foster ideology critique) and critical praxis were not forthcoming.

6.2.4 Conclusion

A positive aspect for the potential implementation of education for sustainable living, was the assertion by most of the interviewees that it was possible to incorporate it into the different subject areas of the curriculum for teacher education. However, the impediments to this potential can be ascribed to those obstructing the realisation of the changes necessary for education for sustainable living at:

- Macro level, which included:
  - the prescribed nature of the syllabuses, complicated further by externally controlled examinations;
  - a lack of formal policy;
  - the exclusion in terms of stipulations within syllabus guidelines; and,
  - the conflicting ideologies of the curriculum and environmental education and the need for practitioners to develop an environmental ethic.
- Meso level, which included:
  - the large volume of uncritical content to be lectured within a confined time frame.
- Micro level, which included:
  - a lack of time.

Furthermore, while the majority of the interviewees declared that environmental education could be incorporated into their subject areas, very few (only eight) were involved in environmental projects. Similarly, only ten included activities on environmental education within their lecturing

programmes. Held up against education for sustainable living, these projects (and other alleged environmental education activities) reflected a dearth of critical praxis, which is restrictive for realising the challenges that underpin the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape. The projects falls short in that:

- the focus was exclusively on the bio-physical (similarly, the environmental education that was allegedly incorporated into the lecturing programmes of the interviewees favoured the biophysical perspective); and,
- the aspects of participation and collaboration were overlooked as was the critical facet of problem-solving.

In summary, although the interviewees acknowledged that environmental education could be incorporated into their subject areas, not much effort had been made to do so. A prominent barrier that obstructed change at macro level, was the current teacher education curriculum; thereby pointing to the desperate need for a restructuring of the teacher education curriculum. However, other important barriers related to a lack of formal policy (necessary for change at macro level) and, even more importantly, to the inappropriate quality of the education of the teacher educators resulting in an inadequate knowledge base as well as a lack of confidence, vital to further critical praxis (see 6.1.3.1). INSET programmes in the area of environmental education for teacher educators are, therefore, one of the most important priority areas that need addressing if education for sustainable living is to become successfully established within the formal education system.

6.3 KEY FACTOR THREE: DO COLLEGES HAVE WHAT IT TAKES?

The third key factor reflected the institutional influences, and which enabling infrastructures were in place within and among the different colleges of education, with regards to the exploration of the potential implementation of education for sustainable living. Included were two sub-factors:

- the ethos (section 6.3.1) for environmental education prevalent at the colleges, where for example, environmental education programmes are scheduled on important environmental days; the absence or presence of environmental clubs or societies functioning at the colleges; the availability of environmental education resources;
- the availability of enabling infrastructures in place (section 6.3.2) within and between the various tertiary institutions and outside organisations which foster collaboration and networking. In this regard, an examination of whether the interviewees interact with colleagues at other colleges or universities regarding their subject areas was considered

first. Secondly the interviewees' liaison with non-government organisations (NGOs) and other organisations for their lecturing programmes was explored. Third, the interviewees' involvement in subject associations was explored.

6.3.1 An ethos for environmental education

Education for sustainable living demands a reconstruction of current teacher education (see section 3.3.3), which, in turn requires changes at macro, meso and micro levels, that will advance the potential implementation into the teacher education curriculum. Appropriate strategies, however, are necessary to further the realisation of these changes (see section 2.6). Central to any such strategy is an understanding of what is to be changed (Dalin 1993; Elton and Cryer 1994; Fullan and Hargreaves 1992). Considering the latter, it was important for the researcher to find out first, what environmental education was in existence, and, based on this, work towards a strategy on how to change it for the realisation of education for sustainable living. Therefore, it was necessary to ascertain whether there was an ethos for environmental education at these colleges that could foster (or resist) the changes towards the potential implementation of education for sustainable living.

In this regard, the interviewees were asked to respond to the following question: *"Are any programmes/ activities scheduled for staff and students on days such as river/ world environment / arbour / marine day? If yes, who co-ordinates such programmes?"* (Question 39). The second part of the question was included in order to ascertain whether it was a college effort, and whether the students were afforded the opportunity to develop the organisational skills associated with organising such events. Four of the six colleges indicated that programmes were scheduled for important environmental days, but it appeared that only those involved in the organisation of these knew about them. However, at these four colleges students were also involved with the co-ordination and organisation of the programmes.

To ascertain what structures were in place at the various institutions that attempted to promote environmental education, the interviewees were asked: *"Is there an environmental club/ society currently functioning at this institution? If yes, mention the name of the club and the nature of its activities"* (Question 38). Twenty-three of the interviewees at five of the six colleges indicated that environmental clubs were in place. Four colleges had a hiking club[28], while one had an

[28] One of these had both a hiking club and a Geography society in operation, both of which, apparently, functioned to further the aims of environmental education.

environmental society. Once again, not all the interviewees were aware of the club/s or society/ies at their colleges. It appears that only those involved with the co-ordination of the activities knew about the respective clubs, which is restrictive in regards to the collaboration facet, that might advance the potential implementation of education for sustainable living.

Responses regarding the activities of these clubs/ societies indicated that they involved education *in* environmental activities, like hikes, fieldtrips and excursions. These are important since they may lead to the acquisition and development of numerous skills needed to engage in active environmental problem-solving. However, these *in* and *about* approaches to environmental education (see sections 1.3.1 and 1.3.2) should be neither the dominant nor the only orientation, which was the case at the colleges in this study. Many environmental educators (Maher 1986; Greenall 1987; Fien 1988; 1991) argue that while both these approaches to environmental education are needed, only when the emphasis is on education *for* the environment, from a socially-critical perspective, can the roots of the environmental crisis be addressed. Therefore, in the view of the researcher, by failing to engage in the more critical approaches, (which are conducive to the realisation of real change), the alleged environmental education related activities that were prevalent at these colleges were restrictive in terms of the potential implementation of education for sustainable living.

The third aspect of this sub-factor examined the availability of resources that might be useful for the potential implementation of education for sustainable living at these colleges. Interviewees were asked to respond to the following questions: *"Are you aware of any resources (journals/ magazines etc.) acquired by your library, which are relevant to environmental education?"* **and** *"If you responded positively, mention a few of these"* (Questions 36 and 37). Twenty-eight of the interviewees indicated that they were aware of environmental education journals in their libraries[29] (these are listed in **Table 6.8**) while twelve indicated that they were not aware of any. A positive feature for the potential implementation of education for sustainable living is that resources on environmental education were available. Notwithstanding this positive aspect, the suitability of many of the resources, outlined in table 6.8, is questionable. Furthermore, not all the interviewees at an institution knew of the resources, which indicates that only those who were using these were aware of them. This indicates a possible lack of interest and/ or involvement in the area, which adversely affects the potential for education for sustainable living.

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[29] Their responses concentrated on journals or magazines that they believed could be employed to foster environmental education.

Table 6.8 Summary of environmental education user-friendly magazines and journals at the colleges

Name of Journal or Magazine	Number of interviewees who mentioned it	Number of colleges using it
National Geographic magazine	fifteen	five colleges
Spectrum	six	three colleges
Biology Teacher	three	two colleges
Custos	six	two colleges
New Ground	seven	two colleges
Enviroteach	six	two colleges
EEASA Bulletin	two	one college
Molo Songololo	three	two colleges
Conserva	five	three colleges
Veld and Flora	four	three colleges
Primary Geography	one	one college
Archimedes	two	one college
The Geographer	one	one college
Garden and Home	one	one college
Prospect	one	one college
Scientific American	one	one college

In most cases, the librarian (in certain instances it was staff members who operated on a roster basis to see to library matters) was more than willing to purchase relevant and suitable material; nonetheless, it would appear from the materials available that assistance and guidance is needed in this regard. The response that a magazine like Scientific American is a user friendly magazine for environmental education, is questionable, which, once again, signifies a misconception regarding the interviewee's perception of environmental education. A resource like *Enviroteach,* on the other hand, is one of the few resources that can assist teacher educators in their practices, while many of the other magazines and journals might only be useful for expanding the knowledge-base of the practitioners. Notwithstanding the importance of the latter aspect, practitioners also require resources that will assist them in their practice, given the

- limitations of their knowledge base;
- lack of formal policy; and,
- a lack of suitable guidelines for incorporating environmental education into the teacher education curriculum.

This signifies that lecturers from the different institutions need to collaborate to exchange ideas and information that could assist with the purchasing, exchange and development of suitable resource materials for environmental education. This, in turn, in the opinion of the researcher, might foster the potential incorporation of education for sustainable living into the curriculum for teacher education.

In summary, this sub-factor revealed that environmental education was given some consideration at these colleges of education, in the following instances:

- programmes were scheduled to commemorate diarised environmental days;
- clubs and societies were functioning to further some form of environmental awareness; and,
- a few resources were available for staff and students.

However, the positive features were underscored by an apathy, grounded in the negative attitudes towards environmental education, that emanated from a large percentage of the interviewees, since,

- only those with some interest in the area of environmental education were involved in the programmes, clubs and societies; and,
- not all the interviewees were familiar with the available resources.

In the light of realising the potential implementation of education for sustainable living, it is unlikely that the prevalent ethos for environmental education (depicted by the infrastructures, activities and resources) at these institutions are conducive to further the necessary changes that are

required. Furthermore, change rarely comes from the group that needs changing, a view that is supported by, for example, Fullan (1990; 1994). In this regard, it might be necessary for change to be initiated by an 'outside agency', like the Education Department, in terms of securing an official policy for professional development programmes. With this in place, partnerships with the education department, colleges, universities and Non Government Organisations (NGOs) may be of great value[30] for the advancement of the incorporation of education of sustainable living into the curriculum for initial teacher education in the Western Cape. This facet is subsequently explored.

6.3.2 Exploration of existing collaborative and participative practices[31]

The second sub-factor relayed an exploration of further enabling infrastructures that were operative within and between the various tertiary institutions, and outside organisations, that fostered collaboration and networking. Collaboration and networking, in the view of the researcher, are avenues that may engender critical reflection necessary for the furthering of critical praxis. The latter, however, is the central thread for education for sustainable living. While collaboration and networking may further critical praxis, these are also important strategies to resist the barriers that contribute to the powerlessness[32] of the teacher educators (see sections 3.6 and 5.5.2), and thus hold the potential to advance the implementation of education for sustainable living into the initial teacher education curriculum. The existence of collaboration and networking was explored by the following:

- Firstly considered was, whether there was any interaction with colleagues at other colleges or universities relating to the course presentation in their subject areas.
- Secondly appraised was the extent to which the interviewees liaised with NGOs and other organisations for their lecturing programmes.
- Thirdly explored was the interviewees' degree of involvement in subject associations.

The first aspect to ascertain whether a spirit of collaboration and networking existed at these colleges of education in the Western Cape Region, was examined when the interviewees were asked: *"Do you ever interact with colleagues at other colleges/universities for matters relating to*

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[30]For the sharing and development of resources- human and materials, to further the implementation of education for sustainable living.

[31] An exploration of the availability of enabling infrastructures in place within and between the various tertiary institutions and outside organisations which foster collaboration and networking

[32] Their disempowerment is a multifaceted impediment obstructing the realisation of the changes required for the potential implementation of education for sustainable living.

your course presentation?" (Question 33)[33]. While twenty-one responded positively, it is surely a matter of some concern that the rest (almost half of the interviewees) worked in complete isolation from colleagues who operated within the same subject area, lecturing the same prescribed syllabus. In so doing, it is the opinion of the researcher that these teacher educators perpetuate the ills of privatisation, intensification and technologization, that have been identified (see section 3.6; 5.5.2) as significant contributory factors to the powerlessness of the teacher educators. Collaborative practice, however, has the potential to resist this impediment, since according to Robottom (1987a) it can assist practitioners of environmental education to recognise and unpack the false consciousness, and also to weather institutional pressures together. Furthermore, against the backdrop of education for sustainable living, environmental problems have their roots in the political system, which might be countered more effectively via collaborative (rather than individual) action. Yet, despite the value of collaboration outlined, it was not firmly established in these institutions, which is restrictive for the potential implementation of education for sustainable living.

The second aspect was explored, based on the analysis of the interviewees' responses to the following questions: *"Do you ever liaise with any organisations (NGOs; government organisation/s) for assistance with regards to your course presentation? Name the organisations involved, and the assistance rendered by them"* (Questions 31 & 32). It was ascertained that only nine liaised with such organisations. Where there was evidence of collaboration, it was either a one-off situation or it took place on rare, unique occasions (outside of the situation at one college). The organisations (NGOs and government) mentioned by the interviewees, assisted them with:

- information dissemination (Naturalist Society/ NATSOC; Museum);
- presentation of certain syllabus topics (Stellenbosch Agricultural Department; Planetarium; Weather Bureau);
- fieldwork excursions (NATSOC; South African Nature Conservation; Department of Cultural Affairs); and,
- professional development programmes of the staff at one college (Wildlife Society; Ecolink).

Outside of networking with NGOs for professional development programmes in environmental education for one college, the interviewees at the other colleges interacted with the organisations mentioned in an infrequent, sporadic manner, which is restrictive in terms of bringing about

[33] Questions 31-33 did not apply to the rectors of the six colleges.

meaningful change at the colleges. That NGOs have a contribution to make towards the improvement of the education is no doubt (DE 1995; 1996a; 1996b), but they should become involved with the institutions in an ongoing, developmental and sustained manner. The importance of the potential contribution from NGOs has been recognised in the *White Paper on Education and Training* (DE 1995), and is at present explored by the Western Cape Education Department[34]

The third aspect explored in this sub-factor considered the interviewees' involvement with subject associations. This aspect was included in the interview schedule since, in the view of the researcher, networking with teacher educators within and between these associations could be important avenues and channels for collaborative practices for education for sustainable living. In this regard, the following questions were put to them: *"Do you belong to any subject associations/ organisations related to your subject area/s? If you responded positively, please mention these"* (Questions 34 and 35). Twenty-three interviewees indicated that they were affiliated to associations involved in their curricular areas[35].

An analysis of the data indicated that not all the lecturers interviewed were affiliated to their respective existing subject associations (notwithstanding that these associations operated along ethnic lines, since they were linked to the separate education departments at the time when the interviews were conducted). There was no evidence of a science/ biology association, which indicated that these teacher educators never interacted with each other, due to the absence of such a forum, reinforcing the ills of privatisation, and thus adding to their powerlessness (see sections 5.2.1; 5.5.2 and 5.5.3). If appropriate curriculum development for education for sustainable living is to establish itself in the teacher education sphere, there is a desperate need for the establishment of subject associations for teacher educators. Such associations could create a platform to assist with the professional development of the teacher educators, a very neglected (even non-existing) area in the area of teacher education. Another important aspect in this regard is for teacher educators to collaborate and network within the infrastructure created by an association (or associations) that function along provincial and national levels rather than along the old established racially segregated lines.

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[34] Members of EEASA- Western Cape, including the researcher, set up a meeting with some of the subject advisors in August 1995 to offer assistance in terms of environmental education for the formal education sector. Unfortunately, to date this offer has not yet been taken up by the Western Cape Education Department, for reasons not made clear by the education department. It might be that more time is needed to break through the barriers of suspicion and mistrust that evolved over the years of Apartheid education.

[35] These questions did not apply to the six heads of the various institutions, since they were all active in the Rectors' Association.

In summary, an exploration of this sub-factor established that while there was some form of collaborative practice and networking between the colleges, universities and outside organisations, the potential worth of these interactions was undercut by:

- The infrequent and sporadic nature, since there were no ongoing and sustained programmes;
- The failure to establish a spirit of collegiality, that might engender critical reflection (central to the advancement of critical praxis), since isolated incidences cannot be viewed as true collaboration and networking.

Furthermore, the interviewees' involvement in subject associations was underscored by the

- non-existence of such associations for areas like biology/ science;
- fact that not all interviewees were affiliated to these associations; and,
- racially segregated functioning for some of these organisations.

Held up against realising the potential implementation of education for sustainable living, and the changes that underpin this, the infrastructure for collaborative practice and networking was wanting. It seems that a concerted effort from the Education Department, in conjunction with colleges, universities and NGOs in terms of developing an official policy for professional development programmes, warrants attention.

6.3.3 Conclusion

This key factor investigated the institutional influences and which enabling infrastructures were in place within and among the different colleges of education, with regards to the exploration of the potential implementation of education for sustainable living. The first sub-factor revolved around an exploration of the existence of an ethos for environmental education at these colleges of education. Positive features included environmental education programmes on environmental days, that were supplemented by operative clubs and societies; and a limited type of resources to further environmental awareness. These positive features were underscored by an apathy, grounded in the negative attitudes towards environmental education, since few were actually involved in the programmes, clubs and societies; and not all the interviewees were familiar with the available resources. This seems to indicate not only a degree of apathy but the absence of an ethos required for education for sustainable living to function at a meaningfully transformative level as well. An analysis of the nature of available resources at these institutions further reinforced this perception. In the light of realising the potential implementation of education for sustainable living, it is unlikely that the prevalent ethos for environmental education (depicted by the infrastructures, activities and resources) at these institutions is conducive to further the necessary changes that are

required.

In its attempt to identify the extent, at these colleges, of enabling infrastructures (like teacher educators' subject associations) for collaborative practice and institutional networking, widely acknowledged as important for the furthering of education for sustainable living (Huckle 1995; NIER 1993; UNESCO 1993; UNESCO-ACEID 1994), this key factor met with a number of barriers. From the analysis of responses it is quite evident that many of the teacher educators worked in isolation, perpetuating privatisation and intensification (see sections 5.2.1.3 and 5.5) of their work. In the absence of a well organised and sustained infrastructure to nurture collaboration, it is unlikely that critical praxis (imperative for realising the potential for education for sustainable living) will be furthered.

6.4 KEY FACTOR FOUR: PROFESSIONAL DEVELOPMENT

The aspect of professional development formed the fourth key factor of multisited case study two, and laid the basis for a framework and possible solutions in chapter seven (see also section 5.4). In this regard, the interviewees' perceptions of their colleagues' understanding of environmental education was examined (section 6.4.1) to verify whether there was a need for professional development to develop and extend their understanding of education for sustainable living. After that, their perceptions as to whether there is a need for INSET in environmental education was examined (section 6.4.2). Finally, their opinion regarding who ought to take the lead in this regard, the frequency, and how INSET should take place, was examined (section 6.4.3).

6.4.1 Interviewees' perceptions of their colleagues' understanding of environmental education

To ascertain how the interviewees perceived their colleagues' understanding of environmental education, they were asked: *"How informed are the teacher educators (at your particular institution) with regards to environmental education?"* (Question 3). While nine of the interviewees asserted that their colleagues were knowledgeable in this area, the majority (thirty-one) felt that their colleagues lacked adequate knowledge. An analysis of the responses of the first group resulted in three categories:

- vague, and unsubstantiated responses for three interviewees (category one);

- the level of knowledgeability was relative (category two)[36];
- teacher educators were knowledgeable because of the staff development programmes on environmental education at that college, which the teachers attended (the three other interviewees, represented in category three, are all from the same college).

Six categories of responses emanated from the thirty-one interviewees who asserted that the teacher educators' knowledge in environmental education was limited. Represented in the first category was the response of one interviewee who attributed the teacher educators' lack of knowledge to the nature of the curriculum for teacher education, arguing that:

> "[D]ue to internal departmentalisation of teaching, further broken up by subject teaching the emphasis is placed on converging as opposed to the holistic approach. Anything that is not immediately subject related is irrelevant" (interviewee B4).

Implicit within this argument is the compartmentalised and fragmented nature of the current curriculum. These constraints, which also surfaced in multisited case study one (see sections 5.1.2.2 and 5.5.1), are widely acknowledged (Davidoff and Robinson 1992; NEPI 1992a; b; Salmon and Woods 1991; Van den Berg 1994), and are interrelated with the changes required at macro level for the realisation of education for sustainable living. The second category, representing responses of six of the interviewees, focused on the lack of formal education in environmental education as the primary cause of teacher educators' lack of adequate knowledge related to environmental education. This constraint corresponds with what Ham and Sewing (1988) identified as educational barriers, and are grounded in the meso level challenges (aspiring for a practice that furthers critical praxis) for the realisation of education for sustainable living. It was also identified as a major impediment by the interviewees in multisited case study one (see section 5.5.2).

The third category, (closely resembling the second category) comprised the responses of six of the interviewees, who asserted that environmental education is a recent initiative, and therefore teacher educators lack the necessary knowledge. While there have been numerous conferences both internationally (see section 3.2.1) and nationally (see section 3.2.2) that focused on the nature, scope, aims and objectives of environmental education since the 1960s, these interviewees' perception is accurate. Environmental education is 'new' and foreign to the formal education

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[36] This correlates with the responses of the interviewees depicted in category five below (regarding those who said that their colleagues were not knowledgeable in this area).

system in South Africa (see section 5.2.1), a point stressed by one of the interviewees[37]. This situation, in the view of the researcher, once again points to the desperate need for INSET in this area. Without a solid foundation, it is unlikely that teacher educators will have the necessary expertise to practice with the necessary confidence and competence to further the goals of education for sustainable living.

The fourth category represented the responses of seven interviewees who ascribed their colleagues' lack of knowledge in environmental education to their lack of interest in this area. This correlates with the attitudinal barriers identified by Ham and Sewing (1988). This impediment emerged in multisited case study one (see section 5.5) and, as argued in section 5.5.2, it cannot be viewed in isolation from the ills which underpin the powerlessness of the teacher educators. These negative attitudes, in the view of the researcher, depict a barrier that illustrates the interrelatedness of the changes at all levels that are necessary for realising the implementation of education for sustainable living into the curriculum for initial teacher education. Grounded within the macro level challenges, it can be ascribed to the disempowerment of the teacher educators who are functioning in a bureaucratic system, characterised, for example, by power and control. However, this disempowerment manifests in their practice - which relates to the challenges for change at meso level, and which might have adverse ramifications in terms of furthering critical praxis. Their practice, in turn, impacts on the challenges at micro level, which includes, for example, the curriculum content and resources. In essence, negative attitudes are restrictive in terms of furthering the potential implementation of education for sustainable living into the initial teacher education curriculum in the Western Cape.

The fifth category depicted the responses of seven interviewees who argued (similar to the three interviewees in category two who asserted that teacher educators were knowledgeable) that some of their colleagues were more knowledgeable in this area than others. However, interviewees here argued that the more knowledgeable lecturers were those who operated within the natural and earth sciences, indicating a misconception that environmental education is 'owned' by the sciences, and which adds to the 'technocratic rationality'. This misconception suggests a lack of insight and understanding of environmental education by these interviewees, which is restrictive for the potential implementation of education for sustainable living.

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[37] Interviewee B7 had this to say: "...generally the full significance of the implications of environmental education has not taken root yet".

The final category represented the responses of four interviewees who argued that their colleagues lacked adequate knowledge and understanding of environmental education since they had not incorporated this field into their lecturing programme. Interviewee A3 summed up this position: "The fact that environmental education has not been implemented as yet, is an indication that they are not well versed in environmental education". This assertion, when viewed in the light of the general consensus of the need for education for sustainable living to be incorporated into the curriculum for teacher education, implies that teacher educators need guidance on how to proceed. INSET environmental education programmes for teacher educators can pave the way in this regard.

In summary, thirty-one interviewees asserted that the teacher educators' knowledge in environmental education was limited. The roots of these limitations can be traced to the challenges in the way of change at:

- Macro level, which includes the:
    - lack of a holistic vision, that can be ascribed to the compartmentalised and fragmented nature of the curriculum;
    - powerlessness of the teacher educators which is reflected in their negative attitudes and their lack of interest in the area of environmental education; and,
    - lack of formal policy for environmental education, as the primary cause why environmental education was unfamiliar to many teacher educators.
- Meso level, which includes the:
    - educational barriers, resulting in the;
    - failure to incorporate environmental education into teacher education programmes.
- Micro level, which includes:
    - what is included and imparted in the curriculum content, centred in the misconception that environmental education is confined to the natural and earth sciences.

Having established that the interviewees generally perceived that their colleagues were not sufficiently knowledgeable in the area of environmental education, they were then asked whether they perceived the need for INSET programmes for teacher educators, which is discussed below.

6.4.2 Perceptions of the interviewees regarding environmental education INSET programmes for teacher educators

When the interviewees were asked whether environmental education INSET programmes were a

priority, (in response to Question 21: *"Do you feel that teacher educators will have to undergo INSET programmes prior to the introduction of environmental education into a curriculum for student teachers?"*) all forty agreed that it was a much needed and rather neglected area. Nine categories resulted from the analysis of the interviewees' responses, the first five of which considered why INSET for teacher educators was regarded as important. The interviewees' responses in the other four categories (while acknowledging that INSET is necessary) related to what ought to be considered for such programmes.

While twenty-two interviewees motivated that INSET in environmental education is necessary for teacher educators to increase their knowledge base in this area (category one), only four interviewees (category two) held a broader perspective and argued that INSET programmes need to become part of the ethos of the profession of the teacher educators, not only for environmental education, but in all areas. In South Africa, INSET programmes, (in a professional developmental sense - see section 5.4) are not part of the experiences of most teacher educators (DE 1996b; Hofmeyr 1991; Hofmeyr et al. *TSUD Report* 1994; NEPI 1992a). Neither has there been any formal policy for INSET (ibid). With INSET and initial teacher education programmes functioning in complete isolation, the reconstruction of teacher education ought to strive to bring these two complementary facets closer, where the one informs the other and, in so doing, establishes an ethos for professionalism. The CEPD task team for Teacher Development and Support Report states that teacher educators have a vital role to play in the reconstruction of teacher education, and recommends professional development programmes for teacher educators as a starting point in the reconstruction process (Hofmeyr et al. *TSUD Report* 1994: 6). Further recommendations for the reconstruction of teacher education include the need for closer collaboration between the schools, colleges, the Department of Education and the community:

> Collaborative arrangements will provide mechanisms through which institutions, characterised by different levels of capacity and diverse historical contexts, are able to pool their resources, learn from each other and build the professional platform for taking teacher education into the twenty-first century (ibid: 7).

These sentiments are reiterated in the *Draft Document Curriculum Framework for General and further Education and Training* of the Department of Education (DE 1996a), and in the COTEP (1996) document. What is lacking, however, is a definite commitment from the Department of Education to secure the necessary policy, so that the necessary infrastructures can be set in place in order to initiate and sustain such endeavours. If this is not forthcoming, the danger exists that all these sentiments might be reduced to idealistic rhetoric.

In the other three categories which underpin the necessity of INSET, category three represented the responses of six interviewees who were of the opinion that environmental education INSET programmes would give the teacher educators the confidence needed to engage in the area since, as argued by two interviewees in category four, many of them were not formally educated in environmental education. The fifth category represented the opinion of two interviewees who asserted that INSET is needed for teacher educators since they don't engage with literature outside of their subject areas. This response, when viewed in the broader educational context, might be ascribed to the impediments obstructing the realisation of change at macro level, i.e. the fragmented nature of the teacher education curriculum (with its heavy emphasis on separate, specialist subjects) intensified by the prescribed, content-laden syllabuses. The latter virtually prevents teacher educators from reading outside of their specialist field. On the other hand, the intensification of their work load, compounded by the privatisation thereof, (contributing to their powerlessness) can be viewed as further reasons why they refrain from venturing out of their specialist areas, notwithstanding that professional development programmes were not part of their experiences.

Represented in categories six to nine are the responses of interviewees who, while agreeing that environmental education INSET programmes for teacher educators is a priority, recommended that certain provisos had to be considered for these programmes. One interviewee (C1), represented in category six, argued that these programmes had to be conducted in an ongoing manner, while another (C4), in category seven, argued that "these INSET programmes should be challenging and stimulating, and of a practical nature to turn people on". One interviewee (F1), in category eight, suggested that these INSET programmes had to be centred on local environmental needs. The views of these three interviewees, collectively taken, are widely accepted as necessary conditions for effective professional development in the area of education for sustainable living (Huckle 1995; NIER 1993; UNESCO 1993; UNESCO-ACEID 1994). Finally, interviewee B7, whose response is represented in category nine, argued that: "political literacy should form a big part of it", a view that is supported by many environmental educators (Di Chiro 1987; Fien 1992; Huckle 1985; 1995; Martin 1990). Political literacy, one of the cornerstones of education for sustainable living in the view of the researcher, which finds support in the arguments of, for example Huckle (1993), enables learners to unpack the social, economic and political facets of environmental risks. It enables learners to reflect on these in a critical manner, and to take up the necessary action to respond to the problem. Implicit in this response is that INSET should be critical, enquiry-based, and that it should be based on relevant local environmental problems and needs.

6.4.3 Interviewees' perceptions on how environmental education INSET programmes should be conducted

While all the interviewees perceived the need for environmental education INSET programmes for teacher educators as a prerequisite to the incorporation of education for sustainable living into the curriculum for teacher education, their opinions regarding the management, frequency and this INSET varied. An analysis of their positions is based on their responses to the following:

(a) "who do you foresee arranging these INSET programmes?"

(b) "how frequently should these programmes occur?"

(c) "how should these programmes be conducted?" (Question 22)

6.4.3.1 The management of INSET

The responses were grouped into eight categories, with the first four containing responses from thirty-one interviewees (the majority) who felt that INSET programmes should be managed from outside by experts (category one), NGOs (category two), scientists (category three) and the Department of Education (category four). That so many interviewees clung to the 'expert-driven' notion is not surprising, since this is what the teacher educators have been accustomed to in their practice. Their curricula, for example, have been developed via the RDDA (research, dissemination, distribution and adoption) approach (O'Donoghue and McNaught 1991; Robottom 1987a; see also section 3.4.3.1). Indicative in their responses are the barriers that underpin the powerlessness of the teacher educators, encompassed within the macro level challenges for change. Included are, for example, the manifestation of technologisation, (see sections 5.2.2 and 5.5.2) that contributes to the deskilling (see section 5.5.2) of their work. The reaction from three interviewees (category five) against the Department of Education being made responsible for INSET, may be viewed in the light of the suspicion and mistrust that accumulated over the apartheid years that has resulted in discontent and negative attitudes towards the government.

The last three categories of responses (six, seven and eight) represented the views of only six interviewees. They believed that their colleagues had the potential to embark on the development of INSET programmes themselves through, for example, the establishment of collaborative partnerships with universities and NGOs.

6.4.3.2 Frequency and nature of INSET

The interviewees' responses as to how often environmental education INSET programmes need to occur resulted in six categories of responses. Nine interviewees, whose responses are depicted in category one, suggested that environmental education INSET programmes need to be ongoing throughout the year. Similarly, the responses of nine other interviewees, represented in category two, recommended that these INSET programmes need to be frequent at first, and thereafter take place at regular intervals. This recommendation of INSET programmes has been previously acknowledged (Hofmeyr et al. *TSUD Report* 1994; Robottom 1987a). Category three encompassed the responses of six interviewees, who held the view that environmental education INSET programmes first need to consider the needs of the teacher educators. Ten interviewees represented in category four stated that INSET programmes had to be conducted quarterly. Category five, however, included the view of four interviewees, who recommended that environmental education INSET programmes for teacher educators need to be conducted once per semester (twice annually) while, in the last category, two interviewees suggested it takes place annually.

In response to how these environmental education INSET programmes ought to be conducted, five categories emerged, the first representing the views of twenty-seven interviewees. These interviewees made vague suggestions, such as the holding of workshops, lectures and seminars without elaborating further. The second category included the views of five interviewees who argued that both theory and fieldwork (of a practical nature) had to be included in the environmental education INSET programmes. In category three, the recommendations of five interviewees are represented which, in addition to the suggestions made in categories one and two, expressed the need for clearly formulated objectives for such programmes. The fourth category included the view of two interviewees (B4 and C1) who argued that these INSET programmes should be of a formal and informal nature. One interviewee (F5) representing category five asserted that "...it is important to have it (INSET) during college hours otherwise people do not attend during their own time" - an important consideration in the absence of an ethos of INSET in a professional development sense (see sections 5.4 and 6.4.2).

In summary, when viewing the interviewees' recommendations for INSET collectively, many of these correspond to the guiding principles for professional development in environmental education proposed by Robottom (1987a: 114-115) which finds wide support (Fien 1991; Huckle 1995; NIER 1993; UNESCO-ACEID 1994). This approach to INSET suggests that it should be:

- collaborative;

- participatory and practice-based;
- community-based (based on relevant local environmental problems and needs);
- critical; and,
- enquiry-based[38].

Given the largely uncritical, authoritative practices, centred on rote learning which these teacher educators were subjected to during their 'training' (see sections 3.1.1; 3.3.2), which is in conflict with the goals of education for sustainable living, INSET programmes, in the view of the researcher, are imperative if there is to be any chance for education for sustainable living taking off at the colleges of education.

6.5 BARRIERS OBSTRUCTING THE POTENTIAL INCORPORATION OF EDUCATION FOR SUSTAINABLE LIVING INTO TEACHER EDUCATION

Numerous barriers may obstruct the realisation of change (at macro, meso and micro levels), necessary for the potential implementation of education for sustainable living within the initial teacher education curriculum. These are identified in this component of the second multisited case study (see also sections 3.6; 5.5), and brings to fruition objective four of the research project. The constraints that may inhibit education for sustainable living have been noted for each of the key factors that underpin this multisited case study, as well as from the analysis of the following questions: *"Are there any factors which may hamper the introduction of environmental education into a curriculum for teacher education? If you replied yes to the above question, list a few factors, which in your opinion, might restrict the introduction of environmental education into teacher education"* (Questions 12 and 13).

The responses provided by the interviewees were analysed, from which three broad categories (each underpinned by properties) of barriers (represented in **Table 6.9**) emerged. Included were the constraints that are ascribed to the:

1. **Formal education system**. Within this category, six properties were distinguished that portrayed impediments obstructing the realisation of change necessary for education for sustainable living, at

- Macro level, which included:

[38] These aspects will be further explored in chapter seven.

Table 6.9 Interviewees' perceived barriers to the incorporation of environmental education into the curriculum for initial teacher education.

Barriers centred within formal education	Barriers related to the teacher educators	Logistical barriers
Ideological impediments (two interviewees).	Impediments ascribed to the notion of powerlessness: • apathy (one interviewee), • resistance to new initiatives (two interviewees), • lack of interest (one interviewee).	• Lack of facilities and apparatus at the institutions (one interviewee). • Shortage of money (three interviewees). • Lack of time (two interviewees). • Barriers of an organisational nature, that include the fear for students' safety on fieldtrips (one interviewee).
Institutional bureaucracy (one interviewee).		
Lack of autonomy (one interviewee).		
Absence of official policy or directives to incorporate environmental education (six interviewees).		
Curriculum for teacher education: • external exams (six interviewees), • prescriptive nature (four interviewees), • content driven (two interviewees), • loaded (eleven interviewees), • ambivalence regarding academic and professional education (three interviewees), • irrelevant (one interviewee), • skills, attitudes and values lacking (three interviewees), and, • fragmented (one interviewee).	Educational barriers: • teacher educators do not have an understanding of environmental education (fourteen interviewees).	
Impediments associated with the schools: • Environmental education is not part of the school curriculum as yet (one interviewee), and, • Teachers are not educated in environmental education (one interviewee).	Attitudinal barriers: • teacher educators have negative attitudes towards environmental education (two interviewees).	

- ideological constraints;
- lack of autonomy;
- institutional bureaucracy;
- absence of official policy and directives to incorporate environmental education; and,
- the curriculum for teacher education, that is a manifestation of the broader formal structures and processes.

- Meso level, which included:
  - the impediments associated with the schools, that are centred within the notion of schooling.

2. **Teacher educators**. This second category contained three properties which depicted impediments obstructing the realisation of change necessary for education for sustainable living, at

- Macro level, which included:
  - barriers that are rooted within the 'notion of powerlessness' of the teacher educators;
- Meso level, which included:
  - educational barriers; and,
  - attitudinal barriers.

3. **Logistical barriers**, (third category) comprised four properties which depicted impediments obstructing the realisation of change necessary for education for sustainable living, at

- Micro level, which included:
  - a shortage of funding;
  - a lack of facilities and apparatus at the institutions;
  - time constraints; and,
  - barriers of an organisational nature relating to safety of students.

The constraints mentioned here closely resemble the barriers that emerged from a review of the terrain pertinent to the parameters of the research (see section 3.6), and those mentioned for the first multisited case study[39] (see section 5.5). However, additional properties were mentioned by the

[39] See section 5.5 for the three categories that emerged from the analysis of the teacher educators' responses regarding the barriers. Included were three categories that deliberated on the formal education system (category one), the teacher educators (category two), and logistical barriers (category three).

interviewees in this multisited case study. The first five properties of category one are directly linked to the macro context that shapes the education system, encompassed within what interviewee C4 referred to as the "stifling political ideology" of Christian Nationalism of the immediate past government (see section 3.1.1). Encompassed within this ideological position are the constraints related to the lack of autonomy (property three) that was identified by interviewee B2, where the colleges involved in this multisited case study[40] were subjected to strict control measures exerted by the respective Departments of Education.

These control measures are directly linked to the barriers pertaining to the curriculum for teacher education mentioned by several of the interviewees in this multisited case study (also in multisited case study one). Of significance is that the colleges involved in this multisited case study had to follow prescribed syllabuses which denied them the freedom of incorporating initiatives like environmental education programmes into the curriculum (which is currently still the status quo). Hence, in the absence of formal policy (identified as a barrier by six interviewees) or directives from the government, the teacher educators are prevented from incorporating environmental education into the curriculum.

However, the neglect of considering new initiatives like environmental education can also be attributed to the powerlessness of the teacher educators (represented as the second property in category two). Apathy, resistance to innovations and a lack of interest (identified by four interviewees) can be attributed to many of the causes that contribute to the disempowerment of the teacher educators; for example, the technologization, low status, intensification and deskilling (see sections 5.2.2 and 5.5) of their work. These causes of disempowerment might result in the attitudinal barriers identified by two of the interviewees (represented as property two of the second category).

The barrier most widely identified by the interviewees included the teacher educators' lack of knowledge and understanding of environmental education, a barrier that is widely acknowledged as vital to overcome for the successful incorporation of education for sustainable living into the teacher education curriculum (NIER 1993; QBTR 1993; UNESCO 1993; UNESCO-ACEID 1994).

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[40] The colleges involved in this multisited case study were governed by the ex-House of Representatives and the ex-Department of Education and Training. Autonomy was granted to the colleges governed by the ex-House of Assembly ('White' colleges) and, to a lesser extent, the colleges governed by the ex-House of Delegates (NEPI 1992a; Meerkotter and Van den Berg 1994). The latter education department granted a certain degree of freedom pertaining to curriculum development to the colleges under their auspices ('Indian' colleges).

Finally, in category three (logistical barriers), an additional barrier mentioned in this multisited case study (but not in multisited case study one) was the fear for the safety of students during fieldtrips. This signifies a misconception where environmental education is equated with outdoor education (fieldtrips), rather than viewing outdoor education as an aspect of environmental education. This misconception, however, is not surprising in the light of the interviewees' understanding of environmental education which views it in terms of the scientific realm (see section 6.1.2).

6.6 CONCLUSION

When revisiting the aim of the research (see section 1.6) against the backdrop of education for sustainable living (see section 3.1.4), the 'potential for incorporating education for sustainable living into initial teacher education' is bleak considering all the constraints mentioned. An exploration of the main influences (key factors) impacting on education for sustainable living at colleges of education in the Western Cape (objective three), and the barriers emanating from these that might obstruct the incorporation of education for sustainable living into initial teacher education (objective four) raised a number of serious concerns.

Emanating from key factor one, in the light of exploring the potential for incorporating education for sustainable living into the initial teacher education, and the necessary changes that underpin this potential, an analysis of the data obtained via the interviews exposed serious flaws and shortcomings in terms of:

- Formal qualifications in environmental education. Not only did the majority of the senior primary teacher educators lack formal qualifications in environmental education and the necessary grass roots experience at primary school level; more seriously, they tended to display a distinct apathy towards the whole field.
- Where qualifications and interest were present, a somewhat myopic and technicist interpretation of environmental education tended to prevail, thereby exacerbating the situation.

The teacher educators' educational and environmental ideological positions did little to enhance this scenario, with most of them perceiving curriculum in terms of fragmented exclusivity, and regarding environmental education from a rationalist ecological foundation. Their environmental education ideological positions were restrictive in regard to the realisation of the changes at macro level), in that:

- Most teacher educators had a very narrow view of the concept of environmental education;
- Only a few teacher educators acknowledged that the roots of the environmental crisis are centred in the interconnectedness of the social, economical and political bases of society.
- The majority of teacher educators were inclined towards the neo-classical educational and technocentric environmental ideological persuasions.
- The majority of the interviewees' perceptions of both curriculum *per se* and a framework for a curriculum in environmental education failed to recognise the macro-micro objective interlinkage between the two (Giroux 1988a; Van den Berg 1994), thereby failing to recognise the value-laden and political-economy driven nature of their perceptions of knowledge.

In essence, there was a chronic absence of any critical perspective on environmental education viewed in terms of sustainable living. These shortcomings (resembling those uncovered for multisited case study one) have negative implications for realising the changes necessary for education for sustainable living, and are thus restrictive in terms of the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape.

Key factor two displayed the bearing of the existing course structures on environmental education. A positive feature was the fact that all the teacher educators acknowledged that it was important to incorporate environmental education into the curriculum for teacher education, in an integrated manner, into the different subject areas. However, the impediments to this potential can be ascribed to those obstructing the realisation of the changes necessary for education for sustainable living at:

- Macro level, which included:
  - the prescribed nature of the syllabuses, complicated further by externally controlled examinations;
  - a lack of formal policy;
  - the exclusion in terms of stipulations within syllabus guidelines; and,
  - the conflicting ideologies of the curriculum and environmental education and the need for practitioners to develop an environmental ethic.
- Meso level, which included:
  - the large volume of uncritical content to be lectured within a confined time frame.
- Micro level, which included:
  - a lack of time.

A ray of optimism shone through in that the majority of the teacher educators felt that their subject

areas could accommodate environmental education. However, very few were involved in environmental projects, or included activities on environmental education within their lecturing programmes. Held up against education for sustainable living, these projects (and other alleged environmental education activities) reflected a dearth of critical praxis, which, in the view of the researcher, is restrictive for realising the challenges that underpin the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape. The projects falls short in that:

- the focus was exclusively on the bio-physical (similarly, the environmental education that was allegedly incorporated into the lecturing programmes of the interviewees favoured the biophysical perspective); and,
- the aspects of participation and collaboration were overlooked as was the critical facet of problem-solving.

In summary, although the interviewees acknowledged that environmental education could be incorporated into their subject areas, not much effort had been made to do so.

The third key factor reflected the institutional influences and which enabling infrastructures were in place within and among the different colleges of education, with regards to the exploration of the potential implementation of education for sustainable living. An examination of the existence of an ethos for environmental education at these colleges of education, reflected, on a positive note, that

- Environmental education programmes were scheduled on environmental days;
- Clubs and societies were operative; and,
- A limited type of resources to further environmental awareness were available for staff and students.

These positive features, however, were underscored by:

- An apathy, grounded in the negative attitudes towards environmental education, since few were actually involved in the programmes, clubs and societies; and,
- Not all the interviewees were familiar with the available resources.

These negative features indicated to the researcher not only a degree of apathy, but the absence of an ethos required for education for sustainable living to function at a meaningfully transformative level as well. An analysis of the nature of available resources at these institutions further reinforced this perception. In the light of realising the potential implementation of education for sustainable living, it is unlikely that the prevalent ethos (depicted by the infrastructures, activities and resources), at these institutions are conducive to further the necessary changes that are required.

The extent of enabling infrastructures (like teacher educators subject associations) for collaborative

practice and institutional networking, widely acknowledged as important for the furthering of education for sustainable living (NIER 1993; UNESCO 1993; UNESCO-ACEID 1994), revealed a number of impediments. From the analysis of responses it is quite evident that:

- The disempowerment of the teacher educators were perpetuated since they worked in isolation (contributing to the privatisation and intensification of their work).
- In the absence of a well organised and sustained infrastructure to nurture collaboration, it is unlikely that critical praxis (fundamental for realising the potential for education for sustainable living) will be furthered.

The optimisms (acknowledgement of the need for environmental education, and that environmental education could be incorporated into the respective subject areas in the initial teacher education curriculum), however, have to be weighed up in the light of the dearth of collaborative practice and institutional networking[41], widely acknowledged as important for the furthering of education for sustainable living at these institutions.

The area of professional development[42] was characterised by a distinct ambivalence. On the one hand, while there was widespread recognition for such a need (in the form, mainly of INSET), the management was viewed as being the domain of outside experts, reflecting a distinct technicist orientation. However, on a positive note, the interviewees' collective recommendations for INSET correspond to the guiding principles for professional development in environmental education proposed by Robottom (1987a: 114-115) which finds wide support (Fien 1991; Huckle 1995; NIER 1993; UNESCO-ACEID 1994), and with which the researcher concurs. This approach to INSET suggests that it should be:

- collaborative;
- participatory and practice-based;
- community-based (based on relevant local environmental problems and needs);
- critical; and,
- enquiry-based.

Nonetheless, realism tainted the potential implementation of education for sustainable living in the form of an acute awareness of the numerous constraints (at macro, meso and micro levels) which stood in the way of attaining this ideal. Central, at macro level, is the pervasiveness of the hegemonic manifestations of Christian Nationalist ideology, reinforced by fundamental pedagogics.

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[41] Explored as the third key factor.

[42] Explored as the fourth key factor.

Notwithstanding that the barriers of formal education are ascribed to the former government, and that it is presently receiving attention, any redress has to realise:

> If we wish to understand and transform present events, we need an appreciation of how fragments of the past live into the present (Smyth 1987: 2-3).

The formal education of the past is ridden with inequalities, authoritative practices and tight control. When viewed in this light, it is not surprising that the powerlessness of the teacher educators is firmly entrenched, manifesting itself in all spheres of their work. This is one of the major barriers, in addition to educational barriers (challenges to realise change at meso level), which stems from their lack of knowledge in environmental education that might obstruct the incorporation transformative education for sustainable living into the curriculum for initial teacher education. Further constraints that emanated from the interviewees' responses was the need for formal policy (macro level challenge) to guide the implementation of environmental education into the curriculum (micro level challenges), without which teacher educators would be reluctant to include environmental education within their lecturing programmes. In summary, considering all the barriers to education for sustainable living outlined in this conclusion, it is clear that some form of intervention has to be made in teacher educators' current practices to render the incorporation of education for sustainable living into initial teacher education in the Western Cape possible. It is this need which forms the rationale for the strategy that will facilitate this process (comprising objective five) which is discussed in the next chapter.

CHAPTER SEVEN

TOWARDS A STRATEGY FOR ENVIRONMENTAL EDUCATION WITHIN INITIAL TEACHER EDUCATION: CONCLUSIONS AND RECOMMENDATIONS

7.0 INTRODUCTION

This research set out to explore environmental education programmes at initial senior primary teacher education level nationally, in order to understand why similar programmes, initiated at the College of Education where the researcher works, have failed. In identifying why these programmes have been functioning at these national institutions, and by examining the perceptions of teacher educators at teacher education institutions in the Western Cape, the researcher hoped to formulate a tentative, working strategy that could be utilised to implement similar environmental education programmes at colleges of education in the Western Cape where these are not in existence.

An analysis of the data obtained from both multisited case studies reveals certain trends and patterns in current environmental education practices at initial teacher educator level that suggests they are, to a large extent, somewhat dysfunctional and uncritical. As the analysed data began to arrange itself into key factors and related sub factors (see section 4.5), via the employment of grounded theory (see sections 1.7; 4.1.4) developed through the case study method (see sections 1.7; 4.2), the reasons for these deficiencies became more apparent: many environmental education programmes for teacher education are clearly locked into outdated discourses with pervasive remnants of apartheid ideology (see chapters five and six). Both of these factors appear not only at a structural level in teacher education practices but also at the personal level, as part of teacher educators' individual consciousness.

Change theory (see chapter two) provided the basis for realising and explaining these shortcomings, by helping to identify the barriers that might obstruct the realisation of the changes that are necessary for education for sustainable living. An awareness of these barriers emerged from the analysis of both multisited case studies, as well as from those insights gained of the underlying causes for their (the barriers') existence, through a review of the theoretical terrain (see chapter three) pertinent to the parameters of the research. Within the theoretical framework identified (see section 3.1.4), and the macro, meso and micro level challenges (see chapter two) posed for the

of education for sustainable living, a sense of what ought to comprise environmental education[1] at initial senior primary teacher education level began to emerge. It is around a critical engagement with the component elements of this sense, the conclusions drawn, and the recommendations put forward from this research that the present chapter is built. Central to the possibility of incorporating education for sustainable living into initial teacher education at senior primary level at teacher education institutions in the Western Cape, is the requirement of initiating the debate around means to overcome the barriers in the way of the changes at macro, meso and micro levels, which currently impede the success of such an endeavour.

7.1 ENVIRONMENTAL EDUCATION PRACTICES: A SYNOPSIS OF THE BARRIERS

The shortcomings in current teacher educator practices regarding environmental education at initial teacher education level, both collapse into, and extend the perceived barriers to the implementation of environmental education in the Western Cape. These barriers that may obstruct the realisation of the changes (at macro, meso and micro levels), required for education for sustainable living within initial teacher education have been identified (see sections 3.6; 5.5; and 6.5), and are summarised (below) in terms of their impediments:

- which are centred within the formal education system (see section 5.5.1, and **Table 6.9**);
- that may be ascribed to the teacher educators (see section 5.5.2 and **Table 6.9**); and,
- that are described as logistical constraints (see section 5.5.3 and **Table 6.9**).

7.1.1 Barriers located within the formal education system

The barriers centred within the formal education system that might obstruct the realisation of change necessary for education for sustainable living at macro[2] level have to be viewed in the light of the formal education system of the previous South African government, that was rooted within the ideology of Christian Nationalism, and secured by fundamental pedagogics (see sections 3.1.1; 3.3.2). Characterised by power, control, bureaucracy and authoritative practices that were engineered by the Nationalists who controlled the political power, the government failed to secure a

[1] i.e. in terms of content, methodology, ideological underpinnings etc.

[2] These included ideological constraints, a lack of autonomy, institutional bureaucracy, absence of official policy and directive to incorporate environmental education, and the curriculum for teacher education, that is a manifestation of the broader formal structures and processes.

policy for environmental education that encouraged critical thinking, broad-based participation and the advancement of a democratic and socially just society. This vision for environmental education was never considered since it was in direct conflict with the government's agenda. Similarly, teacher education was largely shaped by a centralised, externally developed and prescribed curriculum, where tight control over the content and the learning environment was strengthened, and reinforced via Fundamental Pedagogics. However, while the present restructuring of education is receiving attention, the impediments of the authoritative control measures of the past are still part of the historical baggage of the teacher educators, and the prescriptive curricula and their hidden curricula are currently still in use, and will be for some time.

The impediments obstructing change at meso[3] level, encompassed within the notion of schooling, (see section 3.4.2), are interlinked with the changes needed to realise education for sustainable living at macro level. In the opinion of the researcher, which finds support in the sentiments expressed by educationalists internationally, for example, Beyer (1987); Giroux (1988a; b); Harrison (1994); Verma (1993), and in South Africa, for example, Meerkotter and Van den Berg (1994); Siebörger and Kenyon (1992); Taylor (1993), schools[4] are likely to foster the values, views and agenda of the dominant classes, and consequently reproduce their social, economic and political order. Often, due to the technologizing (see section 5.5.2), order and control are reinforced by those in senior management positions, which retards creative and more progressive innovations such as education for sustainable living practices, especially if it challenges authority and the existing power relations (see section 2.3).

To transcend these constraints at macro and meso levels is a great challenge facing the education system, notwithstanding the broader societal structures. These barriers highlight the need for professional development in the area of environmental education, of all stakeholders, in order to transcend the confines of the maintenance paradigm (Hoyle 1990 see section 2.3), towards the realisation of education for sustainable living.

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[3]These included the impediments associated with the schools that are centred within the notion of schooling.

[4] Perceived in terms of the sites where students do practice teaching, and where they will be working once they qualify as teachers. However, colleges of education function along similar lines, as they are governed by the college-school sector (Provincially based). This situation is presently under review.

7.1.2 The barriers ascribed to the teacher educators

Included amongst the barriers that might obstruct the realisation of education for sustainable living are those impediments that are ascribed to the teacher educators. The macro[5] level challenges, as well as the meso[6] level challenges have adverse implications for realising the changes necessary for the incorporation of education for sustainable living into the formal education system. While these barriers may be ascribed to 'training' (see section 3.1.1) which the teacher educators received under apartheid structures, teacher educators have not sufficiently seized the opportunities for innovation and experimentation afforded by the interregnum, because many of these 'opportunities' have not been driven by official INSET policy. This negligence may be ascribed to the vicious circle in which they are entangled, where their own uncritical training has left them without the skills critically to reflect on and transform their own practices in the light of critical praxis (see sections 3.1.4; 3.3.1). To realise the changes necessary for education for sustainable living in South Africa, professional teacher educator development that will further the realisation of critical praxis, steered by official policy of teacher educators, needs to be formulated and implemented.

7.1.3 Logistical barriers

The impediments that might obstruct the realisation of education for sustainable living at micro level included logistical[7] barriers. Although these impediments are viewed as micro level challenges, it is the view of the researcher that they cannot be separated from the challenges at macro level, and have to be viewed in conjunction with the barriers centred in the formal education system where teacher educators' work is intensified by menial tasks in order to maintain their subjugation to current undemocratic governance autocracies. Similarly, the educational barriers (a lack of knowledge in environmental education), which are embedded within the meso level challenges for the realisation of education for sustainable living, are directly related to the changes at micro level, which pertain directly to curricular matters.

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[5]Included are the barriers that are rooted within the 'notion of powerlessness' of the teacher educators. Their historical baggage, in the form of CNE and FP manifests itself in the intensification, privatisation, technologizing, deskilling, feminization and the low status of the work of the teacher educators. These are located in the teacher educators themselves, and are reflected in their acquiescence to their disempowerment.

[6]Educational and attitudinal barriers.

[7]These included a shortage of funding, a lack of facilities and apparatus at the institutions, time constraints and barriers of an organisational nature relating to safety of students.

The constraints manifest themselves in the absence of the mechanisms through which the impact of the formal education system of the former government[8] on the environment can be critically interrogated and comprehended, since transformation is contingent on an understanding of the roots of the problem. This view of the researcher finds support in the writing of, for example, Chisholm and Motala (1995) and Parker (1993; 1995). These barriers, in conjunction with the various shortcomings established in the research (subsequently discussed), form the basis of a suggested framework for the incorporation of education for sustainable living into initial teacher educations in the Western Cape.

7.2 THE INFLUENCE OF THE TEACHER EDUCATORS: CONCLUSIONS AND RECOMMENDATIONS

An analysis of the data obtained in both multisited case studies indicated that teacher educators wield considerable influence on existing environmental education within initial teacher education with regard to their formal qualifications, involvement in environmental organisations and primary school teaching experience. In terms of education for sustainable living, and the macro, meso and micro level changes necessary for the transformation of teacher educator practices an analysis of these practitioners' practices in this realm exposed serious flaws and shortcomings. What is of particular concern, however, is that much of the teacher educator corpus is characterised by a degree of apathy reflected in the fact that whilst numerous interviewees, due to unsatisfactory circumstances[9], did not hold any formal qualifications in the area of environmental education (see sections 5.1.1; 6.1.1), they have generally made little effort to broaden their knowledge base, or interest, by participating in environmental education organisations. Furthermore, the actual pedagogical encounter between teacher educators and student teachers has to, by default, be deficient since the majority of the former entirely lacked any form of primary school teaching experience. Consequently, student teachers essentially become 'trained' (see section 3.3.1) to impart, often, a body of unproblematised facts to children, in uncritical and pre-determined ways,

[8] It is the view of the researcher, which is supported by, for example (Tickly 1994), that a critical interrogation of Western capitalist ideology, with its individualistic, materialist and socially divisive orientations, which formed a basis for apartheid structures, needs to be included here.

[9] Included are the failure of the former government to secure a policy for environmental education in the formal education system, the lack of an ethos and national policy for INSET (Hofmeyr 1991), factors related to the powerlessness of the teacher educators (Van den Berg 1994), and others mentioned in chapter five, particularly in sections 5.4 and 5.5.2.

transmitted in the didactic components of their courses. In so doing the students, and also the teacher educators, perpetuate the reproductive nature of the curriculum (Giroux 1990- see sections 3.4.1; 3.4.3.1).

In addition, directly related to the kind of 'training' received by the teacher educators which, as Van den Berg (1994: 38) articulates, has left them "intellectually stunted by Fundamental Pedagogics" (see section 3.1.1), and which lies at the core for their reactionary resistance and subservience to external restraints regarding the content and governance of schooling[10] is not conducive to the introduction and implementation of meaningful environmental education programmes[11]. Education for sustainable living is in direct conflict with the "paternal, authoritarian and essentially non-critical" (Van den Berg and Meerkotter 1994: 302) positivistic paradigm in which the 'training' of the teacher educators were grounded, and in which they are consequently currently operating. With these deficiencies as a backdrop, the **first conclusion** *drawn from the research is that the limited knowledge base of the teacher educators is restrictive rather than facilitative with regard to the meso level changes that are necessary for realising education for sustainable living*. By inference therefore, ***education for sustainable living within initial teacher education has to be founded on the basis of suitably qualified teacher educators who have had sufficient relevant experience***. This is **recommendation one** put forward from this research.

Possibly of even greater importance regarding the influence of teacher educators in environmental education within initial teacher education is their ideological orientations in environmental education (see sections 5.1.2; 6.1.2). These ideological orientations are embedded within the macro level challenges for the realisation of education for sustainable living and lie at the root of the shape, substance and direction of teacher educators' practices. In relation to their ideological perceptions, in terms of education for sustainable living, the research found that the majority of interviewees do not locate the roots of the environmental crisis in the social, economic and political systems since their general understanding of environmental education is apolitical and neutral, centred in conservation and knowledge about the environment. This signifies a lack of insight necessary for implementing education for sustainable living, which would further the aims of

[10] These are manifested in an analysis of their responses which are characterised by an uncritical acceptance of the status quo, a position which tends to reflect the material comfort which their status affords them, but which could be jeopardised should they venture into any form of departure from the hegemonic mainstream (Van den Berg 1994).

[11] This idea will be taken up shortly; however, in brief, it relates to a reconceptualisation of environmental education.

democracy and social justice (see sections 5.1.2.2; 6.1.2.1; also **Tables 5.1; 5.2; 6.1**). In addition, the apolitical and neutral perceptions of education of many of the interviewees was reaffirmed in that many of them ignore the inclusivity of the curriculum (see section 3.1.4), so vital in terms of redressing the still rampant inequalities of the past (see sections 5.1.2.3; 6.1.2.2 also **Tables 5.3; 6.2**). Furthermore, their suggestions for a curriculum framework for environmental education reflect the science perspective (corresponding to their understanding of environmental education), a perception of environmental education which does not seek to uncover the roots of the environmental crisis in its broader social, political and economical context (see sections 5.1.2.4; 6.1.2.3 also **Tables 5.4; 6.3**).

From the above findings, the **second conclusion** *drawn from this research is that the environmental ideological orientations of the teacher educators are not conducive to the furthering of education for sustainable living practice within initial teacher education*. These deficiencies span those insights central to realising the macro level challenges for the transformation of environmental education (as currently formulated) into education for sustainable living. As such, they point to **recommendation two** put forward from this research, which suggests that ***teacher educators be exposed to, and to engage with, socially critical educational*** (see section 3.1.2) ***and ecosocialist environmental*** (see section 3.1.3; 3.1.4) ***ideologies.*** Implicit within this requirement is the need for the reconceptualisation of the curriculum, which is central to the education process, including the education of teachers (see section 3.4.1). The curriculum needs to be conceptualised in terms of inclusivity, which is an important vision in terms of redress in South Africa, in order to foster the functioning thereof in terms of a language of critique and as a discourse of possibility (Giroux 1990; Giroux and Simon 1984 see sections 3.4.1 and 3.4.3.1). ***The reconceptualisation of the curriculum, in terms of inclusivity***, thus forms **recommendation three** put forward from this research.

7.3 EXISTING ENVIRONMENTAL EDUCATION COURSES: CONCLUSION AND RECOMMENDATION

An analysis of the data regarding the status of environmental education at initial teacher education level (for multisited case study one) indicates a number of crucial inadequacies. Central to the findings of the research was the fact that environmental education does not form part of the initial teacher education curriculum for many of the colleges of education in the Western Cape (multisited

case study two) when the data for the research was collected[12] (see section 5.2.1.1 and **Table 5.5**). Furthermore, while the lack of policy for environmental education (see section 3.2.2), and the fragmented, apolitical and uncritical nature of the Apartheid education system (see sections 3.1.1; 3.3.2) can be perceived as impediments in the way of change at macro level, the challenges for the realisation of education for sustainable living at macro level are interlinked with those at meso and micro levels. The impediments obstructing change at meso level include a lack of participation of student teachers (as well as of schools and communities) in the formulation (see section 5.2.2) and evaluation (see section 5.2.3) of most of the courses. Consequently, many of the environmental education courses are presented as a set of externally determined and imposed facts that had to be mastered, and bore little relation to environmental needs at grassroots level.

At micro level, however, due to curricular and time-tabling constraints, few students are afforded the opportunity to include environmental education in their teacher education courses (see section 5.2.1.2). In many instances, environmental education is linked to the natural and earth sciences, which perpetuates technocratic rationality (see section 5.2.1.2). Furthermore, most of the environmental education course presenters mentioned that a lack of time is a problem (see section 5.2.1.3). While time constraints are viewed as a micro level challenge for change, this barrier is rooted in the bureaucratic nature of the education system, and may also be viewed as an impediment ascribed to the powerlessness of the teacher educators (see section 5.5.2; **Table 6.9**).

In short, most of the environmental education courses reflect the fragmented, content and exam-driven nature of the curriculum. Therefore, the **third conclusion** *that is drawn from this research, is that the infrastructure, functioning, development and evaluation for many of the existing environmental education courses reveal a number of impediments in the way of the changes necessary for the realisation of education for sustainable living at macro, meso and micro levels.* Thus, resulting in **recommendation four** put forward from this research, these flaws reflect ***the urgent need for alternative approaches to curriculum development***. Such approaches, in the opinion of the researcher, need to be underpinned by principles such as participation and collaboration. Furthermore, it is argued by the researcher, who also finds support in the sentiments expressed by, for example, O'Donoghue and McNaught (1991) and Wagiet (1996) that curriculum

[12] The fragmented nature of teacher education (see sections 3.1.1; 3.3.2) is manifested in the fact that some colleges of education were allowed greater 'freedom' to implement curricular innovations, like environmental education. However, it is only since 1995 with the COTEP (1995) document that environmental education has been able to be introduced into initial teacher education programmes for all colleges of education South Africa (see sections 3.3.2; 3.4.3.2; 3.4.3.3 for critique on COTEP (1996) document.

development must be grounded within local, relevant and critical grass-roots practice, as opposed to the expert-driven, externally controlled RDDA approach (see section 3.4.3.1). Moreover, the researcher suggests that the aforementioned principles need to be established as a function of curriculum policy. In summary, outside of securing the necessary policy for environmental education for all levels of the formal education system (see section 3.2.2), curriculum development in the light of education for sustainable living should take place at local, rather than at expert-driven level.

7.4 ENVIRONMENTAL EDUCATION COURSES IN PRAXIS: CONCLUSION AND RECOMMENDATION

Practitioners' praxis is necessary for realising change at all levels (see sections 3.1.4; 3.3.1; 3.3.3). However, an analysis of practitioners' praxis reveals several barriers in the way of the changes that are necessary for the realisation of education for sustainable living.

In multisited case study one, even though a variety of teaching strategies were employed by many course presenters, the absence of a student voice in determining the content and methodology of their environmental education courses means that true critical praxis is not in place at the vast majority of the institutions (see section 5.3.1). In addition, most environmental education projects incorporated outdoor education and involved activities like conservation and biophysical environmental issues (see section 5.3.2; and **Table 5.6**), which signifies conceptual ambiguities as to the true nature of environmental education. A similar situation was reflected in the nature of the projects analysed for multisited case study two (see section 6.2.2 and **Table 6.7**).

Another neglected area (in multisited case study one) where true critical praxis is not in place, is practice teaching (see section 5.3.3). The dysfunctional notion of schooling, a lack of formal policy, and close collaboration between the schools and the teacher education institutions perpetuate uncritiqued practice. Also, due to the nature of the initial teacher education curriculum, student teachers are (according to the teacher educators) lacking in conceptual foundations (local relevant issues, environmental concepts, and education in the environment activities) and professional competencies (linking theory to practice, critical analysis and problem-solving strategies) necessary for critical reflection.

In multisited case study two, the institutional influences and enabling infrastructures within and

among the different colleges of education in the Western Cape point towards a dearth of critical praxis (see section 6.3.1). In the absence of both an ethos for environmental education and the infrastructures to nurture collaboration, it is unlikely that critical praxis (imperative for realising the potential for education for sustainable living) will be furthered. In this regard, the prevalent ethos for environmental education at these institutions is not conducive to furthering the necessary changes required for education for sustainable living, as reflected by the infrastructures (teacher educators' subject associations) for collaborative practice and institutional networking (see section 6.3.2), environmental education activities (see section 6.3.1) and, resources (see **Table 6.8**). Moreover, many of the teacher educators work in isolation, perpetuating privatisation and intensification (see section 5.5.2) of their work.

The shortcomings outlined point to the **fourth conclusion** *drawn from the research: that teacher education practice, informed by critical reflection, is almost totally absent from current initial teacher education programmes*. That critical praxis is fundamental to the transformative goals of education for sustainable living which, in itself is necessary for addressing the structural roots of our current environmental crisis goes virtually without saying (Beyer 1991; Fien 1992; Grundy 1987; Huckle 1993; McTaggart 1991). In the opinion of the researcher, which finds support in the assertions echoed by, for example, Beyer (1993) and Ensor (1995), the realisation of critical, praxis-driven teacher educator practice calls for mechanisms through which practitioners can be made aware of the issues and outcomes which underpin their pedagogical encounters with their students.

Regarding the outcomes of the pedagogical encounters between teacher educators and students, reference needs to be made of those essential outcomes which, in the view of the researcher, are relevant to education for sustainable living. Included are the essential outcomes[13] towards the realisation of which teacher educators and student teachers should aspire, namely, to:

- act in a manner which reflects human dignity, justice and democratic values (UBUNTU see section 2.5);
- interact effectively and acknowledge diversity;
- collect, analyse, organise and critically evaluate information;
- learn ways of more meaningful and effective communication;
- use science and technology critically, showing responsibility towards the environment and health of others;

[13]Adapted by the researcher from the *Curriculum Renewal Bulletin:* 1 (WCED 1996: 2).

- make informed choices for healthy and responsible living;
- understand the world, and function as a global citizen;
- pose and solve problems using critical and creative thinking;
- participate in political, social, economic and cultural processes; and,
- learn how to learn.

It is the view of the researcher that ***teacher educators and students can utilise these essential outcomes as a yard-stick to reflect on their pedagogical encounters as a means to further critical praxis, a central feature of the 'inquiry-oriented' teacher education approach which is concerned primarily with furthering and developing both teacher educators' and the student teachers' capacities for reflective action*** (see section 3.3.1). As such, the furthering of critical praxis comprises **recommendation five** put forward from this research.

7.5 PROFESSIONAL DEVELOPMENT OF THE TEACHER EDUCATORS: CONCLUSION AND RECOMMENDATION

In the opinion of the researcher, which is also expressed in the work of, for example, Davidoff et al. (1995); Grundy (1987); Kelchtermans and Vandenberghe (1994) and Schofield (1995), professional development in the sphere of education can be viewed as an 'intervention' that may lead to the enrichment and quality of teacher educators' practice. However, the analysed data in this study, in terms of key factor four for both multisited case studies, (see sections 5.4; 6.4) points to the **fifth conclusion** *that can be drawn from this research: that neither professional development programmes nor a semblance of established infrastructures required for their functioning are in place*. In the context of South African realities[14], this situation is clearly untenable. Consequently, there is a distinct need for ongoing professional development programmes, not only for environmental education but for all areas of the curriculum, where teacher educators can reflect critically (and collaboratively) on their practice. And given the vastness of the current teacher educator system, all of which is mainly characterised by outdated practices, professional development should form an urgent aspect of a renewed teacher educator programme for education for sustainable living.

[14] i.e. the abysmal 'performance' of learners at school (Motala 1993), as well as the environmental crisis that threatens to overcome us (Ramphele 1991).

Based on the findings of this research, it is the view of the researcher that professional development programmes for education for sustainable living form the fulcrum to realise recommendations one to five as put forward in preceding sections 7.2 - 7.5. Of profound importance in addressing the lack of professional development programmes, as well as the infrastructures necessary for the functioning of these, is a reformulated approach to INSET, a view of the researcher which concurs with those of, for example, Schofield (1995), Robinson (1994), and Davidoff et al. (1995). The insights of a number (though a distinct minority) of interviewees who participated in this research indicate some possible foundations for a reconceptualised INSET[15] in their contention that it has to be ongoing, relevant, critical, participatory, and, enquiry based (see sections 5.4; 6.4). Structures, however, need to be created to bring all stakeholders together, so that education for sustainable living programmes can be developed in a collaborative manner, an important factor in terms of the philosophy of education for sustainable living. This, in the opinion of the researcher, calls for a networking partnership with the provincial education department, inter-collegial infrastructures, unions, professional organisations and the NGOs. In short, the **sixth recommendation** put forward from this research is the call for ***the official implementation of professional development programmes, to further the realisation of education for sustainable living into initial teacher education in the Western Cape.***

7.6 A SUMMARY OF THE MOTIVATIONS BEHIND THE NEED FOR A STRATEGY TO REALISE THE CHANGES NECESSARY FOR EDUCATION FOR SUSTAINABLE LIVING

The alternative approaches to teacher education demanded for the realisation of education for sustainable living require dramatic changes at various levels of the education system, as well as within the broader societal structures. Furthermore, they are needed to unite all stakeholders in a common purpose. Several barriers will have to be overcome if these changes are to be realised. Implicit in the striving to transcend these impediments is for stakeholders to deal with the prevailing situation in environmental education, while simultaneously working to build an alternative to it. At bottom, alternative approaches to teacher education call for a renewed vision for education and, more specifically, for teacher education, where the teacher educators become active, critical agents of change. Notwithstanding the uncertainty and disarray in which the teacher education profession

[15] What is noteworthy about their perceptions is that they echo widely recommended guidelines for professional development in environmental education (Huckle 1995; Robottom 1987a; UNESCO-ACEID 1994).

finds itself at the moment, it is the opinion of the researcher that all stakeholders need to work closely together to deconstruct and then to reconstruct the curriculum for teacher education in terms of a new (inquiry oriented) paradigm. While there is no simple blueprint for achieving this vision, a strategy to foster these changes is recommended by the researcher. In the preceding sections (7.2 - 7.5) the six recommendations put forward from this research justify the need to outline a strategy for teacher educators in the area of education for sustainable living at initial teacher education level if the flaws and shortcomings evident in the findings from this research (subsequently discussed) are to be addressed.

7.7 A STRATEGY TO OVERCOME THE BARRIERS FOR THE REALISATION OF EDUCATION FOR SUSTAINABLE LIVING

7.7.1 Introduction

The realisation of the changes necessary for education for sustainable living is a highly complex process, since it includes changes that demand redress at all levels of the education system which, in turn, cannot be separated from the dynamics of the broader society (see section 2.1). To complicate this process, the optimism that was prevalent amongst educators immediately after the 1994 elections in South Africa is, for a host of reasons, rapidly on the decline.

First, the composition of the new governance structures for education at both national and, particularly in the Western Cape at provincial level, are still inundated with officials from the former government's apartheid departments, made 'acceptable' Parker notes, with "a sprinkling of new faces, mainly from universities, NGOs and unions" (1995: 147). The upshot is the perpetuation, due to the distrust and suspicion that was created over the years, of the 'us-them syndrome' entrenched in the educators' attitude towards any innovation that emanates from the Education Department at both national and provincial level. Second, the gloom surrounding retrenchments and rationalisation has added to the decline in optimism. Furthermore, the rationalisation that many colleges are facing at this very moment dampens the chances of success of many innovations such as the incorporation of education for sustainable living into the curriculum for initial teacher education. Third, much misgiving has emanated from the manner in which many of the interim subject/ syllabus committees steamrolled ahead without securing true participation. For many, their modus operandi depicts a fraudulent democracy in that the ex-House of Assembly agendas were bulldozed to take the reigns for the interim period. An example in this regard is what

is described as the 'hijack of the interim syllabus sub-committees by the old guard' *(Weekly Mail and Guardian - The Teacher Supplement* January 1996)[16]. Similar sentiments pertaining to the interim biology syllabus have been reported (Wagiet 1995: personal communication)[17]. Then, there is the issue of teacher education, currently characterised by disarray emanating from the lack of clarity regarding governance due to the unresolved national-provincial power-of-control struggle.

These are the realities of the situation. As such, they cannot be ignored. Neither can government structures, proposals and initiatives. Nor is it viable to create new structures and work in isolation: the infrastructures and resources are simply not available. These recognitions do not, however, imply that undemocratic and unjust practices should go unchallenged. A way forward is perhaps to explore the option of working with government initiatives to ensure that democracy and justice are safeguarded for the much desired transformation of the education system.

At its core, education for sustainable living demands a reconstruction of current teacher education which, in turn, has to be underpinned by the necessity for changes that will further this reconstruction, in order to secure and to sustain an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education. Policy alone cannot secure change for transformation, since transformation is, by definition, centred in the process that ought to strive for good practice, in the sense of critical praxis. The process that is suggested is largely dependent on extensive networking in a collaborative, participative and inclusive manner, to create the enabling infrastructures currently absent (see section 6.4).

7.7.2 Professional development programmes as a vehicle towards the realisation of education for sustainable living: Why?

In sections 5.1 and 6.1 it has been argued that education for sustainable living within initial teacher education cannot be realised without suitably qualified teacher educators who have had sufficient relevant experience. While this formed the first recommendation put forward from this research (see 7.2), it is recommended by the researcher that professional development programmes be the

[16] This article outlines how the interim history syllabus has been 'hijacked' by certain departmental officials.

[17] Wagiet (1995: personal communication) asserts that the intention of the interim syllabus sub-committees is to maintain the status quo under the disguise of participation. To a large extent the biology syllabus of the ex-HoA is taken as the interim biology syllabus. This favours the pupils at these schools, and maintains materials resources disparity in that these schools have secured the particular textbooks.

driving force behind the strategy in order to overcome these impediments. Without the necessary insight, it is unlikely that education for sustainable living will contribute to the alleviation of the environmental crisis that South Africa is facing. What is more likely to occur is that the technocratic rationality will be furthered. As an illustration to this assumption, see Appendix seven[18].

Furthermore, the conflicting agendas of the socially critical and ecosocialist direction of education for sustainable living on the one hand, and the role that education plays as a medium for economic and cultural reproduction on the other, pose significant problems in terms of the philosophical underpinnings and classroom practices for teacher educators. While these constraints point to the second recommendation put forward from this research (see section 7.2), it is suggested by the researcher that professional development programmes need to become the driving force behind the suggested strategy. In this regard, it is recommended by the researcher that professional development programmes be grounded in socially critical educational, and ecosocialist environmental, ideologies, so that teacher educators are exposed to, and engage with these ideological orientations in these proposed programmes. Furthermore, when teacher educators engage with each other at such forums, they can break through some of the disempowering barriers, for example the technologizing and privatisation (see section 5.5.2) of their work; furthermore, such interaction might also engender collective action to resist these forces.

Encompassed within the 'ideological challenge' is the need to reconceptualise the curriculum in terms of inclusivity. While this comprises the third recommendation put forward from this research (see section 7.2), it is also suggested by the researcher that professional development programmes for education for sustainable living be initiated to advance this reconceptualisation. However, the reconceptualisation of the curriculum also necessitates that alternative approaches to curriculum development be established, which comprises the fourth recommendation put forward from this research (see section 7.3), and, thus, also for recommending professional development programmes for education for sustainable living. It is suggested by the researcher that this 'alternative' approach be underpinned by principles such as, for example, participation and collaboration. Furthermore, this 'alternative' approach needs to be established as a function of curriculum policy (for environmental education for all levels of the formal education system), which should take place at

[18]At the college of education where the researcher works, environmental education was implemented into the curriculum for teacher education in 1996. The first year programme for environmental education was placed under the auspices of the geography department. Extracts of their final examination paper are an illustration of the content that was covered, under the disguise of environmental education.

local, rather than at expert-driven level. Finally, the research established that critical praxis, a key feature of the 'inquiry-oriented' teacher education approach (see section 3.3.1), and also the central thread for education for sustainable living, was largely lacking. The advancement of critical praxis-driven teacher educator practice comprises the fifth recommendation put forward from this research (see section 7.4), and, that professional development programmes be the driving force as a means to further education for sustainable living.

7.7.3 Process-driven approach to professional development

Professional development of the teacher educators has thus been identified as a vital area to realise the changes necessary for education for sustainable living. However, it is argued by the researcher, and supported by, for example, Elton and Cryer (1994); Fullan and Hargreaves (1992); Fullan (1994) and Jones and Lewis (1991) that professional development as an isolated event is not enough to bring about change, but that a process that will foster change needs to be considered. To this end, failures to achieve educational change often arise from strategies which are dependent on the 'converted', and which rely upon these 'converted individuals' to change the 'unconverted'. In the opinion of the researcher, based on the reason why this research was initiated (see section 1.6), this is a recipe that is doomed for failure, for change seldom comes from the group that needs to be changed. In this regard, to address the sixth recommendation put forward from this research (see section 7.5), for professional development programmes, various stages for a strategy to foster the changes necessary for the realisation of education for sustainable living are identified below. It is important to note, however, that these stages do not necessarily follow in the specific order outlined, for the change process is multidimensional and organic (see sections 2.2; 2.4; 2.6).

The first stage for devising a strategy for professional development as a process to advance the realisation of the changes required for education for sustainable living, is three-fold:

- The necessary policy as a prerequisite for devising a strategy for change is imperative. This is important for South Africa where there is no national policy for professional development (DE 1996a; b; c) generally, nor for environmental education specifically (see sections 3.2.2; 3.6).
- Policy alone does not bring about or secure change; moreover, nor does it sustain change. To facilitate and sustain change, it is suggested by the researcher that the commitment of, and support from, the educational authorities in the education department, and senior management at the specific teacher education institution, need to be secured (see section 2.6). This suggestion is supported in the writing of, for example, Dalin (1978) and Fullan

(1990).

- In the opinion of the researcher, which finds support in the sentiments expressed by, for example, Dalin (1993); Schofield (1995) and Robinson (1994), a balance needs to be struck between top-down political and structural commitment on the one hand, and grassroots participation on the other, since neither of the two in isolation is likely to sustain change (see section 2.3).

The second stage for devising an envisaged strategy for professional development as a process, to realise the changes necessary for education for sustainable living, is networking. Implicit here is collaboration and consultation with teacher educators at colleges in the Western Cape through existing structures[19], such as the Provincial Staff Association[20], the unions and other subject associations, to initiate the negotiations and pave the way for the determination of a situation analysis. While it has been established that networking is not firmly established at teacher education institutions in South Africa, particularly at the colleges of education (see sections 5.4.2), and more specifically at the colleges of education in the Western Cape (see section 6.3.2), it is an important facet to become established for a number of reasons. Included, for example, is to break through the disempowering barrier of the privatisation of teacher educators' work. Also, networking may lead to collaboration and to fostering a spirit of collegiality between the teacher educators, which might engender critical engagement that has the potential to improve their practice (see sections 5.4; 6.4). Collegiality, furthermore, should set the parameters for the establishment of a forum for environmental education involving all stakeholders in teacher education.

The third stage for devising an envisaged strategy for professional development as a process to realise the changes required for education for sustainable living, is the question of participation. It is argued by the researcher, supported by, for example, Watkins (1995), that development (including professional development) is concerned with enhancing the stakeholders' capacity to become active participants in the process of change. This demands that all stakeholders should have a voice in the process right from the start, to enable all to participate democratically in a collaborative manner. The vital role of participation has been outlined before, especially with regard to professional development (see sections 3.3.2; 3.3.3; 5.4; 6.4).

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[19] The White Paper on Education and Training (DE 1995) proposes that all stakeholders and role players be consulted for any innovations that are initiated.

[20] In June 1995, a Provincial Staff Association was launched, involving all colleges (and all sectors in college structure).

Closely interlinked with the participation facet is the issue of ownership, which forms the fourth stage for devising an envisaged strategy for professional development as a process to realise the changes required for education for sustainable living (see section 2.6). It is argued by the researcher that participation might engender ownership, and vice-versa. That ownership is a widely acknowledged facet in a strategy for realising change cannot be denied (Dalin 1978; 1993; Elliot et al. 1993; Elton and Cryer 1994; Jones and Lewis 1991; Watkins 1995). However, it is the researcher's view that true ownership evolves during the change process, rather than being firmly established at the start. Furthermore, ownership might foster a sense of accountability and commitment to change, a view of the researcher which concurs with that of other educationalists, for example, Dalin (1993); Davidoff et al. (1995) and, Fullan (1994).

Once a forum has been established, the agenda for professional development programmes (in the light of securing and sustaining change) for the teacher educators for education for sustainable living can be jointly negotiated by all stakeholders. This is the fifth stage for devising an envisaged strategy for professional development as a process for realising the changes required for education for sustainable living. Aspects that need to be built into such negotiations, in the opinion of the researcher, and supported by other writers, for example, Dalin (1993); Davidoff et al. (1995); Fullan (1994) and Wagiet (1996), is that an agenda for change needs to take into cognisance the contextual realities. This brings into question the issue of flexibility. Implicit here is that a negotiated agenda needs to be flexible to adapt to the specific needs of the stakeholders in a specific context. Furthermore, it is suggested by the researcher that the issue of accessibility, particularly with regard to language and location, needs to be given serious consideration when an agenda for professional development programmes (in the light of securing and sustaining change) for the teacher educators for education for sustainable living are negotiated.

7.7.4 Professional development programmes as a vehicle towards the realisation of education for sustainable living: How?

In the view of the researcher, the nature of professional development programmes for education for sustainable living should conceptualised so as to foster capacity-building in the participants, so that they can become actively involved in furthering social change via the transformation of their practice. Implicit is the need to reconceptualise the curriculum in terms of inclusivity and, as an extension of this reconceptualisation of the curriculum, is the need for an alternative approach to curriculum development.

Established from this research (see sections 5.4; 6.4), and agreed upon by several environmental educators (Fien 1993; Greenall-Gough 1993; Huckle 1995; Robottom 1987a: 114-5), professional development programmes to further environmental education practice in a socially critical sense, (which is in line with the agenda of realising the challenges posed by education for sustainable living) should be:

- ongoing, rather than one-off interventions;
- enquiry-based, in that they should stimulate environmental educators to adopt a research stance to their practices;
- participatory and practice-based;
- critical, in that they ought to critique the values and assumptions that inform environmental education policies, activities and practices;
- community-based, linked to the specific, local environmental and educational problems; and,
- collaborative, in that collaboration assists practitioners to recognise and counter "false consciousness" and can further collective action necessary to resist the forces, often political in nature, which hamper environmental transformation.

In South Africa (and the rest of the world), teacher educators are faced with the challenge of equipping future teachers with the skills and values that are necessary to transform the dominant, uncritical and often disempowering patterns (embedded within the notion of schooling), of current school practices (see section 3.4.2). This calls for critical reflection by teacher educators on their practices, so that these are exemplary and worthy of emulation by their student teachers when they enter the field. Such critical reflection is central to professional development for environmental education to further critical praxis, which is pivotal to secure and sustain the changes (at all levels) demanded for the realisation of education for sustainable living at initial teacher education level.

Furthermore, professional development for the advancement of critical praxis for teacher educators, should not take place in isolation from the student teachers. Such programmes should run concurrently with institutional curriculum research and development programmes, where students at the different institutions need to be drawn into the process from the start. The role of the universities will also have to be negotiated. In the Western Cape, the expertise available at the two universities (and two colleges) where environmental education is offered at initial teacher education level will have to be drawn into the process. Curriculum research and development should be

accompanied by materials development[21], and all materials could be placed in a bank where everyone can have access to them. This could lead to the development of an environmental education resource centre, that should not only be accessible to the teacher educators and other stakeholders, but also driven by them. Ideal sites for such centres are the Teachers' Centres in the Western Cape, which were primarily utilised by teachers from the ex-HoA Education Department in the past. Furthermore, negotiations with publishers should be set in motion in order to facilitate the publication of resources.

7.8 EDUCATION FOR SUSTAINABLE LIVING: RECONSTRUCTING THE PARADIGM

7.8.1 The challenges inherent in current policy

Crucial for education for sustainable living at initial teacher educator level is that maximum potential, for two main reasons, be derived from the current interregnum. The first is that the potential of education for sustainable living to address the environmental crisis cannot be denied. This study has made that abundantly clear. The second is that education for sustainable living can contribute to the realisation of real change, change which would further the transformation of our conflict-riddled and inequitable society towards a more democratic and just one. However, two central questions which require confrontation, underlie this pedagogy of potential: the procedural strategy regarding implementation, and the ideological perspective which should underpin environmental education, both of which are, irreducibly, questions of policy. Consequently, any strategy for a new education innovation needs to take cognisance of existing education policy.

Education policy in South Africa has come under renewed scrutiny since 1992 when the politics of conflict and struggle were supplanted by the politics of negotiation and reconstruction (Jacklin and Kruss 1995). In this light, the critique levelled against the existing education policy is especially important in terms of environmental education since environmental education is now at the cross roads where policy is on the verge of being developed. With regard to the eight areas of learning that have been proposed for general education and training in the *Draft Document Curriculum Framework for General and further Education and Training* (DE 1996a see section 3.4.3.4) and the

[21] In the research it was established that there was a scarcity of resources for environmental education (see section 6.3.1).

subsequent *National Policy on Learning Programmes and Related Matters for General and Further Education and Training* (DE 1996c) environmental education has been excluded. While there is a great possibility to incorporate education for sustainable living into each of these areas, the eight Learning Area Committees (LACs) that have been established to identify a number of focuses in each of the eight proposed areas of learning (DE 1996c), need to include environmental education as an area of focus for teachers. If not, the danger exists that environmental education will very likely be marginalised and left to the natural sciences to pursue.

Any new policy developmental initiative needs to focus on the shortcomings of the policy documents in current use to ensure that the former do not become a reactionary manifestation of the latter, since conflict and struggle rather than the innuendos of negotiation and reconstruction still have to characterise the domain of environmental education. The *White Paper on Education and Training* (DE 1995), as the most influential policy document for education, is a case in point. Supposedly a progressive document, designed to lead education out of its current impasse, it has been criticised (see section 2.5) for lacking an alternative, relevant and realistic African vision (Parker 1995). In addition, Chisholm and Motala (1995) outline two further weaknesses regarding its claim of support for participatory process to policy development. They point out first, that it fails to outline the institutional mechanisms, structures and resources to safeguard true participation in the formulation of national policies by those operating outside of government.

Secondly, and closely related to the aforementioned critique is that there has been an altering in the perception of what constitutes participatory democracy. In this regard, while consultation of all stakeholders was of immense importance for the establishment of the Government of National Unity (GNU), the current negotiations with GNU officials is now employed to renegotiate[22] the gains made in education prior to the 1994 elections. This brief critique serves as a powerful point of departure to outline the strategy and the ideological perspective for environmental education - as education for sustainable living. Furthermore, the assertion that colonialism and marginalisation[23] act as substantial barriers to the successful implementation of education for sustainable living in teacher education in the Asia-Pacific Region (Greenall-Gough 1993) are entirely valid for South Africa. This ties in with Parker's (1995) critique of the *White Paper on Education and Training* (DE 1995 - see also sections 3.1.4; 3.3.2), and points to the need for education for sustainable

[22] This leads to a redefinition of participatory democracy.

[23] Greenall- Gough (1993) argues that statements about environmental education at international level have largely been driven by a Western, Eurocentric, industrialized, male and English-speaking worldview.

living to include and deliberate on the practices by which indigenous people lived sustainably prior to colonisation and Western imperialism. In so doing, an appreciation of the value of indigenous people's knowledge, in addressing the problems that are caused by unsustainable lifestyles and land-use practices, may be advanced. Moreover, education for sustainable living has the potential to make the voices of the people from the margins more audible, and to ensure that these be heard.

While the *White Paper on Education and Training* (DE 1995), as the most influential policy document for education broadly, the COTEP[24] (1996) document serves as a guiding document for 'norms, standards and governance' for teacher education specifically. Outside of the issues[25] that cloud the functionality of this document (see section 3.3.2), the different fields of study enunciated in the COTEP (1996) document, show certain pitfalls[26] (see sections 3.3.2; 3.4.3.2) as well. An assumption that can be made in this regard is that the old system of CNE (see section 3.1.1) has 'wormed' its way back into the new policy of teacher education. This brings into question how officials, who implemented apartheid education, and who are still functioning in key role playing positions can be expected to play a central role in introducing an alternative education - which, in certain instances, is in direct conflict with their previous ways of thinking and doing. In addition, there are problems associated with the philosophical and ideological orientation of environmental education as depicted in this document. Furthermore, the COTEP (1996) document articulates a behaviourist notion of governance in its subscription to a 'top down' hierarchy of authority and accountability. In this respect, it largely ignores the proposals for more critical and active problem-solving approaches, fundamental to education for sustainable living, as a strategy to confront the environmental crisis.

If one of the goals of education for sustainability is to contribute to the transformation of education, true democratic participation (Chisholm 1995), rather than representative participation (Chisholm and Motala 1995) is required for all to engage actively and critically to address the environmental crisis. However, for this, the teacher educators need to break through the barriers that underpin

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[24]COTEP - Committee for Teacher Education Policy is explained in section 3.3.2.

[25]The lack of consultation, particularly relating to ex-HoR colleges in the Western Cape, has resulted in a situation where no guidelines or support structures are available to teacher educators at these colleges for the development of new curricula for initial teacher education.

[26]As an example, the introduction of Professional studies, a field of study which encompass a wide array of proposed disciplines (see section 3.3.2), including the development of environmental literacy can be viewed as a stop gap to fulfil the requirements of the professional objective. Furthermore, religious education is elevated to a compulsory field of study, which is contradictory to the suggestions from COTEP, that colleges devise their own curricula

their powerlessness. By participating collaboratively, the teacher educators will have a better chance to reflect critically on their practice, collectively make meaning of the environmental crisis, and identify ways to solve it, which is what emanated from their collective recommendations regarding professional development programmes for environmental education. True democratic participation needs to be safeguarded in education for sustainable living policy and process initiatives. The proposed strategy for education for sustainable living, (subsequently summarised) should be process driven and supported by pedagogical approaches that will move towards the mastering of hegemonic knowledge. In this regard, education for sustainable living needs to take cognisance of those pedagogical approaches (see section 3.4.3.4) underpinned by a socially-critical orientation to education, that strongly recommends a critique of the hegemonic influences (which includes knowledge) of the dominant ideology.

7.8.2 Synopsis of conclusions and recommendations: Towards a strategy to realise the changes for education for sustainable living

Pivotal to this research is to explore the potential for the implementation of education for sustainable living, and to identify a strategy for this for initial teacher education in the Western Cape. The following **conclusions** are drawn from this 'exploration':

1. The limited knowledge base of the teacher educators is restrictive rather than facilitative with regard to the meso level changes that are necessary for realising education for sustainable living.
2. The environmental ideological orientations of the teacher educators are not conducive to the furthering of education for sustainable living practice within initial teacher education.
3. The infrastructure, functioning, development and evaluation for many of the existing environmental education courses reveal a number of impediments in the way of the changes necessary for the realisation of education for sustainable living at macro, meso and micro levels.
4. Teacher education practice, informed by critical reflection, is almost totally absent from current initial teacher education programmes.
5. Neither professional development programmes nor a semblance of established infrastructures required for their functioning are in place.

In the light of the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape, these conclusions point to the following **recommendations** put forward from this research:

1. Education for sustainable living within initial teacher education has to be founded on the basis of suitably qualified teacher educators who have had sufficient relevant experience.
2. Teacher educators need to be exposed to, and to engage with, socially critical educational and ecosocialist environmental ideologies.
3. The curriculum needs to be reconceptualised in terms of inclusivity.
4. There is an urgent need for alternative approaches to curriculum development, that are
   - ongoing;
   - enquiry-based;
   - participatory and practice-based;
   - critical;
   - community-based, linked to the specific, local environmental and educational problems; and,
   - collaborative, to further transformation.
5. Teacher educators and students need to further critical praxis, a central feature of the 'inquiry-oriented' teacher education approach.
6. There is a need for the official implementation of professional development programmes to further the realisation of education for sustainable living into initial teacher education in the Western Cape. For this, the necessary enabling infrastructures need to be created and sustained.

However, the attainment of these recommendations centres on the implementation of process-driven professional development programmes, underpinned by a strategy to foster the changes necessary for the realisation of education for sustainable living. Such a strategy needs to consider the following stages (not necessarily in this order):

- securing the necessary policy;
- networking;
- participation;
- ownership;
- negotiating an agenda, which is:
  - contextual;
  - flexible; and,
  - accessible.

In short, process-driven, professional development programmes are suggested to overcome the barriers in the way of the changes necessary for the potential implementation of education for sustainable living into the curriculum for initial teacher education in the Western Cape.

The barriers, identified by this research, that are obstructing the changes necessary for the incorporation of education for sustainable living into the curriculum for initial teacher education level in the Western Cape are summarised in **Tables 7.1, 7.2 and 7.3**. In the first column of these tables respectively, the levels of change (macro, meso and micro), necessary for the realisation of education for sustainable living are outlined. While the barriers are broadly represented in the second column (i.e. those located in the formal education system, or ascribed to the teacher educators), these barriers are further elaborated on in the third column. In the fourth column suggestions, put forward from this research, are provided on how to overcome these barriers, with professional development programmes as the driving force. The barriers, and the possible suggestions on how to overcome these, are grounded in the synthesis of the theory[27] (see sections 1.7; 4.1.4), that emerged from this research. These three tables (7.1 - 7.3) collectively may be viewed as a synopsis of a suggested strategy for the incorporation of education for sustainable living into initial teacher education for senior primary student teachers at teacher education institutions in the Western Cape, which points out suggestions on the nature of such a programme, its implementation and its governance.

In **Table 7.1** a summary of the barriers obstructing the changes necessary for the realisation of education for sustainable living at **MACRO** level is outlined. Furthermore, this table provides suggestions on possible considerations to overcome these impediments, via professional development programmes. Similarly, **Table 7.2** provides a summary on those barriers obstructing the changes demanded for the realisation of education for sustainable living at **MESO** level, while also putting forward suggestions on what needs to be accomplished by professional development programmes to overcome these barriers. Finally, in **Table 7.3** the changes that are necessary for the realisation of education for sustainable living at **MICRO** level, in addition to suggestions (via professional development programmes) on how to realise these challenges, is outlined.

[27]Informed by the grounded theory approach, developed through the case study method, theory emerged from three closely related levels. For further elaboration, see section 1.7; 4.1.4; and 7.9.1.

TABLE 7.1 Addressing the Macro level changes necessary for the incorporation of education for sustainable living into initial teacher education

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MACRO LEVEL CHANGES NECESSARY FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MACRO LEVEL	
MACRO LEVEL	FORMAL EDUCATION SYSTEM	Policy: COTEP Document is conceptually flawed. Favours an apolitical, and science perspective of environmental education	Professional development programmes might enable teacher educators to participate in a collaborative and collective manner in an attempt to unpack the shortcomings inherent to this document. Teacher educators can become a pressure group, to request that the COTEP committee bring about the recommended changes that are necessary for education for sustainable living.	
		Bureaucratic nature favours Maintenance Paradigm.	Recommendations, and pressure from teacher educators' forums, to request that more democratic and just procedures be adopted by institutional administrations to move towards the radical change paradigm.	
		Ideology ridden with remnants of CNE and FP	Ongoing professional development programmes for all stakeholders, including officials from the Department of Education, where, via collaboration, they might become empowered to recognise and counter "false consciousness".	
	TEACHER EDUCATORS	Ideological orientations clouded by CNE and FP	Professional development programmes for teacher educators, that will equip them to employ ideology as a tool to embark on an ideological critique of CNE and FP.	
		Conceptualisation of environmental education is • apolitical; • neutral, • linked to the natural and earth sciences; and, • misconstrued to be perceived as conservation.	Professional development programmes that enable teacher educators to engage with ecosocialist environmental ideology, which draws on: • a worldview of the New Environmental paradigm; • the goals of ecocentrism; • a contribution from ecofeminism; • ecological sustainable development perspective; and, • those values associated with communalism and cooperation inherent to African civilisation.	Professional development programmes that enable teacher educators to engage with socially critical educational ideology, that aspire to: • liberate them from restrictions that hamper emancipation; • further the transformation towards just and democratic societies; • create new forms of knowledge, by breaking down disciplinary boundaries.

TABLE 7.1 (Cont)

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MACRO LEVEL CHANGES NECESSARY FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MACRO LEVEL
MACRO LEVEL	TEACHER EDUCATORS	Powerlessness of teacher educators' work include: • Intensification • Privatisation • Technologizing, • Deskilling • Low status and poor working conditions • Feminization	Professional development programmes may create the much needed platforms for teacher educators (and other stakeholders) to work collaboratively, to overcome the impediments that contribute to the powerlessness of their work. Also, such platforms might advance critical reflection, that is vital for the furthering of critical praxis. Furthermore, the engagement of teacher educators in such programmes might lead to the establishment of collegiality, that is vital, especially in this period of uncertainty which the teacher education profession is faced with.
		Failure to perceive curriculum in terms of inclusivity	The reconceptualisation of the curriculum, in terms of inclusivity, might be furthered via professional development programmes for teacher educators and other stakeholders. This implies that stakeholders: • acknowledges and places a great value on the position and experiences of diverse social and cultural groups; • analyses inequalities critically, and counters them; and, • identifies and strives to eliminate all barriers which frustrate the participation of stakeholders.

TABLE 7.2 Addressing the Meso level changes necessary for the incorporation of education for sustainable living into initial teacher education

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MESO LEVEL CHANGES NEEDED FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MESO LEVEL
MESO LEVEL	FORMAL EDUCATION SYSTEM	Prevailing approaches for the preparation of students at initial teacher education level is behaviouristic in nature.	Working towards the inquiry orientated paradigm, which is concerned primarily with furthering and developing student teachers' and teacher educators' capacities for reflective action. It also proposes to assist student teachers to explore moral, political and ethical issues established in day-to-day practices and thinking, in addition to the instrumental issues involved. The focal point of departure from this perspective, for both teacher educators and student teachers, is to establish not only the appropriate educational goals and experiences which may facilitate social constructions that are mediated by justice and equality, but the institutional arrangements necessary to such an exercise as well.
		Teacher education approaches does not equip students for confronting the impediments linked to the notion of schooling. Schooling functions to promote social stability, entrenched within the maintenance paradigm, thereby reproducing current social and economic inequalities.	Professional development programmes for education for sustainable living need to focus on social reconstruction, transformation and justice, in addition to ecological and social sustainability. This is in conflict with the dominant notion of schooling, because education for sustainable living undermines social stability by creating conflict, in that it challenges the interests and value systems of those who are in power. Underpinned by socially critical - educational, and eco-socialist - environmental ideology, such programmes need to equip teacher educators to challenge what is perceived to be normal, acceptable and right, by going beyond the obvious, in an attempt to find wider, historical, cultural and social explanations. Teacher educators need to employ these insights, in their interactions with their students, to prepare students for the realities that they will encounter in their future places of work- the schools.
	TEACHER EDUCATORS	Educational barriers, relates to the teacher educators' lack of competence to carry out environmental education programmes,	Via professional development programmes, teacher educators might develop the necessary competences to engage with education for sustainable living with confidence.
		Lack of experience and skills for alternative approaches to curriculum development.	Professional development programmes need to equip teacher educators with the insight and skills to engage in alternative approaches to curriculum development. Such alternative approaches are: • ongoing; • enquiry-based; • participatory and practice-based; • critical; • community-based, linked to the specific, local environmental and educational problems; and, • collaborative, to further transformation.

TABLE 7.2 (Cont)

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MESO LEVEL CHANGES NEEDED FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MESO LEVEL
MESO LEVEL	TEACHER EDUCATORS	Negative attitudes may stem from the assumption that a lack of positive attitudes towards environmental education will prevent practitioners from venturing into related activities.	Contributory factors are attributed to the powerlessness of teacher educators, as part of the deeper underlying causes from which these negative attitudes may stem. In an attempt to identify and comprehend the seemingly inherent negative attitudes towards the environment and environmental education, professional development programmes for teacher educators need to explore the area of values education.
		Lack of critical praxis	Critical praxis, fostered by critical reflection, is a fundamental dimension of professional development, and is central for the realisation of the changes for education for sustainable living, at all levels. It underpins the challenges at • micro level (what knowledge and experiences are most worth); • meso level (practice of the teacher educators); and, • macro level (it acknowledges that education is not neutral and value-free, and therefore challenges the false consciousness). Critical praxis informs a wide range of teaching strategies, for example, enquiry-based learning, values exercises, ideology critique, community involvement as well as social action. Central is the empowerment of the learners, who critically reflect on their actions.

TABLE 7.3 **Addressing the Micro level changes necessary for the incorporation of education for sustainable living into initial teacher education**

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MICRO LEVEL CHANGES NEEDED FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MICRO LEVEL
MICRO LEVEL	TEACHER EDUCATORS	Ascribed to their lack of formal education in environmental education, teacher educators have conceptual barriers, i.e. they hold a science perspective of environmental education.	Professional development for teacher educators need to advance: A critical environmental consciousness based on eco-socialist environmental ideology that is underpinned by the following four principal areas: • the socially constructed nature of the environment; • the roots of the environmental crisis are centred within the social and economic systems; • environmental problem-solving needs to be accompanied by challenging the hegemonic influences of the dominant ideology of those who are in power; and • participation within matters concerning environmental politics for all stakeholders is vital. Critical thinking and problem-solving skills; A critical eco-socialist environmental ethic; Political literacy, by focusing on the: • understanding of environmental politics; • democratic procedural value; and • action skills; and, Critical praxis.
	CURRICULUM	Values	Professional development programmes need to further the development of a critical eco-socialist environmental ethic, based on the values of: • people-people relationships (for social justice), which includes satisfying basic human needs, striving for inter-generational equity and human rights and, participation in matters to foster democracy and social justice; and • people-nature relationships (for ecological sustainability), where humans are seen as part of and interdependent with the environment, conservation practices that would promote biodiversity are ventured into, all living organisms are treated equally (interspecies equity), and, everyone should become accountable for their impact on nature (living lightly on the earth).

TABLE 7.3 (Cont.)

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MICRO LEVEL CHANGES NEEDED FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MICRO LEVEL
MICRO LEVEL	CURRICULUM	Outcomes	Professional development programmes need to consider those essential/ critical outcomes that are pertinent to furthering the goals of education for sustainable living, for example, those that aspire for teacher educators and students to: • act in a manner which reflects human dignity, justice and democratic values (UBUNTU); • use science and technology critically, showing responsibility towards the environment and health of others; • make informed choices for healthy and responsible living; • understand the world, and function as a global citizen; • pose and solve problems using critical and creative thinking; and, • participate in political, social, economic and cultural processes.
		Skills	Professional development programmes need to include activities that will develop, in the teacher educators, critical thinking and problem-solving skills. Encompassed are those skills for: • inquiry (observing and perceiving, defining and describing, analysing and explaining, predicting and evaluating, decision-making, personal evaluation and judgement); and • ideology critique (to critically analyse the ideological manifestations of the dominant social paradigm, and to identify opportunities for change, reconstruction and transformation).
		Content:	Professional development programmes need to develop in the teacher educators, the personal qualities and competences for education for sustainable living, eg.: Environmental studies competencies, which include • ecological foundations; • social foundations; • environmental investigation and evaluative skills; and, • environmental action skills.
		Evaluation	Professional development programmes ought to address the issue of evaluation (broadly perceived), that will equip teacher educators to employ a variety of evaluative strategies, in a continuous and ongoing manner. These evaluative strategies need to be empowering, in order to facilitate the professional self-development of the practitioners. An evaluation structure of this type demands that the technicist systems of the past, which included 'inspection' in the form of tests, observation and assignments, be abandoned. Instead, action-based projects, interviews and critical self reflective strategies need to be considered. In short, a more process-oriented evaluation strategy is proposed.

TABLE 7.3 (Cont.)

LEVEL OF CHANGE	BARRIERS OBSTRUCTING MICRO LEVEL CHANGES NEEDED FOR EDUCATION FOR SUSTAINABLE LIVING		PROFESSIONAL DEVELOPMENT AS A POSSIBLE MEANS TO OVERCOME THE BARRIERS AT MICRO LEVEL
MICRO LEVEL	LOGISTICAL	Time constraints;	Professional development that aspire to counter institutional bureaucracy, which contributes to the powerlessness of teacher educators, might assist to overcome this barrier.
		Lack of facilities and resources	When networking is established between various teacher education institutions, negotiations for exchange of resources and facilities can be set in motion.
		Shortage of funding	Fundraising, and exchange of resources can be negotiated when institutional networking has been established .
		Organisational problems during fieldtrips	Teacher educators need to become competent and confident to embark on education *in* the environment activities to overcome this barrier. Professional development programmes for teacher educators need to include education *in* the environment experiences.

	Absence of enabling infrastructures to initiate, and sustain professional development programmes for teacher educators and other stakeholders, in the area of education for sustainable living.		To initiate process-driven, professional development programmes for teacher educators, the various stages for a strategy, to foster the changes necessary for the realisation of education for sustainable living, is identified. However, in practice, the stages, subsequently outlined, does not necessarily follow in this specific order, for the change process is multidimensional and organic
			• Securing the necessary policy;
			• networking;
			• participation;
			• ownership;
			• negotiating an agenda, which is:
			  • contextual;
			  • flexible; and,
			  • accessible.

7.9 REFLECTIONS ON THE RESEARCH

7.9.1 Aim, underlying assumptions and objectives

- The Aim

In an attempt to evaluate this thesis, and the research that constitutes the thesis, a critical reflection of the extent to which the aim and objectives of the research have been met is now undertaken. The aim of this thesis, namely to explore the potential for the implementation of education for sustainable living for initial teacher education for senior primary school student teachers in the Western Cape, and to identify a strategy for this has, in the view of the researcher, been achieved. The realisation of the aim was twofold. First, this thesis has demonstrated, via the four key factors (see section 4.5.3) for multisited case studies one[28] (see sections 5.0; 5.1; 5.2; 5.3; 5.4) and two[29] (see sections 6.0; 6.1; 6.2; 6.3; 6.4) what the crucial areas are that influenced the potential for education for sustainable living (positively or adversely see sections 7.1- 7.6) at the various sites. Second, the aim has been realised in that a strategy to further the potential implementation of education for sustainable living, has emerged from the research (see section 7.7; **Tables 7.1; 7.2 and 7.3**).

However, in regard to the strategy to further the potential implementation of education for sustainable living, two important dimensions have been overlooked. The first is linked to the question of policy. It has been argued by the researcher (see section 7.8) that any strategy for a new education innovation (also the potential implementation of education for sustainable living) needs to take cognisance of education policy. Given the bureaucratic nature and externally controlled teacher education system in South Africa (see sections 3.1.1; 3.3.2), an aspect that might have contributed significantly to the data (and thus the realisation of the aim) in this research, is the incorporation of the views of curriculum policy makers, specifically in the Western Cape Education Department. While the justification for having interviewed the rectors as key persons who determine policy at

[28] For multisited case one, the key factors identified were the influence of the teacher educators (course presenters); environmental education courses functioning at a specific site; praxis of environmental education; and, professional development of the teacher educators.

[29] The key factors identified for the second multisited case study included: the influence of the teacher educators; an exploration of the bearing of the existing subject areas in the teacher education curriculum on environmental education; an examination of the institutional influences, and enabling infrastructures for environmental education that exist within and between the different colleges of education; and, the aspect of professional development of the teacher educators.

the various colleges of education in the Western Cape during the research (see section 4.7.2), they are merely responsible for institutional management policy, rather than for the formulation of curriculum policy. The inclusion of the views of curriculum policy makers might have added significantly to the data on the changes necessary for the realisation of education for sustainable living at macro level. Second is the exclusion of the students' voice. The tentative formulation of a working strategy for the implementation of education for sustainable living could have been much more valuable had the visions, needs and fears of this major sector of the potential audience been incorporated. The student voice might have contributed substantially to shed further light on the challenges for realising education for sustainable living at meso (for example the approaches to initial teacher education) and micro levels (i.e. curricular matters) for change.

- Assumptions

This aim was based on three closely related assumptions (see section 1.6). These assumptions, are both valid and questionable. It is valid, since both the roots of problems manifest in society, and their solutions, are often ascribed to the education system. The reconceptualisation of the environmental crisis as one of unsustainable ways of living, and the discourse on this crisis, likewise calls for education for sustainable living to solve the crisis. The validity of these assumptions, is, on the other hand, ironically questionable in the light of the challenges embedded within the notion of schooling (see section 3.4.2). The latter portrays some of the constraints that underscore the realisation of changes, thus bringing into question whether colleges of education (that function along the same lines as schools - see section 2.1) are ideal sites to further the changes that are fundamental for the realisation of education for sustainable living. On the contrary, education for sustainable living in teacher education is concerned with social reconstruction, transformation and justice, as well as with ecological and social sustainability, which is in conflict with the dominant notion of schooling. Furthermore, inherent to the philosophical underpinnings of education for sustainable living, is the enhancement of critical praxis (see sections 3.1.4; 3.3.1) that strives for a theoretically informed practice, to be furthered by critical reflection, rather than to reproduce and perpetuate the status quo inherent in the notion of schooling.

Nevertheless, in regard to the debatable aspect of the appropriateness of colleges as sites for realising change, this thesis has, in the opinion of the researcher, demonstrated the complexity, underpinned by several challenges, with regard to securing and sustaining an appropriate and sound ethic for sustainable living within education. The thesis has also demonstrated that the realisation of the changes at macro, meso and micro levels necessary for education for sustainable living demand

a reconstruction of current teacher education, in order to secure and to sustain an appropriate and sound education ethic to form the basis of a transformative teacher education curriculum for sustainable living within initial teacher education. These demonstrations strengthen the validity of the assumptions in which this research is grounded.

- Objectives

While an evaluation of the extent to which the objectives of the research have been met has been outlined in chapters five (see section 5.6) and six (see section 6.6) respectively, the relationship between the objectives and the grounded theory approach, is now reflected on. Informed by the grounded theory approach, that was developed through the multisited case study method, the emergence of theory which informed the aim of the research in relation to the underlying objectives occurred at three, closely related levels.

Level one generated theory that emerged from the research data (chapters five and six), that explained the status of environmental education at tertiary institutions in South Africa where it is formally implemented for senior primary student teachers, satisfying objective one (see sections 5.1- 5.4). Furthermore, level one generated theory pertaining to the status, which highlighted those aspects that facilitated the incorporation of education for sustainable living into the curriculum for initial teacher education in the Western Cape, satisfying objective two, (see sections 5.1 - 5.4). Also, theory generated at this level shed light on what the major influences are at the colleges of education in the Western Cape that had a bearing on the possibility of incorporating education for sustainable living into the curriculum at these institutions, satisfying objective three, (see sections 6.1 - 6.4). Finally, theory generated at level one highlighted what the barriers are that might impede the incorporation of education for sustainable living into the initial teacher education curriculum, satisfying objective four (see sections 5.5; 6.5).

Level two pertained to the theory, in the light of education for sustainable living, that emerged from a review of the theoretical terrain, pertinent to the parameters of the research (see chapter three), and which were applied at two interrelated levels. First, it resulted in the development of a theoretical framework to guide the analysis of the data (see section 3.1.4), and, second, it outlined the challenges that stood in the way of securing and sustaining an appropriate and sound education ethic to form the basis for a transformative teacher education curriculum for sustainable living within initial teacher education (see section 3.6).

Level three included a synthesis of the theory that emerged at both levels one and two. The synthesis of the theory was considered in relation to the changes demanded for realising education for sustainable living at initial teacher education and the theory that emerged from the data. This theory was employed and resulted in the suggested strategy for the incorporation of education for sustainable living into initial teacher education for senior primary student teachers at teacher education institutions in the Western Cape, which included suggestions on the nature of such a programme, its implementation and its governance, satisfying objective five (see sections 7.7; 7.8.2 and **Tables 7.1 - 7.3**). The realisation of the objectives formulated for this research may serve as a means of justifying the setting of these.

7.9.2 Reflections on method, methodology and techniques

The reasons for the researcher's selection of the methodology that underpins this research (see section 4.1.3), and of the sites for the two multisited case studies have been justified (see sections 1.6; 4.2.4). The selection of the research sites was based on the aim of the research which, in turn, was underpinned by five objectives as outlined in section 1.6. In section 4.8 the research methodology, method and techniques were critically reflected upon. Negative aspects concerning the collection of data, which relate, for example, to the exclusion of participant observation, and the limitations surrounding the nature of the interviews conducted, have been elaborated on in sections 4.4 and 4.8. Similarly, attention was also drawn to ethical issues, the validity and reliability in general, and to this research in particular (see sections 4.6; 4.8). The period of time over which data used in the thesis was collected (which was not discussed in section 4.8), needs to be added.

Whilst a potentially negative reading could lie in the time which elapsed between the collection of the first data (1992) and its presentation in this thesis (1997), it is not the data per se which is crucial for this thesis but the inferences drawn from it. The researcher is not aware of any dramatic changes that have occurred with regard to the status quo of environmental education; and where any new initiatives have surfaced, reference has been made to these in the thesis. In addition, while there have been a great deal of negotiations regarding policy formulation for environmental education on a national level, no formal official policy that might alter the data dramatically has been implemented. Furthermore, the rationalisation that is currently being implemented in the broader education system, and more specifically at the colleges of education, has diminished the opportunities for teacher educators to venture into the kind of practice which might further critical praxis, which this thesis has demonstrated to be lacking. Thus, there appears to be no reason to

doubt the validity of the data, notwithstanding that there might have been changes in some areas, such as formal qualifications of practitioners and aspects pertaining to their understanding of, and insight into, environmental education, innovative projects and more creative practice.

7.9.3 Reflections on the content and results presented

There are both strengths and weaknesses in this aspect of the work. Strengths are primarily that the study is broad and informative, both in terms of the data gathered about the teacher educators' insight and views on the nature, scope and future of environmental education in South Africa broadly and, more specifically, in the Western Cape. Furthermore, this research enabled the researcher to gain substantial insight into the status quo of environmental education nationally, and also to make personal contact with environmental education practitioners to strengthen the basis for networking in this area. A further strength of this research, in the light of a lack of widespread research in the area of environmental education within initial teacher education is that the strategy that evolved out of this research (**Tables 7.1 -7.3**) can be employed by teacher educators to enable them to reflect on the challenges in the way of implementing and securing education for sustainable living. On a personal level, however, this research clarified for the researcher the multifacetedness and organic nature of change, and, thus, why initial innovation at the college of education where the researcher works, which induced this research, was doomed to fail. This failure, however, is not perceived in a depressive light but in a positive and hopeful one, since the strategy for change that emanated from this research may serve as a guide for future innovators to reflect on before embarking on a similar endeavour.

Also, outcomes-based education, the currently unfolding direction for education generally, and more specifically teacher education, is foreign to all stakeholders. The strategy that is proposed here recommends that professional development becomes the driving force to equip practitioners with a new vision. Like education for sustainable living, outcomes-based education demands that teacher educators (and students) undergo a radical paradigm shift with regard to their thinking and doing. With reference to **Tables 7.1,7.2, and 7.3**, this strategy for change might be useful for stakeholders to consider to embark on professional development programmes, not only for education for sustainable living, but also for outcomes-based education. Whatever the case, the researcher is hopeful that a strength of the thesis as a whole is that it will act as a stimulus for the furthering of education for sustainable living at initial teacher education level, as well as for addressing the pitfalls and gaps in the area of professional development of the teacher educators.

The strength of having gained insight into the functioning of environmental education nationally may, ironically, also be viewed as a limitation, since it might have been more useful for the researcher to research the Western Cape Region, with extensive follow-up to incorporate, for example, participation observation. A potential weakness of the research is thus that follow up visits might have been more focused on specific issues, which might have enabled the researcher to gain deeper insight. There are also some gaps in the data collected, both nationally and, more specifically, in the Western Cape. Additional factors which could have been explored more closely in the Western Cape (multisited case study two) include issues pertaining to management, with regard to the rectors at the various colleges of education, since many of the questions posed during the interviews were also applicable to them. Such an exploration could have added another dimension to change theory in the research.

With regard to certain aspects of the data and results discussed in Chapters five and six, the researcher takes cognisance of the superficial nature of some areas discussed, in particular the interviewees' vision for the future of environmental education (i.e. see section 5.3.3), but this was largely dictated by limitations on what could be incorporated within a single thesis. Similarly, not all the data collected has been worked into this thesis (see appendices one and two for a list of all the questions posed during the interviews), which creates the potential for future publications in this regard.

7.10 CONCLUDING REMARKS

This thesis has explored the potential for incorporating environmental education into the initial teacher education level for senior primary student teachers, and has outlined some guidelines that could serve as a catalyst for engaging with education for sustainable living in the proposed strategy. The 'potential', however, became a reality in 1996 at the college of education where the researcher works, in that environmental education was incorporated into the curriculum for initial teacher education (see epilogue). However, given the barriers that have been made visible through this research, and from the environmental education programme (discussed in epilogue), it will not be straight sailing for education for sustainable living within initial teacher education.

The counter-hegemonic nature of this approach to environmental education necessitates a totally new vision for teacher education, one which will continuously challenge and shift boundaries, one that aspires to change the mindset of people who have been stunted by Christian National Education

and Fundamental Pedagogics (see section 3.1.1). To break through these barriers requires a long-term process of deconstructing to reconstruct. Huckle (1993: 65), however, provides teacher educators with just such a vision:

> The links between environmental education and social change is clear. Education is not the solution to our environmental predicament... but appropriate forms of education informed by critical theory can assist the political struggle to adopt more sustainable forms of development....The challenge now is to test our critical theory of environmental education in action. As environmental educators we still have much to learn, little to lose and everything to gain.

Teacher education in South Africa stands on the brink of these possibilities. Flux has determined the opportunity to engage in an approach to environmental education contrary to the practices of the past in which nothing was done to revoke the environmental crisis of sustainability. Alternative approaches, unique to this country, that move from where we are at present, with our historical baggage as a backdrop, can be employed to redress and transform the inequalities, disparities and exclusionary practices of the past to realise real change.

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APPENDIX ONE: INTERVIEW SCHEDULE A

1 How informed do you think teacher educators are on the topic of environmental education?

2 Should one ignore the social, political and economical facets of environmental education?

3 Environmental education should be integrated into all subject areas of a teacher education curriculum. What is your opinion?

4 Environmental education, when introduced into teacher education should only be linked to GEOGRAPHY and BIOLOGY. What is your opinion?

5 Environmental education, if introduced into teacher education, should be incorporated as a separate subject. What is your opinion?

6 One of the factors which may hamper the introduction of environmental education into the teacher education curriculum might be a lack of insight and knowledge as far as teacher educators are concerned. What is your opinion?

7 What, in your opinion, might be other constraints which may restrict environmental education from being incorporated into teacher education?

8 What do you understand by the concept of curriculum?

9 Which key concepts/ topics in your opinion, should be incorporated into a framework for an environmental education curriculum?

10 How would you define "environment"?

11 How would you define "environmental education"?

12 Too much emphasis is placed on the bio-physical aspects in current practices relating to environmental education. What is your opinion?

13 Colleges of education/ universities do not prepare students for the obstacles (relating to the compartmentalised curriculum and the nature of the school organisation), which they will encounter should they wish to introduce environmental education at school. What is your opinion?

14 For environmental education to be positively received by all participants, it must be incorporated into all levels of the formal education system (primary, secondary and tertiary)? What is your opinion?

15 Environmental education will only be seriously considered in formal education if is examinable. What is your opinion?

16 How long (no. of years) has the environmental education course which is currently presented at this institution been functioning?

17 Is the environmental education course presented at this institution / faculty an elective course, or is it compulsory for all student teachers?

18 Does the course form part of another course, i.e. biology/ geography?

19 Does the course allow for a progression from first year through to final year?

20 Do the students write examinations in environmental education, for progression to the following year level/ attainment of teachers diploma / degree?

21 How many periods per week are allocated for the presentation of environmental education?
1st years
2nd years
3rd years
4th years

22 What is the duration of a single period?

23 Do you feel that the time allocated for the presentation of the environmental education course at all year levels is sufficient? Please comment.

24 How many lecturers are involved in the presentation of the course (excluding yourself)

25 Are you involved in the presentation of other courses at this institution?

26 If you are, kindly mention which other courses you present.

27 What percentage of your lecturing time (no. of periods) are allocated to the presentation of environmental education?

PROJECTS

28 Are your students involved in any environmental educational projects? (If not, briefly mention the constraints which prevented you from venturing into projects.

29 If yes, mention the nature of the projects in which the following year groups are involved.
1st years
2nd years
3rd years
4th years

30 Does any of these projects involve the local community?

31 Are these projects related to local environmental problems?

32 Do the students work individually, or in groups/ both?

33 Who decides on the themes and the nature of these projects?

34 Are students involved in determining which projects to become involved with?

35 Do these projects differ from year to year?

36 Are these projects evaluated?

37 Who are involved in the evaluation of these projects?

38 Mention briefly how the projects are evaluated.

39 Do you collaborate with other colleges/ universities regarding common projects? If yes, comment on a few examples. If not, mention why not.

FIELDWORK

40 Are there any fieldwork activities included in the environmental education course? (If not, please comment on the constraints).

41 If yes: How frequent are the various year groups (per quarter) exposed to fieldwork?
1st years
2nd years
3rd years
4th years

42 Mention the type of fieldwork activities which students venture into:
1st years
2nd years
3rd years
4th years

43 Where do you normally do fieldwork?

44 Do the students engage in fieldwork activities during practice teaching? (If not, give a few reasons why this is so).

45 If yes, which year groups participate in such practices?
1st years
2nd years
3rd years
4th years

46 Is fieldwork evaluated during practice teaching?

47 If yes, who evaluates the students?

48 List a few criteria used to evaluate fieldwork activities during practice teaching.

TEACHING PRACTICE

49 Are the general principles of environmental education evident in the students' approaches to teaching when they are out practice teaching at the schools?

50 Do the lecturers involved in the course presentation have guidelines for lecturers from other departments in terms of environmental education, during practice teaching?

51 What do the lecturers look for, in terms of application of environmental education, when they evaluate students during practice teaching?

52 Is there any liaison between the lecturers functioning in the environmental education departments and the other subject departments?

53 Are the environmental education approaches well received in the schools? Any comments?

COURSE-WORK

54 Do you ever consult with certain individuals, NGO's/ and/ or other organisation/s (eg. National Parks Board) for assistance in presenting certain aspects of the environmental education?
NGO'S
Government organisations
Universities/ Colleges
Individuals

55 Who decides what the specific objectives for a group during a particular year, will be?

56 Do the students contribute towards the formulation of the objectives?

57 Who decides on the course-work for a particular year group in environmental education?

58. Are local schools consulted in any way for suggestions pertaining to the course work?

59 Is the course content reviewed from time to time? (Please comment on the following in this regard):

60 If yes, who does the reviewing?

61 Are the students involved in the reviewing process?

62 Briefly indicate a few methods employed in the presentation of the environmental education course

63 Does the method of course presentation differ for the different year groups?

STAFF DEVELOPMENT

64 Do the lecturers who present the environmental education course participate in any staff development programmes in this regard? (If not, comment on this).

65 If yes, how frequent does staff development for environmental education occur?

66 Who coordinates these staff development programmes in environmental education?

67 Name a few issues that have been addressed during the 1991/ 92 staff development programme in environmental education?

68 Do you have clearly formulated objectives for each staff development programme?

69 Is the attendance at such programmes monitored/ are attendance records kept?

70 What are the career implications for the attendance of such development programmes?

71 Do the course presenters for environmental education ever run workshops/ address the rest of the staff on important environmental issues?

72 Are such workshops/ presentations well received by the rest of the staff?

73 Are you a member of any organisation/s involved with the promotion of environmental education?

74 If not, do you see the need for such organisations to exist?

75 If yes, list these organisations below:

76 What is your opinion on the future of environmental education in Southern Africa, relating to the schools?

77 What is your opinion on the future of environmental education in Southern Africa, as far as teacher education is concerned?

BIOGRAPHICAL DATA

1 Home language:

2 Age

3 Sex: M/F

4 Qualifications:

Degrees/ Diplomas	Institution	Major subjects

5 Was ENVIRONMENTAL EDUCATION part of your formal education?

6 Name of Faculty/ies and/ or Subject Department/s in which you operate at present:

7 How long (years) have you been working at this institution?

8 Where were you employed prior to your appointment at this institution? Primary schools? (Please list the last two places/ institutions where you have been employed, as well as the number of years of service at these institutions.

APPENDIX TWO: INTERVIEW SCHEDULE B

1 What, in your opinion, is environmental education?

2 On a given scale of 1 - 5; [1 being very weak and 5 being very strong] how relevant would you rate the following areas to environmental education?
Languages
Mathematics
Geography
History
Biology
Physics
Biblical studies
Physical education
Economics
Politics

3 How informed do you think teacher educators are with regards to environmental education?

4 What is your view on the idea that environmental education should be incorporated into the curriculum for teacher education?

5 The education authorities see the need for the incorporation of environmental education into teacher education.

6 Student teachers at your college/ university have an adequate knowledge of environmental education.

7 Does the teacher educators (at your college) see the need for implementing environmental education into the pre-service curriculum of student teachers?

8 If environmental education is introduced into formal education, it should be introduced into all levels of education: pre-primary, primary, secondary and tertiary. What is your opinion?

9 Environmental education will only be considered seriously, if it is examinable. What is your opinion on this?

10 If environmental education is introduced into teacher education, how should it be done? Please comment on each of the following.
Cross-curricular
Independent subject
Linked to Biology
Linked to Geography
Formally via programmes
Informally
Mention your own ideas

11 Is there room, in the current curriculum for teacher education for the incorporation for environmental education?

12 Are there any factors which may hamper the introduction of environmental education into a curriculum for teacher education?

13 If you replied yes to the above question, list a few factors, which in your opinion, might restrict the introduction of environmental education into teacher education.

14 What do you understand by the term "curriculum"

15 Are you familiar with the "White Paper" on environmental education that has been tabled in 1989?

16 The Council for the Environment is currently negotiating with education authorities to implement environmental education into formal education in the near future. What, in your opinion, does this imply for teacher education?

17 Will teacher educators be prepared to implement environmental education if it is formally introduced into the schools?

18 Name a few key concepts/ topics/ anything (in your opinion) that should be included into a curriculum framework for environmental education in initial teacher

19 Does the curriculum [in your subject area] allow for the incorporation of environmental education/ principles thereof? Please mention why not (If you respond negatively)

20 If you responded positively to the question above, briefly explain how this curriculum allows for the incorporation of environmental education with reference to:
[a] Subject matter:
[b] Volume of the content
[c] Time available
[d] Approaches to your teaching
[e] Aims and objectives of your subject

21 Do you feel that teacher educators will have to undergo INSET programmes prior to the introduction of environmental education into a curriculum for student teachers?

22 If you responded positively to the previous question:
[a] who do you foresee arranging these INSET programmes?
[b] how frequently should these programmes occur?
[c] how should these programmes be conducted?

23 Is your subject departments/s involved in any projects which can be linked to the environment?

24 If yes, mention:
[a] The nature of the projects for the various year groups
[b] Do these projects involve the local community?

25 Are you, at present, involved with any activities which can be linked to environmental education? If you are, please mention these briefly.

26 Do you belong to any organisation/s involved with the promotion of environmental education?

27 If you replied yes, please list these organisations

28 If you responded negatively, do you see the need for such organisations to exist?

29 Can such organisations be of any assistance to tertiary institutions with regards to environmental education?

30 If you responded positively, please indicate how these organisations can be of assistance.

31 Do you ever liaise with any organisations [NGO's; government organisation/s] for assistance with regards to your course presentation?

32 If you responded positively, please name the organisations involved, and the assistance rendered by them

33 Do you ever interact with colleagues at other colleges/universities for matters relating to your course presentation?

34 Are you affiliated to any subject associations/ organisations related to your subject area/s?

35 If you responded positively, please mention these.

36 Are you aware of any journals/ magazines acquired by your library, which is relevant to environmental education?

37 If you responded positively, list a few of these

38 Is there an environmental club/ society currently functioning at this institution? If yes, mention:
Name of the club
Types of activities they venture into.

39 Are any programmes/ activities scheduled for staff and students on days such as river/ world environment / arbour / marine day?

40 Who co-ordinates such programmes? Students? Staff? Both sectors?

41 List a few priority issues that need to be addressed in a teacher education curriculum in this country

42 What is your opinion on the future of environmental education as far as teacher education is concerned?

BIOGRAPHICAL DATA

1 Home language:

2 Age

3 Sex: M/F

4 Qualifications:

Degrees/ Diplomas	Institution	Major subjects

5 Was ENVIRONMENTAL EDUCATION part of your formal education?

6 Name of Faculty/ies and/ or Subject Department/s in which you operate at present:

7 How long (years) have you been working at this institution?

8 Where were you employed prior to your appointment at this institution? Primary schools? (Please list the last two places/ institutions where you have been employed, as well as the number of years of service at these institutions.

APPENDIX THREE: Letter for negotiating access

7 Tennessee Avenue
Colorado Park
7785
Mitchells Plain
Cape Town
July 1992
Ph. 021 349414 [Home]

The Rector
..... College of Education

Dear Sir/ Madam

I am a Ph.D student in the Botany Department at the University of the Western Cape, the area of my research is **Environmental** Education within **initial teacher education for senior primary student teachers.** To start this project, I have to determine which tertiary institutions in Southern Africa are offering Environmental Education for student teachers at senior primary level. In so doing, I hope to develop a framework for a curriculum (with teacher educators) for senior primary student teachers at initial teacher education level.

Would you be so kind as to complete the self-addressed and stamped card included, and post it back to me? I would sincerely appreciate it.

Thank you very much for having sacrificed your precious time to read this letter.

Hoping to hear from you soon.
Respectfully Yours.
Razeena Wagiet.

.....

APPENDIX FOUR: Identification of institutions for multisited case study one

1 Name of Institution .....

2 Address of Institution .....

.....

.....

3 Telephone Number: .....

PLEASE PLACE A TICK [✓] NEXT TO THE APPROPRIATE ANSWER.

4 Are student teachers who will be teaching at senior primary level [standards 2 to 5] educated at this institution?

Yes .... **No** ....

5 If yes, is environmental education part of the curriculum of these students?

Yes .... **No** ....

6 If yes, is it offered as a separate course?

Yes ..... **No** .....

7 If not, does it form part of any other courses which are offered?

Yes .... **No** ....

8 If you responded positively to question seven, mention the names (subject/ course areas) where **environmental education** is included as part of the curriculum.

.....

.....

.....

.....

<u>THANK YOU</u>

.....

APPENDIX FIVE: List of Colleges

Algoa College of Education; P.O. BOX 14489; Sidwell; Port Elizabeth; 6061

Amanzimtoti College of Education; Private Bag 20013; Amanzimtoti; 4125

Appelsbosch College of Education; Private Bag X202; Ozwatini; 3476

Athlone College of Education; Sanddrift Street; Paarl; 7464

Barkley House College of Education; Private Bag X1; Claremont; 7700

Bechet College of Education; P.O. Box 47361; Greyville; Durban; 4023

Bellville College of Education; Private Bag X 14; Kuilsriver; 7580

Bloemfontein Onderwyserskollege; 201 Zastron Street; Bloemfontein; 9301

Bochum College of Education; Private Bag 5080; Bochum; 0790

Boland College of Education; Wellington; Western Cape.

Bonamelo College of Education; Private Bag XO8; Phuthaditjhaba; 9866

Cape College of Education; Private Bag X2041; Port Beaufort; 5720

Cape Town College of Education; Private Bag; Mowbray; 7700

Daveyton College of Education; Private Bag X05; Daveyton; 1507

Dower College of Education; Private Bag 6059; West End; Port Elizabeth; 6000

Dr. Phatudi College of Education; Private Bag X1020; Burgersfort; 1150

Dr. W. B. Rubusane College of Education; Private Bag XI40; Mdantsane; Ciskei

Durbanse Onderwyskollege; Private Bag X 11; Congella; 4013

East Rand College of Education; Private Bag X52; Springs; 1560

Edgewwod College of Education; Pinetown; KwaZulu-Natal

Elijah Mango College of Education; Private Bag X1004; Kabokweni; 1245

Eshowe College of Education; Private Bag X503; Eshowe; 3815

Esikhawini College of Education; Private Bag X8520; Esikhawini; 3887

Ezakheni College of Education; Private Bag X20018; Ezakheni; 3381

APPENDIX FIVE

Giyani College of Education; Private Bag X578; Giyani; 0826

Goudstadse Onderwyskollege; Private Bag X27; Aukland Park; 2006

Hebron College of Education; NothH-West Province

Hewat College of Education; Kromboom Road; Crawford; 7764

Hoxane College of Education; Private Bag X1024; Hazy View; 1242

Hoxani College of Education; Private Bag X1024; Hayview; 1242

Indumiso College of Education; Private Bag X9077; Pietermaritzburg; 3200

Johannesburg College of Education; Johannesburg; Gauteng

Kagisanong Teachers College; Private Bag X20528; Bloemfontein; 9300;

Kagisanong College of Education; Private Bag X20523; Bloemfontein; 9300

Katorus College of Education; Private Bag X04; Leondale; 1424

Kwagqikazi College of Education; Private Bag X6059; Nongoma; 3950

Kwena Moloto College of Education; Private Bag X 4015; Seshego; 0742

Lennox Sebe College of Education; Private Bag X 503; Zwelitsha; Ciskei

Lovedale College of Education; Private Bag; Alice; 5700

Madaneni College of Education; Private Bag X5001; Madaneni; 2951

Makhado College of Education; Private Bag X1004; Dzanani; Venda;

Mamokgalake Chuene College of Education; Private Bag X629; Groblersdal; 0470

Mapuleneng College of Education; Private Bag 458; Acornhoek; 1360

Marapyane College of Education; Tuinplaas; North-West Province

Masibulele College of Education; Private Bag X338; Whittlesea; Ciskei;

Mgwenya College; Private Bag; X1008; Kanyamazane; 1214

Modjadji College of Education; Private Bag X 746; Ga Kgapane; 0838

Modsadsi College of Education; Private Bag X746; Ga Kgapane; 0838

Mokopane College of Education; Private Bag X601; Mahwelereng; 0626

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Molapo College of Education; P.O. Box 164; Florida; 1710

Moretele College of Education; North-West Province

Mphodai College of Education; Private Bag X 66; Kroonstad; 9500

Mpumalanga College of Education; Private Bag X1004; Hammarsdale; 3700

Mqwenya College of Education; Private Bag X1008; Kanyamazane; 1214

Natal College of Education; Private Bag 9007; Pietermatitzburg; 3200

Ndebele College of Education; Private Bag X4011; Siyabuswa; 0472

Ntuzuma College of Education; Private Bag XO2; P.O. Kwa-Mashu; 4360

Perseverence College of Education; Barkley Road; Homestead; Kimberley; 8301

Phatsimang College of Education; Private Bag X5047; Kimberley; 8300

Potchefstroomse Onderwyskollege; 37 Borcherd Street; Potchefstroom; 2520

Pretoria College of Education; Private Bag X382; Pretoria; 0001

Ramaano Mbulaheni College; Private Bag X1303; Tshakhuma; Venda

Rand College of Education; Private Bag X6; Langlaagte; 2101

Roggebaai College of Education; Prestwitch Street; Cape Town; 8001

Sally Davis College of Education; c/o John William Kay School; 5th Avenue; Grassy Park; 7800

Sebokeng College of Education; P.O. Box 263005; Three Rivers; Vereeniging; 1935

Sefikeng College of Education; Private Bag X827; Witsieshoek; 9870

Sekhukhune College of Education; Private Bag X08; Apel; 0739

Setotolwane College of Education; Private Bag X7372; Pietersburg; 0700

Sohnge College of Education; Rainier Street; Private Bag X3093; Worcester; 6850

South Cape College of Education; Private Bag 646; Oudtshoorn; 6620

Soweto College of Education; P.O.Box 90064; Berstham; 2013

Springfield College of Education; Private Bag; Dormerton; 4015

Strydom College of Education; North-West Province

APPENDIX FIVE

Taung College of Education; Private Bag X03; Pudimore; Bophuthatswana

Thlabane College of Education; North-West Province

Tlvumbeni College of Education; Private Bag X1420; Letaba; 0807

Transvaal College of Education; Private Bag X 2; Laudium; 0037

Transvaal College of Education; Private Bag X 11; Soshanguve; 0152

Tshisimani College of Education; Private Bag X1302; Tshakhuma; Venda

Tshiya College of Education; Private Bag X 809; Witsieshoek; 9870;

Umbumbulu College of Education; Private Bag X20012; Amanzimtoti; 4125

Upington College of Education; Private Bag X 6037; Upington; 8800

Venda College of Education; Private Bag X2269; Sibasa; Venda

Wesley College of Education; Durham Avenue; Salt River; 7700

APPENDIX SIX: DE I1 (1996) and proposed DE III ENVIRONMENTAL EDUCATION COURSE OUTLINE

Cognisance should be taken of the fact that continuous assessment forms an integral part of the process of the planning and the practice. Competence and continuous assessment are interlinked. In the presentation of the environmental education course the lecturer is aware of the attainment of the competence as outlined in the COTEP Document. The attainment of these competence will be spread over the two years of the duration of the course.

C. Goals and Objectives of environmental education (DE II and DE III)

Goals:

The goal of environmental education, in the light of education for sustainable living is to make student teachers aware of their involvement in, and consequent responsibility for, living a sustainable life. This overall goal should further the development of a critical environmental consciousness, critical thinking and problem-solving skills, a critical eco-socialist environmental ethic, political literacy and critical praxis in the learner. The following interrelated goals are identified in this regard:

- to enable learners to understand the interdependence and interrelatedness of life on earth, and what the consequences of their actions are on the total environment, from local to global;
- further to the understanding of all facets (social, political, economical, cultural, technological) that may inhibit sustainable development; and,
- to integrate environmental and economic decision-making.

These goals, informs the framework for a curriculum for education for sustainable living in initial teacher education, which includes:

- ecological principles, which include various ecological concepts, to enable learners to understand the environmental crisis, and acquire the necessary skills to solve it;
- interrelationships and interdependence between people and the natural world;
- a variety of local and global environmental issues,
- social environmental issues;
- how the social, economic and political systems impact on the environment, and that the roots of these problems are centred within these systems; and,
- political literacy, for example, distribution and redistribution, power and decision making.

Also included within the framework is for students to:

- develop an environmental ethic to enhance ecological sustainability and social justice;
- develop skills for critical thinking, inquiry, evaluation and problem-solving;
- become competent in outdoor education and fieldwork;
- develop personal qualities, for example, positive attitudes towards conservation; and,
- be afforded the opportunities to engage with these during practice teaching.

Environmental studies competencies which cover

- ecological foundations;
- social foundations;
- environmental investigation and evaluative skills; and,
- environmental action skills.
- Professional competencies.
- The development of personal qualities.

Objectives are viewed in terms of the appropriate skills, values, attitudes and knowledge, that need to be developed in the learner. These (skills, values, attitudes and knowledge) are outlined below:

SKILLS [that need to be developed in the learners]

Study/ learning skills:

- Critical thinking skills;
- Research skills;
- Interpretation skills;
- Organisational skills; and,
- Practical skills.

Language manipulation/ communication skills:

- Oral language skills; and,
- Written language skills.

Numeracy skills:

- Pre-numerical skills

Problem-solving skills

Personal and social skills

These can be summarised into:

- critical thinking;
- problem-solving;
- evaluation;
- value positions clarification; and,
- action and advocacy skills.

ATTITUDES AND VALUES (DE II and DE III)

To develop an environmental ethic based on the values of **social justice** and **sustainable living** by:

- appreciating, caring and developing a concern for.the environment and other living things;
- being tolerant and open-minded;
- being able to challenge preconceived ideas, and yet to accept change, and to handle controversial issues;
- recognising the cultural knowledge and experiences of indigenous people related to the total environment;
- showing a commitment to become informed and to participate in decision-making and active environmental participation; and,
- being prepared to inspect personal lifestyles and to change these to secure sustainable and healthy futures.

The **ENVIRONMENTAL EDUCATION** course consist of **FOUR** Modules.

DE II COURSE OUTLINE:

FIRST SEMESTER

- Written Component in June: 50%:
  The questions include the didactical aspects.
- Continuous Assessment: 50%
  Include: Practicals;
  Tests;
  Assignments;
  Tutorials;
  Seminars;
  Projects;
  Class Participation.

SECOND SEMESTER:

The written component is written in November, and totals 50%.
The continuous assessment mark is compiled as outlined for the first semester, (50%).

FINAL MARK:

First Semester:	100
Second Semester:	100
Total:	200
Pass Requirement:	50%

A supplementary examination will be set at the end of the academic year.

MODULE ONE: FOUNDATIONS OF ENVIRONMENTAL EDUCATION

To be covered as part of the DEII and DE III courses

Unit 1: **Philosophical and foundational perspectives of environmental education.**

Purpose: To provide the learner with the foundations of this area, and to place environmental education into a philosophical perspective.

Suggested areas to cover:

A. What is the environment: DE II

A broad view of the total environment incorporates three interrelated, interdependent and interacting parts that are neither separate from, nor competing with each other. These are the:

- **Natural environment**
  Living organisms - their interrelationships and interrelatedness; physical cycles that supports life; sun, water, air, soil; diversity.
- **Socially constructed environment**
  People; human-created world - economy, politics, culture, agriculture, industries, buildings, arts, religions, etc.
- **Personal environment**
  The individual's physical, emotional, intellectual and ethical dimensions.

B. What is environmental education? (DE 11 through to DE 111)

To foster sustainable living, environmental education involves learning how to care for the Planet, other people and the self. The continued existence and wellbeing of these three, interdependent components of the whole environment, are interconnected. Clarity regarding the nature and scope and purpose of environmental education is encompassed in the underlying goals and objectives which are outlined above.

C. Give a historical perspective of the development of environmental education: (DE II and DE III)

- The upsurge in awareness relating to environmental crisis;
- International development and contributions from conferences: Stockholm, Belgrade, Tbilisi, Moscow, Earth Summit (Rio);
- National development: role of Apartheid to stifle environmental education in the true sense, but to promote conservation education instead; White Paper (DEA 1989), etc.

D. Recent Trends in Environmental Education: (DE II and DE III)
Move from awareness campaigns and conservation issues, to include:

- The fundamentals of sustainable living, that encompass inclusivity (democracy, gender equality social and political justice).

MODULE TWO: THE NATURAL ENVIRONMENT

To be covered as part of the DEII and DE III courses

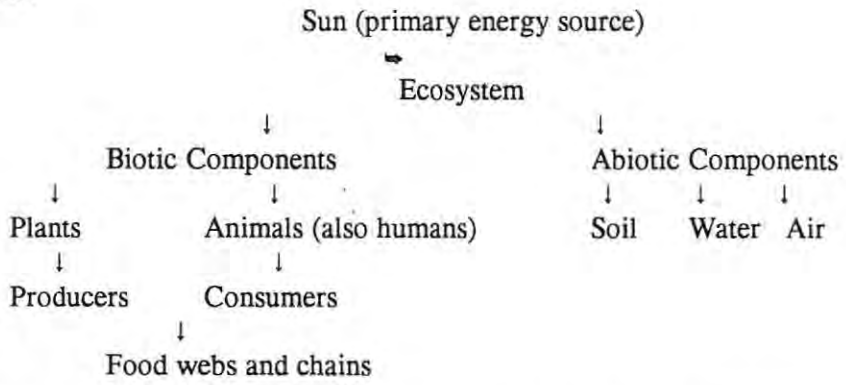
This module encompass aspects of the natural environment in addition to the interrelationships in the syllabus outline. The natural environment includes the sun, air, water, soil, the physical cycles that supports life (oxygen, nitrogen, carbon and water) and biological and ecological systems- living organisms and their interrelationships. The interrelatedness of the environment is discussed with reference to the **ECOLOGICAL CONCEPTS**.(The suggested duration of the module is fourteen weeks).

<u>Unit 2</u>: Ecosystem (basic unit of Ecology): DE II

Purpose: To illustrate how the living and the non-living components of the environment is interrelated in an ecosystem.
Curricular links: Science, geography, language, mathematics, art.
Skills: Observing, problem-solving, hypothesising, sorting and classifying, data gathering and recording, communication, following instructions, listening.

Suggested Activities:

-Illustrate:



- Survey of the college grounds to distinguish living from non-living.
- Identify homes of various creatures (nests, burrows, shells of snails, case of moth, etc).
- Demarcate an area at the college to explore the concept of an ecosystem and identify and record the basic components of it.
- Brainstorm what the consequence would be if any component would be disturbed, to illustrate the need to live sustainably.
- Make a model of the Earth as a huge and dynamic ecosystem. Brainstorm the idea of the planet as a closed ecosystem.
- Inclusion of fieldtrips to examine different ecosystems.

APPENDIX SIX

Unit 3 : **Energy flow: Food chains and Food Webs** (DE III)

Purpose: Illustrate the interrelatedness of living and non-living
Curricular Areas: science, language, art, drama, mathematics.
Skills: sorting and classifying, data gathering, recording, analysing, cooperation, communication, following instructions, problem-solving, measuring.

Suggested Activities:

- Composition of a food chain (producers, primary, secondary and tertiary consumers), explanation, construction, practical.
- Movement of energy along a food chain.
- Nature's pyramid. Students form a pyramid with producers (grass) being the most abundant. Primary consumers (grasshoppers), secondary (birds) and then least abundant - the tertiary consumers (eagle). A little bit of glitter/ sand is passed along the line to illustrate the decrease in amount of energy along a food chain. Students has to interpret and analyse what happened to energy. To illustrate fragile balance in nature, disturb the links of consumers, and let students predict consequences. Stress importance of photosynthesis to trap energy.
- Observe a bordered area and construct food chains and food webs.
- Compare growth under a huge tree (lots of shade) and a tree providing little shade, measure temperature etc.
- Webbing game- to illustrate food web.

Unit 4: **Plants** (DE III and partly DE II)

Purpose: Vital role of plants to sustain life, need for conservation and to secure biodiversity.
Curricular areas: Science, language, art, mathematics, geography
Skills: observation, listing, sorting and classifying, analysing, empathising, values clarification, deduction

Suggested Activities:

- Basic structure of a plant.
- Basic needs of plants (soil, oxygen, carbondioxide, mineral salts).
- Sketching, mounting and drying of specimens.
- How fungi differ from typical plants, its role as decomposers.
- Survey of types of plants in an area (college/ school grounds).
- Research on indigenous plants, importance of biodiversity.
- Plant as a source of oxygen, referring to photosynthesis.
- Plants as a source of food (crops, herbs, vegetables, fruit-primary health and diet).
- Plants with medicinal value.
- Farming - the harmful effects of poor farming practices.
- Starting a vegetable garden- the benefits and modus operandi.
- Research report on endangered and extinct species of the area.
- Research on conservation status of plants (local to global) - what is being done, who is doing what, and what needs to be done.
- Trees as a source of fuel - woodlots, deforestation and implications of the energy crisis.
- Issue of desertification.
- Planning activities for arbor day.

APPENDIX SIX

Unit 5: **Animals** (DE III and partly DE II)

Purpose: Vital role of animals to sustain life. Need to conserve and foster biodiversity
Curricular Areas: Science, language, art, mathematics, geography
Skills: observation, listing, sorting and classifying, analysing, empathising, values clarification, deduction.

Suggested Activities:

- Basic structure of an animal, observing live specimens.
- Basic needs of animals (care, food, water, habitat, etc).
- Emphasise that animals should be handled with care when being brought into the classroom, and should be returned to their natural habitat thereafter.
- Sketching, skeletal mount techniques (emphasise the ethics regarding the need to respect and conserve animals).
- Identifying the decomposers and their role in the ecosystem, (ants, bacteria, etc).
- Research on indigenous animals, the importance of biodiversity.
- Conservation status of animals (local to global)- what is being done, who is doing what, and what needs to be done.
- Research report on extinct and endangered animals.
- Animals as a source of food, primary health and balanced diet - relate to ethics.
- The harmful effects of overgrazing.
- Animals in different habitats (aquatic, burrows, dry areas).

Unit 6: **Abiotic Component - Soil** (DE II)

Purpose: To emphasise the need to sustain and conserve the soil
Curricular Areas: geography, science, language, maths, technology
Skills: observation, listing, sorting and classifying, analysing, empathising, values clarification, deduction, interpretation.

Suggested Activities:

- How is soil formed and the loss of top soil in S. Africa.
- Explain where fossil fuels (coal, oil and gas) is found in sedimentary rocks, and stress the need to utilise this sparingly.
- Importance of soil for plants and animals (including humans).
- Different types of soil (simple experiments).
- Important components in soil to sustain life on the planet.
- Consequences and causes of soil erosion- bad farming methods, poor planning, deforestation, pollution.
- Concept of permaculture.
- Visit to a farm to observe management practices.

Unit 7: **Abiotic component - Water** (DE II)

Purpose: To understand the importance of water in all aspects of life and its role in sustaining life on the Planet.
Curricular areas: Science, maths, language, history, economics, technology.
Skills: Observation, analysis, empathy, values clarification, interpretation, deduction, recording, classification and sorting,

Suggested activities:

- Water cycle.
- Water table.
- Water as a basic need for plants and animals (including humans).
- Water quality: What effects the quality of fresh water that we use? Include, for example the causes and consequences of pollution. Link this to Primary health Care, and implications for humans.
    - organic matter (sewage- increases nitrates and phosphates- death of fish etc);
    - sediments (due to erosion- causes slow flowing streams - breeding ground for disease carrying organisms);
    - toxic waste (metals and organic- causes poisoning of aquatic creatures- lead to cancer, damage to lungs, nervous system);
    - agricultural and horticultural chemicals (pesticides and fertilizers (enter into fish and then into humans- harmful);
    - disease carrying organisms (due to sewage and other waste - cholera, diarrhoea, typhoid, malaria, etc);
    - practical monitoring of water quality at a near-by stream/ river/ beach/ canal etc., (sketching can be included here);
- Water quality of sea water:
    - pollution as a result of oil spills;
    - dumping, farm chemical, toxic and radio-active waste harms the sea life and has implications for humans.
- Water supply: where does the local supply of water come from.
- Filtering process.
- How much a litre of tap water actually costs for flushing a toilet.
- The effects of droughts.
- Usefulness and usage of water.
- How can we conserve water in our daily activities?
- Planning activities for river day.

<u>Unit 8</u>: **Abiotic component - Air** (DE II)

Purpose: Insight into the importance, characteristics, nature and behaviour of air for sustaining life on the planet.
Curricular Areas: Science, geography, maths, technology, economics, language.
Skills: Observation, recording, classifying and sorting, analysing, interpretation, listening, empathy, values clarification, deduction, problem-solving

Suggested Activities:

- Composition and structure of the atmosphere.
- Simple experiments to illustrate the presence of air.
- Importances of air for life: breathing, photosynthesis.
- Explain how atmosphere supports and protects life.
- How the earth's temperature is maintained, and elaborate on the greenhouse effect when temperature rises.
- Air pollution caused by electricity generating stations, cars, factories and homes.
- Ozone depletion: explore harmful effects of CFC's explore alternatives that will -foster 'living lightly on the earth'.
- Causes and consequences of acid rain- sulphur dioxide and nitrogen oxide (food crop and tree losses due to acidification; crumbling of buildings of historical significance).

- Smog and its adverse effects on health (survey on asthmatics).
- Is nuclear energy an alternative? (debate the Chernobyl and Three Mile Island accidents). Koeberg's position.
- Largest air polluters in the world - where does S. Africa stand?
- Identify alternatives- ways to consume less energy, to foster 'living lightly on the earth'.

MODULE THREE: THE SOCIALLY CONSTRUCTED ENVIRONMENT

To be covered as part of the DE II and DE III courses.

The socially created environment encompass people, and the human-created world. Included here is the political and the economical dimensions, etc. Encompassed within the socially created environment is the learner and her/ his development. Social development involves, for example, the growth of the learner's altruism, aggression, honesty, independency, cooperation, self-control, etc. In addition, it involves the learner's embrace of the social roles, how he/she interacts with and relates to, other people, organisms and the non-living world around her/ him.

The health and well-being of individuals, communities, nations and the Earth have many interrelated dimensions, for example physical, emotional, intellectual and spiritual. Planetary health and well-being relies on the state of the Earth's physical and biological systems. Political and economic systems can also affect the well-being of the planet. Environmental education aims to develop an active an informed citizen. This provides a framework for individual and social action directed at making the planet a fairer and healthier place for all. This is underpinned by the interrelatedness of natural and social systems, and the need for ecological and social sustainability.

Unit 9: All about Me/ Us/ Ourselves (DE II)

Purpose: To develop an understanding of the personal environment, in terms of the total environment. The personal environment includes the way the learner feels, thinks and is. It is each person's unique physical, intellectual, emotional, spiritual and ethical self.
The individual is also influenced by her/his interaction within a family situation- the latter being the smallest social unit. A child's need for security is satisfied primarily by stable family relationships with people whose conduct is consistent and reliable. Security breeds independence.
Curricular Links: science, social science, music, language, maths, art, history, geography.
Skills: listening, analysing, collecting and sorting of data, listening, problem solving, empathy, values clarification

Suggested Activities:

- Basic needs: secure, safe and healthy environment to live, clean water, clean air, enough food, and a right to a good education.
- Clean environment (no litter, pollution-free, plants animals). Let students draw a profile of what their local environment look like and then draw another one how they would want it to look like. Identify ways how they could arrive at the desired condition, and sustain it. What makes them feel good about it, what makes them feel bad about it, how can the 'good points' be furthered?
- Hazards and ills of informal settlements.
- Is the water clean and safe, is it polluted/ contaminated? Investigate, and identify ways to solve problems if there are any.
- Clean air: any signs of pollution? Is the learner adding to the problem? Identify ways to live more sustainably in order to lessen air, water and land pollution, ozone depletion, acid rain, energy wastage. Embark upon recycling projects, use environmentally friendly products, etc.

APPENDIX SIX

Health

- Old narrow view of health vs. the broader view of health.
- Primary health care and the RDP.
- Inoculation chart- learners should understand the content and importance thereof (measles, diphtheria, whooping cough, tetanus, tuberculosis)- the symptoms, nature and dangers of these diseases.
- Infant mortality rate in this country in comparison to Africa, the world, research.
- Health and community development.

Food and health:

- Health is dependent on, for example, what we eat.
- Healthy diet: introduce proteins, carbohydrates, fats, vitamins, minerals; daily kilojoule intake and allowance, weight charts, etc.; dangers of anorexia, obesity, malnutrition.

- Understanding the biological aspects of the person:
- brief overview of hierarchy of life;
- cells- tissues- organs- organ systems- living organism (me);
- senses: eyes- sight; ears- hearing; tongue- taste; nose- smell; skin- touch/ tactile;
- Characteristics of living organisms: to concur with personal hygiene and primary health care.
- movement (muscles and skeleton);
- nutrition (digestive system);
- reproduce (reproductive system);
- sensitivity (nervous system), elaborate on feelings and emotions;
- excretion (urinary tract);
- growth (puberty and sex education);
- hygiene: why it is important to keep clean, sweat as a secretion and its composition, dental care, care and hygiene of the body.

- The family.
- Roles of family members, questioning of stereotype roles, division of labour in the family;
- issues of unemployment, poverty cycle, illiteracy/ numeracy and the impact these factors have on the learner's immediate environment;
- violence and child abuse in the family situation;
- family planning: debate pros and cons, linked to overpopulation;
- effects of divorce and the shrinking family circle;
- the extended family - pros and cons;
- pets- the environmental implications, i.e. excretory wastes;
- shopping - environmentally friendly products, the negative effects of plastics (shopping bags and excessive wasteful methods of packaging. Is buying in bulk an alternative?

<u>Unit 10</u>: **The Home** (DE II)

Purpose: Environmentally friendly homes - to foster sustainable life-styles and living lightly on the earth- how you can make a difference
Curricular links: science, history, geography, technology, maths, art, language,
Skills: values clarification, empathy, analysing, measuring, classifying and sorting, deducing, recording

Suggested Activities:

- The right to a decent, safe, home environment.
- Types of homes i.e. the informal settlement (squatter camp) primary health risks, i.e.

- lack of adequate sanitation - the effects of sewage on the environment, diseases and hazards;
- lack of clean, fresh running water, implications for the person regarding hygiene, health, water, pollution;
- litter, effects i.e. erosion of soil and other implied diseases;
- dirty standing water pools- diseases associated with it, land pollution;
- cold damp conditions - how it effect the health of the occupant, i.e. increase in TB, asthma and other illnesses;
- effects and hazards of paraffin etc. air pollution and the adverse effects thereof;
- what does this do to the self-esteem self-image and general wellbeing of the child;
- what are the chances of a decent education? If there are no chances how does it effect the child's interpersonal relationships and the relationship with the environment?
- who benefits from squatter camps? Explore the issues of cheap labour and government compensation to landowners;
- discuss the way forward: dismantling of the informal settlement as a solution;
- are the installation of sanitation and sewage facilities, electricity and water a relief measures?;
- is temporary relief the answer? What can be done?
- Aspirations of what an ideal home should be like- what are the requirements for a decent and environmentally friendly home?
- Energy conservation (solar heating).
- Recycling- sorting of waste, composting.
- Keep a record to explore the use of non-renewable energy sources (kettle, fridge, stove, lights etc) and distinguish between needs and wants.
- Facilities available for recreation (play), eating, sleeping, washing, studying what is required for the child to live securely, comfortably and in happiness.

<u>Unit 11</u>: **The community** (DE II and III)

Purpose: The learner's awareness and understanding of the local environment is broadened, and the idea of what constitutes a healthy, and safe environment is developed. The community is viewed in terms of people with a range of needs, purposes, duties, experiences and aspirations. Furthermore, this unit aims to extend the learner's awareness of other people and their circumstances, and how they can help in a responsible way. The opportunities for progressive development for enquiry-based learning is provided.
Curricular areas: history, geography, mathematics, technology, science, language.
Skills: problem-solving, the gathering, recording, sorting and analysing of data, empathy, values clarification, deductions,

Suggested activities:

- Mapwork:
- understanding how to read a map should be developed;
- the infrastructure of the local area, i.e. the roads, telephones, transportation;
- what type of transport is available to move in and out of the local area (busses, taxis, trains, cars, etc.
- Historical development:
- the history of the local community can be investigated via a project (include aspects such as when the first people arrived, after who the streets were named, what attracted the people to the town, or were they forced to move there, the growth of the town over a period of time, the types of houses and the changing thereof, does the newer buildings suit the climate, what were the older buildings like, who lived where, etc.).
- Workplaces and types of work:

- is there anything that is manufactured in the town?
- who owns it, where does the products go to;
- what are the conditions of the labour force, wages, working hours etc.;
- where does the local people work, what are the implications and costs for them to go to work;
- situation of unemployment in the local community.
- Services:
- services are available in the local community re: health care, library, post, daily produce, etc.;
- adequate? recommendations, accessibility;
- food production (especially in a rural setting, sources, production, environmental implications, i.e. overgrazing, soil erosion, etc);
- for urban children, it is important for them to know where food comes from, i.e. milk, bread and a few other basic foods.
- The population: how many families around a block;
- how many children per family, average amount of children per family;
- overpopulation - a problem? is it being addressed? How/ why not?;
- Cultural differences:
- different places of worship, different languages, and religious holidays. Find out about the different people and always respect the convictions of others;
- Make use of the knowledge of the indigenous people regarding various issues, i.e. remedies for illnesses, conservation methods, etc.;
- The position of the aged.
- Is there enough facilities for them. where do they live and who cares for them. Are they comfortable? Policy.
- Dangers: Various issues can be addressed in this regard:
- gangsterism, drugs, peer pressure and the dangers;
- child abuse, the relevant telephone numbers and help facilities that are offered;
- refuse dumps - identification and strategies for campaigning for the removal of these;
- homeless, i.e. street children - what is being done about their dilemma.
- Recreational facilities (eg.. parks, sporting, clubs):
- Do a survey by interviewing a broad spectrum of people (of different age groups) what they do for leisure, what facilities are available, and what they feel is lacking. Analyse the data, and on a map of the local area, mark all the leisure facilities. Recommend what is lacking, what is needed and why.
- Pollution in the local community:
- take responsibility and ownership for his/her role for the environment, join campaigns designed to improve the area and the quality of life;
- noise pollution levels - take a tape recorder and record the noise levels at various places in the community. Plot a graph to illustrate when the noise levels are at its highest- at what times of the day; make suggestions how this could be decreased;
- air, land and water pollution levels;
- investigate and devise ways to lessen and eradicate it;
- Trace the journey that your waste takes from the time it is collected (if it is). Record the amount of waste in your street. Suggest ways to decrease the amount of waste, and try and campaign for recycling of glass, tin, plastic and paper points in your area if it does not exist.
- Plants and animal life:
- are there enough open spaces for plants to grow?;
- what type of plants are most common in your area;
- are there any indigenous plants;
- try and identify if there are any poisonous plants and warn the local community about this;
- animals should have enough space to walk and run freely. The problem of excrement should

be tackled, and regulation needs to be devised in this regard;
- Possible investigation of a local relevant environmental issue, via action research.

Unit 12: **The School** (DE II and III)

Purpose: To communicate to the learner how the organisation and management of the classroom and the school as a whole should be seen as an opportunity to demonstrate environmentally sensitive lifestyles. A number of things can be implemented in the classroom, staff-room, across the school and in the school grounds that will actively model environmentally sound practice. The school is part of, and interlinked with the community. It can also be a focal link for community involvement in many areas, including environmental education practices. This unit can serve as a valuable tool to equip students for what they are to face when they enter into the teaching profession. The area of practice teaching can be utilised to familiarise students with the negative dimensions (notion of schooling), while also preparing them on how these can be overcome.
Curricular links: history, geography, science, maths, art, language
Skills: recording, sorting, gathering, analysis and interpretation of data, problem-solving,

Suggested Activities:
- Consider what the criteria are for the establishment of an 'environmentally friendly/ sensitive' school; i.e.
- an environmental committee to include representatives from all stakeholders, i.e. pupils, staff, parents, maintenance staff, who will be responsible for 'greening the school';
- in the school building, look at methods promoting energy, water and other forms of conservation, recycling of paper glass and tin, use environmentally sensitive cleaning products, i.e. unbleached toilet paper, etc.;
- on the school grounds various aspects can be tackled, i.e. plant indigenous plants that needs less water and care, use natural/ organic methods for pest and weed control instead of pesticides, start a compost system at school.
- What are the barriers in the way of innovations like environmental education in the school? Identify these impediments during practice teaching, and discuss ways of how to overcome it.

MODULE FOUR ADAPTATION AND CHANGE

This is covered as part of the DE II and III courses.

Much of what is written about the natural environment focuses on the need to preserve it. While this is very important, learners need to know that the environment is not static, but in a state of constant change. Some changes are more obvious than other, for example the day- night cycle and the cycle of the different seasons. This module is partly designed to
. enable learners to observe, appreciate and understand natural changes in the environment,
. enable learners to understand that some of these changes have been brought about by the impact that humans have on the environment.

Unit 13: **Seasonal changes and the weather** (DE III)
Linked to units 6; 7; 8 in the DE II course

Purpose: This unit is designed to broaden children's observation, understanding and appreciation of the changing weather patterns associated with seasonal changes.
Curricular links: Geography, maths, science, language, geography,

Skills: Recording and sorting of data, analysing, interpretation, problem-solving, listening,

Suggested Activities:

- Weather:
- explanation of air pressure, how winds are set up, and what happens when air moves from area to area;
- how is air pressure measured;
- how is weather patterns predicted: the weather signs, show an extract of weather report from television and newspaper and let the learner interpret this;
- Day - night cycles, briefly explain the changes:
- explain what is meant by nocturnal animals, diurnal animals, and changes in plants during this stages;
- identify and list certain nocturnal animals in the area.
- Seasons: Mention the different seasons, and the various associated changes, for example:
- weather, dress, vegetation, animals visiting the area, etc.;
- collection of autumn leaves to depict different colour- make a collage (drying- mounting techniques);
- the importance of skin care and protection during summer -harmful effects of ultra-violet rays, cancer;
- learners can construct a flow chart/ diagram/ web to show how a change in season impacts on the natural, personal and social environment.;
- what happens to the community living on a farm where grapes are harvested when the harvesting season is over? unemployment/ migrant labour for some, effect on family, socio-economic conditions, etc. What are the alternatives.

<u>Unit 14</u>: **Growth** (DE III)
Linked to units 9; 10 and 11 in the DE II course

Purpose: data collection, organisation and analysis
Curricular Links: science,
Skills: Investigation and experimentation, collecting, classifying, sorting and analysis of data, sketches, observation, deduce,

Suggested Activities: (many of these activities are long term investigations. Demarcate a place in the room where observations and recordings can be on-going, until completed).

- Briefly outline the life-cycle of a plant:
  seed- germination- growth - plant- flowers (carry reproductive organs stamens and pistil)- pollination (identify agents- interaction between plants and animals)- fertilisation- fruit- seeds- germination, etc;
- growth requirements:
- Animal growth:
- life-cycle of a mammal: egg + sperm - zygote - embryo - foetus - growth - adult.
- observe and discuss other examples of animal life-cycles, i.e. caterpillars to butterflies/ silkworms; tadpoles to frogs.
- Humans:
- basic needs (air water, food shelter, clothing);
- needs of individual as a baby, toddler, school going child etc.;
- include physical, emotional and other dimensions;
- simple sex education (video can be useful, followed by discussions);
- family planning methods, safe sex: risk of venereal diseases, risk of aids; overpopulation,

implications.

Unit 15: Natural and social adaptations (DE III)

Linked to units 2, 6, 7, 9, 10, 11 in the DE II course
Purpose: Each animal and plant is adapted to living in a habitat with particular features that best meet its requirements. However, each organism needs food, shelter, and a place to reproduce. Each organism has a role and function in an ecosystem.
Plants and animals interact with and are adapted to the non-living environment and the living organisms that surround them.
Curricular Links: science, geography, language, art,
Skills: observation, deductions, analysis, sorting and collecting of data, drawing)

Suggested Activities:

- Plants and animals adapt to the physical environment:
- list some environmental factors that affect living organisms in your region (wind, heat, rain, cold, shade, snow, waterfalls, high mountains, etc).
- Biotic environment (interaction and adaptation in structure and function to their biotic environment).
- Task: design an animal and a plant that would best fit into your local environment. Draw it, and describe its adaptations. For the animal- think about whether it should be big or small, what it would eat, and why. Will it live above or below the ground, and why. For the plant, should it be a tree or a grass or something else, why. What colour should it be, why. What other things can you think about, why.
- Adaptations of plants and animals and their interaction with humans:
- Plants as a source of food for humans;
- Useful products from plants: wood, leaves/ bark/ fruits (medicine), fibres (clothing), stems of grasses (thatch, baskets).
- Adaptations of animals for human use, (including ethics) i.e. sheepdog, sheep (wool meat), chicken (meat), etc. Possible visit to local farm/s to observe these practices;
- where does some of the important plants and animals that we use come from (potatoes- South America; wheat- Middle East; cattle and goats- Europe and Asia);
- Adaptations and changes in humans:
- lifestyles of people in different parts of the world i.e. nomads in the desert/ Eskimo in comparison to people in your community;
- why is there a difference? Does different environments require different adaptations?
- compare a day in the life of a person in your region a century ago, to one today. What will the main differences be. Discuss, list, and motivate why you stipulated certain statements;
- has the change in lifestyles effected the environment? How? (discuss the effects of machines, cars, and technology on the environment);
- as an example of human adaptation to the environment and to change, discuss the cycle of poverty, with reference to:
    - the causes of poverty, list a few;
    - the consequences of poverty on the family, community, country, world;
    - how does people adapt to poverty;
    - what are the environmental implications of poverty (natural, personal, social)?

Unit 16: Challenges (DE II and III)

Purpose: This unit is designed to enable learners respond in a positive way to the challenges of caring

for the environment, in order to promote sustainable lifestyles. Learners are made aware of understanding some of the challenges that the environment (local to global) is facing. Gain some understanding what individuals and communities can do to help improve the quality of the environment (to improve the quality of life).
Curricular Links: science, history, geography, mathematics, language, art, drama,
Skills: problem-solving, deduce, analyse, classifying and sorting, observation, empathy, values clarification

Suggested Activities: examples may include

- The issue of clear water:
- relationship diagram to explore the complex situation representing all the stakeholders (people, community organisations- angling clubs, organic farmer, farmers union, government- sewage works, water department, etc), role play as a visual representation of the problem can be employed;
- force field analysis to ascertain what factors drive or restrain change in this situation. Here the driving forces (to improve the quality of water) work in opposition to the restraining forces (holding back improvements).
  Factors to consider include:
  - sociological factors: improved environmental awareness vs. threat to jobs of local people;
  - technological factors: improved methods of water treatment vs. existing equipment and methods;
  - economic factors: high costs of new water treatment equipment vs. costs to local business;
  - political factors: the green vote vs. availability of national or local government funding.
- The issue of plastics: evaluate packaging, landfill (waste disposal) and analyse recycling schemes.
- Approach similar to above mentioned, after doing SWOT analysis of packaging and landfill.
- Saving energy: Each team decides which form of energy to promote, and embark on a campaign to advertise, and promote it. Poster displays, role play, local newspaper involvement, letters to town council, etc. Examples to include:
  - sun as the basic source of energy;
  - fossil fuels;
  - renewable energy (plant growth, solar power, wind power, water power;
  - geothermal energy;
  - nuclear power;
- energy for the future;
- caring for our environment: Our choices for the future.
- the challenge: getting the balance right;
- The strategy problem-solving via the action research method; problem solving of local, relevant environmental issue:
  - identify problem- investigate problem- evaluate data- list possible action- predict outcomes- select best action- implement action- evaluate action- identify new problem.
- Consider one of the greatest problems facing South Africa - informal settlements.

COURSE STRUCTURE

This course consist of FOUR modules, The duration of the modules extend over two years.

APPENDIX SIX

Module One includes only one unit.
Unit 1: Provides the philosophical and theoretical framework of the course. It is necessary for students to have the basic foundations so that the course can be more meaningful to them.
Covered in both the DE II and DE III courses.

Module Two includes seven units, and, although it deals with the natural environment, the interrelatedness is always stressed. Included are:
Unit 2: Ecosystem (DE II)
Unit 3: Energy flow (DE III)
Unit 4: Plants (DE III partly DE II)
Unit 5: Animals (DE III partly DE II)
Unit 6: Soil (DE II)
Unit 7: Water (DE II)
Unit 8: Air (DE II)

Module Three includes four units, and, notwithstanding (or underplaying the interrelatedness), relates to the socially constructed environment. Includes are:
Unit 9: All about ourselves (DE II)
Unit 10: Home (DE II)
Unit 11: The community (DE II and DE III)
Unit 12: The school (DE II and DE III)

Module Four includes four units, and relates to adaptations and changes in the environment. Included are:
Unit 13: Seasonal changes (DE III)
Unit 14: Growth (DE III)
Unit 15: Natural and social adaptations (DE III)
Unit 16: Challenges (DE II and DE III)

SYNTHESIS OF THE DE II COURSE (End of 1996):

The complexity regarding the strive towards education for sustainable living was explored with regards to summarising the modules in the light of:

- Sustainable living verses sustainable development in the growth mode;
- Biodiversity ideals and problems;
- Energy, atmosphere and climate changes - problems and strategies to combat these;
- Water - problems and strategies to overcome the problems;
- The interrelatedness between population growth, poverty and deterioration of the land.

These aspects were explored to further the goal of environmental education, in the light of education for sustainable living; underpinned by the development of a critical environmental consciousness, critical thinking and problem-solving skills, a critical eco-socialist environmental ethic, political literacy and critical praxis in the learner

APPENDIX SEVEN: Extract of first year Environmental Education Final Examination Question Paper

November 1996
Time : 1 hr
Marks : 50

Hewat College of Education
D.E. I
ENVIRONMENTAL EDUCATION

N.B. Answer TWO questions. One from each section.

SECTION A : (Answer one question from this section)

QUESTION 1 :

1.1 Refer to Figure 1 and write 1 - 8 underneath each other in your answer book and give the required weather elements as required. (The information appearing under each number serves as the clue to the required weather element.) (8x1/2=4)

1.2 Next to each answer to question 1.1 indicate the weather instrument used to gain the required weather data. (8x1/2=4)

1.3 How would you differentiate between weather and climate? Explain briefly. (2x2=4)

1.4 Figure 2 depicts the water cycle. Write 1 - 7 down in your answer book and briefly explain what occurs at each stage of the water cycle. (7x1=7)

1.5 Complete the following sentences. Only write the required word in your answer book next to the correct number.

1.5.1 One of the major factors that influence temperature is ..... - angular distance north or south of the equator.

1.5.2 Countries near oceans are warm in winter and cool in summer, and have considerable rainfall; their climate is described as .....

1.5.3 Countries in the middle of great land masses are hot in summer, cold in winter, and have little rainfall; their climate is said to be .....

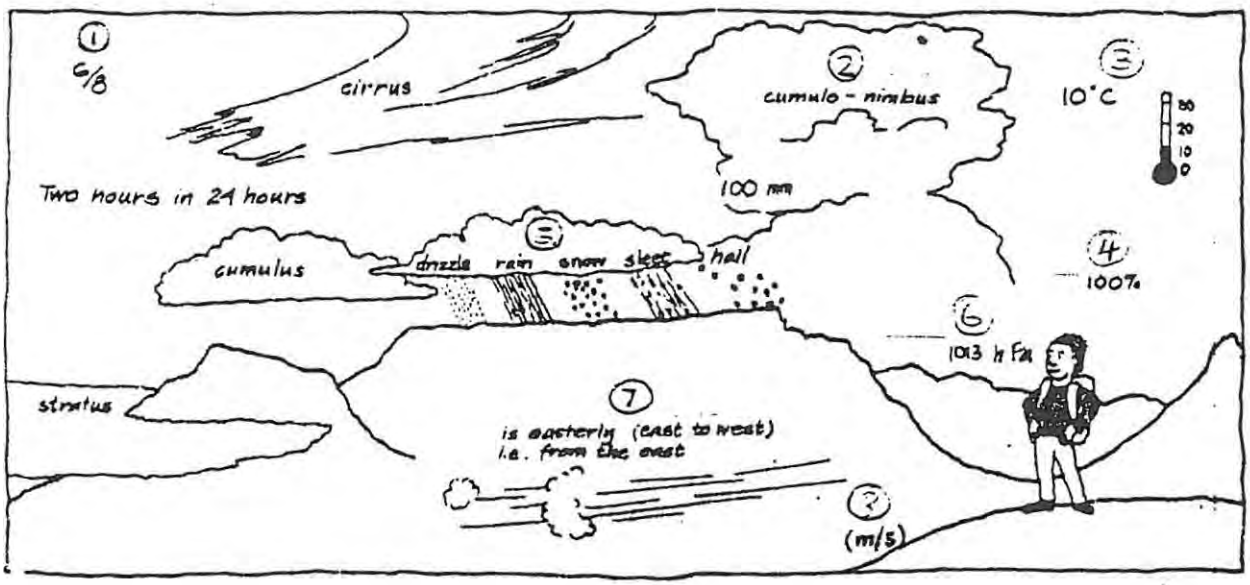
1.5.4 Temperature ..... as you go up a mountain.

1.5.5 Smoke and fog cause ..... over cities.

1.5.6 In the ..... the sun's rays reach the earth from a very low angle. (6x1=6)

/25/

FIGURE 1


1
6/8
cirrus
2
cumulo - nimbus
3
10°C
80
20
10
0
Two hours in 24 hours
100 mm
5
cumulus
drizzle
rain
snow
sleet
hail
4
100%
6
1013 hPa
stratus
7
is easterly (east to west)
i.e. from the east
?
(m/s)

EPILOGUE: Education for sustainable living: A local initiative

Between 1993 and 1995 an environmental education curriculum was developed by the researcher, in collaboration with the other members of the Primary Open Learning Programme (POLP) team. This curriculum was largely shaped by the data gathered for this research project. The curriculum, however, was developed for qualified teachers, at INSET level, who teach at schools where multilingual, multi-literate and multi-aged children were educated, all in one specific class-grouping. In February 1996, this course was implemented at the college where the researcher works (see Appendix six for a summary on the outline of the course). Final negotiations with POLP staff to obtain permission to implement the environmental education course (that had already been accredited by COTEP) proceeded right into the second week after the college re-opened. The researcher was made responsible for conducting the environmental education course for second years, under the auspices of the Science Department. The first year programme, however, was placed in the hands of the geography department which, after having had two consultation meetings with the science department, decided to follow a completely different programme (rather than the POLP programme[1]).

After having obtained permission from the POLP team, the science department decided to follow the POLP curriculum. The course, for several reasons, required considerable restructuring. First, students at the college where the researcher works were following an initial teacher education programme. Second, the curriculum had to be redeveloped for progression over two years, fulltime study. Third, the students were second year initial teacher education students, who were not introduced to environmental education in their first year of study. Finally, these students had very little classroom experience, outside of the three weeks practice teaching experience in their first year (1995) at college.

Prior to embarking on the presentation of the environmental education course, the researcher engaged with the students in order to ascertain, first, what expectations[2] they held regarding the course; and, second, what their perceptions of environmental education were. When the students' perceptions of environmental education were analysed, the researcher found that there was a great deal of confusion. For many, environmental education was equated with nature and conservation. Consequently, the

[1]The implications of this shift to the geography department are discussed later.

[2]The expectations of the students largely correlated with their perceptions regarding environmental education. For many, the expectations included practical hands on activities of plants and animals; also included were prospective fieldtrips and excursions.

researcher spent several lectures trying to break down misconceptions, while also trying to lay a foundation. This was the first stride in an attempt to address the **first recommendation** put forward from the research, namely that education for sustainable living has to be founded on the basis of suitable qualified practitioners.

Thereafter a broad outline of the course was given to each of the thirty students, and the researcher asked them, in a focus group session, to discuss which areas they would prefer to embark on first. This was a 'strange request', for two reasons. First, students were not used to being given the opportunity to decide on what they wanted to do, and second, environmental education was foreign to all of them. Having lost out on two weeks (until permission was obtained to implement the course), the researcher opted to take the 'safe route', and started the environmental education course with the Foundations component. This, in retrospect, had positive and negative aspects. Positive for the researcher, since it provided her with a 'safe crutch', for it was an area of the work with which she was fairly familiar with, and she could thus engage with the confidence needed for embarking on a new course. The researcher justified her choice by arguing that students needed a theoretical foundation before they could tackle environmental issues. This theoretical foundation, in the opinion of the researcher, will satisfy the **second recommendation** put forward from the research, that future practitioners of education for sustainable living require to engage with, and be exposed to ecosocialist environmental and socially critical educational ideology.

While engaging with this module, the researcher and the students grappled with the students' perceptions of the environment, of education, and then environmental education. Negative aspects included that students were often confused, as was reflected in some of their journal entries[3]. As the first term progressed students slowly came on board, as reflected in the journal of student Nobom: *"The subject is not straight forward to me, as I did not know what was happening during the first few lectures"*. Further negative aspects included that students were, at the onset, bombarded with too much theory[4], which is reflected in the journal of student Karin: *"Thus far [end of February 1996] the major*

[3]To introduce an avenue for students to reflect critically on their progress in the course, as well as on the course itself, the researcher and the students jointly decided that a journal will be kept where students could write down how they felt on various issues regarding the environmental education course. While this exercise did not prove to be too useful at the start, as the students gained confidence personally, as well as in the researcher, they felt more relaxed to voice their opinions.

[4]This urged the researcher to review her course outline, which resulted in the postponement of the section on the historical development of environmental education. In consultation with the students, a decision was taken by the group to revisit this section during the fourth term.

part of the course involved only theory, which got a bit monotonous and boring; until we actually started to apply the various theoretical foundations - only then did all the theory make sense".

After the perceptions on environmental education were covered, module three - the socially constructed environment was attempted. The reason why the researcher embarked on this module first, instead of the natural environment, was to deconstruct the students' initial misconceptions regarding environmental education. From the workshop strategy employed during lectures, the students could unravel the interrelatedness of the social, political, economic and natural facets of the environment. Some of them stipulated this in their journals, for example, as reflected in the journal of student Yoemna: *"In the Groupwork and discussions I really learnt a lot. As a person, I have grown. I understand the social, natural, personal, etc. are all interlinked"*. While most of the students' journals reflect that all of them enjoyed the workshopping strategies, as one student noted, this was not the norm as far as the other areas of the curriculum are concerned: *"Dis nie in elke klas waar ek die vryheid gegun word om keuse te maak nie"* [translated into English- I do not have the freedom to make choices in all the other classes]. This once again highlights the feasibility/ non feasibility of education for sustainable living, in isolation of an institutional ('whole schools' approach). It is recommended by the researcher that the participation and collaboration of all staff members is necessary for the realisation of the changes necessary for sustainable living, which include, for example, the furthering of democratic practices, and engaging in more creative strategies for learning. Moreover, to satisfy the **fourth recommendation** put forward from the research, namely that future practitioners of environmental education engage in alternative approaches[5] to curriculum development.

Other negative aspects included that the two lectures per week- two hours, were not sufficient. Very often, no proper report backs from the group work could be held. Also, while theoretical problem-solving strategies were attempted in class, students did not engage in real life problem-solving projects. Thus, a downfall was the theoretical nature of the course. This is reflected in the comments that some students made in their journals, for example, student Yoemna: *"I really feel that more practical work should be done because we are doing too much theory. Another factor that worries me is the time we have available, and we only get environmental education twice a week. This makes me feel that we are working too slow* [sic]".

[5]That such approaches mirror the principles of participation and collaboration, in addition to being grounded within local, relevant and critical grassroots practice.

A further negative factor to emerge from the student teachers' journals was the language issue. In the class there were students whose first language is Afrikaans (12); English (9) and Xhosa (9). While it was negotiated at the commencement of the course that English would be the medium of communication, college policy declared that all examinations be set in English and Afrikaans. The Xhosa speaking students were consequently at a disadvantage, not only as far as environmental education is concerned, but with all the content subjects since these are only presented in either English or Afrikaans. The political dimension of the language issue was also reflected as a major barrier by many of the students. One of the students (Wafieka), writes: *"Ek gesels met almal, maar somtyds voel ek of die Xhosa studente sê dat daar nie in Afrikaans gepraat moet word nie, en ek dink dat ons 'n keuse moet het om te sê met wie ons gegroepeer word"* [translated into English; I talk to everyone, but sometimes I feel that the Xhosa speaking students do not want me to talk in Afrikaans; I think that we must have a choice in deciding with whom we want to be grouped]. The grouping within, and between the different discussion groups in the class, almost resulted into a potential racial tension, for, as noted by Nobantu: *" It is hard enough to learn in English and Afrikaans, but our colleagues* [sic] *makes it worse, because when we do group work, you'll find that each racial group, group itself alone... Sometimes we feel rejected"*. To clear the air, the researcher, in conjunction with the students, decided that the discussion groups would be changed during each lecture period, and that any tensions needed to be confronted as these arose. While there was some improvement in the co-operation between and within the randomly selected groupings, the suspicion and mistrust created over three hundred years in South Africa are real and cannot be wished away; rather, they need to be confronted, and allocated time to be worked through.

In the light of the changes necessary for education for sustainable living, placed against the backdrop of the negative aspects discussed above, several flaws are evident in the environmental education programmes that were initiated at the college where the researcher works. First, the fragmented nature of the initial teacher education curriculum at the specific college was not conducive to developing an integrated, cross-curricular approach. Consequently, environmental education was introduced into the curriculum for initial teacher education as a separate subject, which had several negative effects. In this regard, it has been argued (see section 3.4.3.4) that the feasibility of education for sustainable living within initial teacher education programmes is subject to the participation and commitment of all the staff (teaching and non-teaching) and students at an institution. Reasons for this need include that the institution needs to 'mirror' an ethic of sustainability in its own functioning, which implies that a concerted effort by all is necessary to change towards an 'environmentally friendly' institution -

something which did not happen at the college where the researcher works.

Further flaws included that, at first year level, environmental education (at the same college) was placed under the auspices of the geography department. The nature (content emphasis) is a clear reflection of the bias towards the earth sciences (see appendix seven). This articulates the need for professional development programmes to operate concurrently for teacher educators, to satisfy the **first** recommendation (that teacher educators require a solid knowledge base) for justifying the need for such programmes. For this, policy is vital, since the fact that environmental education was functioning without the necessary policy for professional development, teacher educators did not see the need to supplement their knowledge base. As a result, the science perspective was perpetuated for environmental education a first year level, which brings into focus the failure to uphold the second recommendation (teacher educators need to engage with socially critical ideologies) for justifying the need for professional development for teacher educators.

Then, the curriculum highlighted further flaws. The curriculum, in terms of inclusivity (**recommendation three** put forward from the research), outlined in section 3.4.1

- acknowledges and places a great value on the position and experiences of diverse social and cultural groups;
- analyses inequalities critically, and counters them; and,
- identifies and strives to eliminate all barriers which frustrate the participation of stakeholders.

However, regarding the perceptions of the curriculum, with particular reference to the second year environmental education course which was presented by the researcher (see appendix six), the participation of all stakeholders has been but neglected. While a concerted effort was made to include the students' voices as far as evaluation and the selection of content is concerned, the participation of staff members and the schools were overlooked. The demoralising situation at the college and the surrounding schools was a major factor which impeded such interactions. Examples in this regard include the fact that the particular college where the researcher works faced closure at the end of 1996, and was to be absorbed into another college of education in the Western Cape. Consequently, many staff members were confronted with the possibility of retrenchment. Academic matters had to play second fiddle to endless meetings on amalgamation, rationalisation and staff retrenchments. The staff at the college was preoccupied with securing opportunities for employment elsewhere, and was not interested in considering curricular innovations. A similar scenario can be sketched for the schools, in

particular the schools where the students practice-teach, where many teachers are facing either redeployment or retrenchment. The demoralising situation regarding teacher education and the schools may also be ascribed to the downfall of the fourth recommendation put forward from this research, which calls for alternative approaches to curriculum development. Nevertheless, irrespective of the underlying causes, these inherent shortcomings demand attention, if education for sustainable living is to assume its rightful place in the curriculum for initial teacher education.

Furthermore, there is the flaw which emerged from the journal-keeping exercise. While the keeping of student journals allowed for some critical reflection, the time constraints did not allow for thorough follow up to engage, in a meaningful manner, with some of the concerns raised by the students. Also, only two focus group sessions could be fitted into the environmental education lecturing programme. These, however, mainly focused on reviewing the course and allowing students to decide on the manner and weighting of their assessment. Granted that this was the first time that environmental education had been implemented at this college, an attempt was made to further critical praxis (the **fifth recommendation** put forward from the research); however, there is still much room for improvement to make critical praxis the central feature of education for sustainable living.

And finally, pertaining to the **sixth recommendation** put forward from the research, much still needs to be done to establish the infrastructures that might facilitate and sustain a strategy for professional development programmes for education for sustainable living, that are not in existence.