ENVIRONMENTALISM IN EDUCATION - THE MISSING LINK

by
GARY ARTHUR GALANOS
B.A.(Natal), B.A.Hons.(Natal), H.D.E.(Natal)

Submitted in partial fulfilment of the
requirements for the degree of Master
of Arts in the Department of Geographical
and Environmental Sciences, University of
Natal

Durban, 1989

i

ABSTRACT

One of modern society's most pressing problems today is the environment with which it interacts. Though this interaction is inseparable, the environment has been treated as a separate entity. This lack of a symbiotic relationship between the society and its environment has produced certain pathologies such as increasing economic growth, excessive exploitation of resources, socio-economic inequalities, consumerism and environmentally insensitive planning and decision making.

Education is deemed in this thesis, as a determinant and potential transformer of existing socio-economic, environmental and administrative ideologies. With education/conscientization being regarded as the catalyst for societal change, Gramscian social theory is used to conceptualize societal functioning. Society has a hegemonic and counter-hegemonic realm. The `organic' intellectuals (leaders) within these realms will determine the nature and extent of political, socio-economic and environmental changes in society. A third grouping - the semi-hegemony - is recognized in this thesis. This group which includes tertiary educative institutions, plays a pivotal role between the hegemony and counter-hegemony in determining the nature of societal change. Universities could adopt a critical environmental paradigm. The environmentally conscientized intellectuals from these institutions can permeate the broader society bringing about gradual environmental, economic and societal transformations.

For this reason, the research sets out to gauge the extent to which environmentalism has permeated into some South African universities. The nature and quantity of environmental content in disciplines, the predominant ideological trends and interdisciplinary potentials are assessed. Though experiencing many shortcomings, it is found that these universities had the potential to foster an holistic environmental paradigm. In conclusion, a set of models are proposed that could strengthen the university's semi-hegemonic role; ensure the integration of an holistic environmental paradigm (via an Integrated University Environmental Programme); establish links between the semi-hegemony and the broader society; and allow universities to play a role in regional cooperation as regards the

promulgation of an environmentally based set of socio-economic and development policies and strategies.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MODELS

PREFACE

This thesis has arisen out of a critical reflection of the status of environmentalism in South Africa with particular attention being paid to environmentalism in education.

The term "environment" in the context of this work, is broadly defined to encompass the physical environment (natural and man-made) and the social environment (social, economic, developmental and political). These two broad environmental categories are intertwined. It is proposed here that the nature and type of education which is practiced:

(i) determines the extent to which environmentalism is permeating through the societal base of South Africa and in what form;

(ii) determines the extent of linkages between the concerns relating to the physical environment and social environment. This linking of the physical environment and social environment will assume certain relationship forms based on the predominating ideological trends;

(iii) determines the extent to which environmental education serves either to prop up and enhance, or critically question and change the existing socio-economic and environmental status quo. The extent and form of environmental conscientization has vast implications for decision making at all levels of government as well as at the corporate, developmental and planning levels.

It is thus not difficult to notice an inextricable link between geography with its primary emphasis on human-environment relationships (Haggett, 1979) and education as "initiator into worthwhile activities and modes of conduct" (Baker, 1974:48). Environmental education, arising out of this fusion, would presuppose "...the development of `environmental literacy' as a worthwhile activity and the environmental ethic as providing a worthwhile mode of conduct" (ibid: 48).

I perceive education as being the most important instrument in either bringing about societal transformation, or being `functionalist' in the sense of maintaining the present status quo. In line with this belief, a **dialectical** materialist approach is adopted in this research in which it is proposed that the economic and societal structures of society can both determine and be determined by the society.

The stance adopted in this thesis is that there is no one-way relationship between societal structures and the human agency. Thus the maintenance of or transformations of the popular consciousness of the mass of social members, ie. their ideologies and resulting actions in and upon the world arise from the contradiction between the forces and relations of production, as well as "...between ideas and reality and within consciousness itself" (Eyles and Evans, 1987:39). In accordance with this belief, the writings of Antonio Gramsci are drawn upon.

Gramsci arrived at the concept of **hegemony** in order to explain how society moves through a number of historical `blocs' or epochs during which a particular form of hegemony prevails - hegemony broadly meaning a ruling class or group of people with a set of economic and socio-cultural structures which serve to entrench its dominance.

However, within a society, a **counter-hegemonic** culture (subordinate class or groups with an alternative set of economic, political and social ideologies) emerges which challenges the existing status-quo. This is accomplished through education and conscientization on the part of informed leaders in whatever sphere of life, ie. professionals, administrators, academics and workers (organic intellectuals).

Though Gramsci perceives a clear distinction between hegemony and counter hegemony, the contention of this thesis is that an intermediary grouping exists in society which I term the semi-**hegemony** or **bipolar intermediaries**. This body within society comprises the tertiary educational institutions such as universities, technikons and training colleges; various autonomous and semi-autonomous urban and social research bodies; independent media and critical reformist political, educational and environmental bodies; development institutes and centres and so on. The function of this grouping is to **mediate** between the hegemonic and counter-hegemonic groupings within the society, and (together with its own major input) arrive at an outcome for society that will result from the relative contributions of these three groupings.

Though Gramsci makes only indirect reference to environmentalism per se, it can be incorporated into Gramscian thought with ease, since the environmental dimension is inseparable from the socio-economic and political dimensions of society.

The primary aim of this thesis is to evaluate and analyse the importance of a critical, holistic environmental education as a challenger to and modifier of the existing socio-economic, developmental, decision making, cultural and environmental status quo prevailing in the South African society. With this in mind, the tertiary educative component of the semi-hegemony, ie. the universities, come under the spotlight. Universities and other tertiary educative institutions have the role of inculcating an holistic environmental educative paradigm throughout their different faculties, disciplines, vocational and research departments. Organic intellectuals (professionals, trained specialists, academics and skilled artisans) are produced here, and fed into the hegemonic and counter-hegemonic realm in various ways to implement and disseminate the products of their knowledge. If these semi-hegemonic progeny are environmentally attuned and attempt to environmentally contextualize their tasks, the environmental dimension can assume an equal status to political, social, economic and cultural dimensions in determining the dynamic shift towards a new South African society.

Seven universities were chosen as case studies in order to assess and analyze; (1) the existence and **nature** of environmental education within the discipline departments; (2) the **importance** attached by departments to the role of environmental educative input in their curricula and their universities; (3) the relative predominance of technocentric, accomodatory and ecocentric **ideological** approaches to the environment adopted in the various departments of the universities (to be defined in chapter one and three); (4) the **interdisciplinary** strengths and potentials for promoting an holistic environmental education. The departments under review are divided into four educative categories (social sciences; physical and natural sciences; engineering and planning sciences; and the medical and health sciences) and compared across the four variables described above.

In the results and analysis chapter based on the abovementioned four criteria, a `State of the art' synopsis is arrived at as regards the evidence and nature of problems pertaining to and possibilities for an holistic environmental educative paradigm at the university level. A four staged set of proposals is then outlined that:

(i) would strengthen their semi-hegemonic role;

(ii) would ensure the integration of an holistic environmental paradigm that would involve the adoption of an Integrated University Environmental Programme;

(iii) would suggest ways in which the links between the semi-hegemonic and the broad societal base can be achieved;

(iv) would take universities beyond the national level to play a vital role in a mutual regional cooperation and coordination in respect of an environmentally attuned set of economic and developmental policies and strategies.

It is hoped that the readers of this thesis will at least be able to agree on two fundamental points:

1) That the missing link in education has been properly identified and retrieved.

2) That some attempt has been made, with the use of some simple theoretical tools, to weld the link back strongly into the realm of tertiary education.

ACKNOWLEDGEMENTS

CHAPTER 1

INTRODUCTION

"The temporary, shortsighted frenzy of
using up environmental storages succeeds,
but only in the way beetles and fungi
succeed while consuming a log. Their
reign is temporary" (Odum,1987:16).

The underlying connecting strand throughout this thesis is the concept of an holistic environmental education. It is posited that this concept needs to be deployed throughout South African society in order for substantial, pertinent change to occur in the socio-economic and environmental realms. The thesis sets out to ascertain the existing status of environmental education in tertiary educative institutions and presents a model of an education system to further strengthen and consolidate its status and impact.

While education has the ability to be functional, reflecting the existing socio-economic status quo, education also has the potential to play a crucial dynamic role in the **transformation** process, challenging existing social and environmental ideologies[1] and practices.

Gramsci's holistic conception of education provides a useful and productive conceptual framework for delving into the relationship between education and the societal milieu within which it operates. Education cannot be divorced from political and ideological conflicts. Society is a human construct, and because human thought and actions are dynamic, society is ever changing. The ability of society to create, absorb and execute knowledge ensures the pace and nature of ideological, environmental and social change. History and change is therefore perceived as being `open-ended', taking into account

----

1 Ideologies can be perceived as specific forms of **social consciousness** culminating in general frameworks of representative world views. In each given historical epoch there are contending ideologies which constitute the practical consciousness of people in different classes and groups who "...relate to and indeed more or less openly confront each other and articulate their vision of the right and proper social order as a comprehensive whole" (Mészáros, 1986:xii).

"...questions regarding human agency, culture, politics and **consciousness,** without the compulsion of reducing them to the outworkings of an economic logic" (Scott, 1986:57).

In this sense, ideologies prevailing in society are not viewed as an agglomeration of ideas functioning as a `social cement'. Ideologies are assumed to be social processes which overlap, clash, reinforce or subdue each other. Ideologies display plasticity according to Therborn (1980), who asserts that the explanation of the generation of ideologies will have to start from the processes of change in the structure of a given society and its relationships with its natural environment and to other societies.

Decision making rationales in the productive, social and developmental spheres are a reflection of the quality and content of education prevailing. The state of education does reflect the extent to which socio-economic, political, biophysical and development concerns are divorced from environmental concerns in decision making practices. Education can enhance the self-maintenance of present day culture. However, as a result of changes in the state of consciousness, society's objective form can change. Knowledge can simultaneously be not only explanatory, descriptive and adaptive, but also evaluative, critical, innovative and emancipatory (see Sayer, 1984:45; Braham, 1982:53-54).

Therefore it is proposed in this thesis that the role of education in societal **transformation** is to bring together socio-economic, developmental and environmental concerns, where all three are considered equally important. Such a holistic educational process incorporating environmentalism needs to challenge prevailing environmental ideologies promoting an alternative holistic environmental ideology. An understanding of present-day education in terms of its nature, quality and interdisciplinary potential is an important first step in moving towards change in education, and eventually society. The institutions of higher education are conceptualized as the catalysts of such change.

The primary aim of this thesis is to gauge the extent to which the environmental paradigm has been incorporated into the tertiary educational realm in South Africa. It is this educational level that is

perceived as being of central importance in bringing about changes in the socio-economic, biophysical,

engineering, planning and health domains.

Moreover, the tertiary institutions of education have the potential to perform the role of **mediators in**

society, providing or imparting an education that is relevant for the hegemony[2] and the counter-

hegemony[3]. The extent to which the tertiary institutions such as universities fulfil this role, will

determine the pace and direction of social change.

The philosophical framework within which these arguments are framed, is the dialectical human

agency-structure approach derived from **Structuration** theory (Giddens, 1981). The key assumption of

this approach is that society is not simply an economic construct molded by economic determinants

and resultant societal structures. It is also a <u>social construct</u> resulting from the actions of creative

people who can influence the predominant cultures and ideologies prevailing and instigate

transformations (Johnston, 1983). Given this relationship between societal structures and ideologies, it

can be reasoned that environmental ideologies and practices are the outcome of the dialectical

relationship between societal structures and human agency.

Environmental education has up to now received only token recognition and has enjoyed a relatively

low priority in South African education. Environmentalism is not being incorporated as a set of guiding

principles in education. Rather, it is included to serve the interests of the existing status quo, as

evidenced in the White Paper on Environmental Education (1989) and which shall be discussed in the

concluding chapter. Industrial capitalism is the predominant interest, with its `no-limits to growth'

----

2 Hegemony - Domination by a class or group through the special organization of `force', not only in terms of securing its own economic interests, but also in the moral and intellectual spheres. A social order is attained "...in which the hegemony of a dominant class is created and re-created in a web of institutions, social relations and ideas" (Dictionary of Marxist Thought, 1983).
3 Counter-hegemony - subordinate, non-ruling group or classes opposing the hegemonic culture. Intellectuals or leaders create an alternative culture based on worker and oppressed group self-consciousness (Biographical dictionary of neo-Marxism, 1985: 180). According to Gramscian theory the counter-hegemony will eventually gain hegemonic status imposing its own socio-economic and cultural interests throughout society.

ethic, resulting in the continued expansion of its resource base. As a result, economic and occupational concerns in education take precedence over environmentally related concerns. In this sense education develops peoples' potentialities which are consistent with prevailing social values, both moral and intellectual (see Brown, 1987:149).

Thus the environmental ideology prevailing in South Africa is one of exploitation of the environment as a resource. The **technocentric, instrumentalist** ideology prevalent (Fuggle and Rabie, 1983). Such an ideology assumes that economic growth and exploitation of resources can continue unabated and that scientific, technological, economic and political expertise provide the solutions to problems and matters relating to economic development, public health and safety, social welfare, planning and so on (O'Riordan, 1981).

It is suggested here that the lack of a holistic environmental education and the consequent continued employment of an implicit instrumentalist ideology in society and its decision making mechanisms, will reproduce existing environmental practices and maintain the status quo in South Africa.

Decision making regarding the environment needs to be democratized and made socially and environmentally accountable. The vital interplay between (a) the hegemonic concerns for the maintenance of the socio-economic and ideological status quo; (b) the counter-hegemonic concerns for social, political and economic justice and freedom; and (c) a critical, holistic environmental education process as a vital component of education per se that would impinge on both (a) and (b); will determine the level and direction of transformation in productive and administrative decision making policies and practices.

It is the contention of this thesis that a critical environmental education needs to be viewed as one direction which society needs to follow in order to change and survive. Environmental education therefore needs to be holistic, encompassing many fields of study in the scientific, technological, economic, biophysical, ethical and social realms. As such, environmental education in being

"...an <u>integrated process</u> dealing with man's interrelationship with his natural and man-made surroundings.....is intended to promote among citizens an understanding of the environment, our relationship to it, and the concern and <u>responsible action</u> necessary to assure our survival and to improve the quality of life" (Martin and Turner,1972:ix).

A primary goal of environmental education then is to foster a clear awareness of and concern about socio-economic, political and environmental interdependence in urban and rural areas (Tbilisi Conference, 1977 in Schwass, 1986).

Environmental education is a potentially powerful transformative tool and cannot be divorced from political and socio-economic issues. The politicization of environmental issues is essential in the South African context, especially if the counter-hegemonic realm is to adopt environmentalism into its socio-economic and political struggle.

Given the repression under which extra parliamentary, anti-hegemonic organizations have had to operate in South Africa, environmentalism could be lawfully and successfully adopted in justifying the need for social and economic change. Environmentalism is essentially a concept that has implications for all groups in society and is not of importance to either the hegemonic or counter-hegemonic groups alone. As such it can be deployed throughout the social milieu as a transformative tool.

Changes in the dominant economic and political system need to be accompanied by a new set of environmental ethics and codes of conduct. Failing this, continued destruction and mismanagement of the social and physical environments will remain a reality, resulting in a further deprived society.

The importance of environmental education in society has been highlighted. One final question needs to be addressed:

How is environmental education going to be introduced, developed and deployed through the societal base? It is contended here that the answer lies in the **bipolar intermediary** realm or **semi-hegemonic**

domain (my own terminology)[4]. This realm, comprising a large tertiary educational component orchestrates the interaction between the hegemonic and counter-hegemonic domains. Figure 1 illustrates the position of the semi-hegemonic domain in a society.

It is of utmost importance that the semi-hegemony work towards change in society through education in order that the hegemony, counter-hegemony and the semi-hegemonic realm can contribute to changes in the existing socio-economic and environmental status quo.

HEGEMONY	BIPOLAR	COUNTER H
Schools Development and planning bodies Conservation and wildlife bodies State publicat- ions Recognized poli- tical parties	Universities Technikons Colleges Independent media Critical refor- mist political education and environmental bodies	Critical media Trade Unions Peoples'education Subaltern commu- nity organizations Subaltern,radical political and education organiz- ations

CONTRIBUTE TO OUTCOME:

1. Persistence of economic, political and environmental status quo.	2. Hegemonic reform and change: alternate new economic and environmental ethics and practices; changes in decision making practices (democracy and participation).

Figure 1   The semi-hegemonic role in society

----

4 The intermediary realm or third component which I have identified within the social structure, has been termed the semi-hegemony or bipolar intermediaries. These terms have been chosen because this group falls neither within the hegemonic or counter-hegemonic domain, but interacts with both these societal polarities serving a mediating, pivotal role in society. Because such a grouping both supports and questions/challenges certain aspects of the hegemonic realm, it can be seen as both semi-hegemonic or semi-counter-hegemonic.

Within this theoretical framework, the position of the universities is focused upon to ascertain to what extent environmental education has been taught in these institutions and incorporated into a range of disciplines. This knowledge will test the potential that exists for change and provide the basis for the normative model proposed in chapter six.

The following hypothetical questions are posed in order to ascertain the status and nature of environmental education in the South Africa universities:

(1) To what extent do the technocentric, accommodatory or ecocentric ideologies prevail at South African universities?

(2) To what extent do university departments have an important role to play in an interdisciplinary environmental education?

(3) Does ideology affect the importance of a discipline's role in a holistic environmental education?

(4) Is environmental educative course content largely of (a) an **explicit** or an **implicit** nature and (b) an **important** or **potential** nature; and what influence do the educative categories have in determining the nature of this content?

(5) Do the environmental ideologies of departments affect the nature of environmental content?

(6) What bearing does the nature of environmental content have on environmental educative importance?

(7) Is there potential for interdisciplinary liaison and linking in respect of an holistic environmental education in general and within the range of educative categories?

(8) To what extent do the environmental ideologies prevail within the four educative categories (social sciences, physical sciences, planning sciences, health sciences)?

(9) Do the educative categories have a bearing on interdisciplinary potential?

(10) Is there a significant relationship between environmental ideologies, educative categories, the nature of environmental educative content and interdisciplinary potential in determining the outcome of environmental education at South African universities?

(11) What is the overall status of environmental education in South African universities?

Chapter two provides a theoretical overview of education as both determinant and transformer of existing socio-economic, environmental and decision making ideologies and practices. Attention is focused on the defining of an holistic environmental education; the nature of bureaucracies and decision making and the concomitant role of education; education as maintainer of socio-economic and environmental ideologies; education and its impact on consumerism; the Gramscian conception of education, the status of environmentalism in education, the potential critical role of education; and the role of the semi-hegemony. Without painting the broad scenario in terms of the role and influence of education in society in general, one cannot begin to grasp the importance of and implications for our society of an holistic environment education.

In chapter three, the three predominant environmental ideologies prevailing in society are focussed upon and illustrated with South African examples. The nature of education in South Africa as determinant of the existing political, socio-economic, planning, developmental and environmental status quo is given attention. The lack of environmental conscientization in the counter-hegemony in South Africa is addressed. The potential for the incorporation of an holistic environmental paradigm into the South African semi-hegemony is tackled. The execution of an holistic environmental education by the semi-hegemony into the South African society is also examined. The chapter ends with an

insight into the problems and possibilities of adopting an holistic environmental paradigm into the

semi-hegemony; and the potential influence of the semi-hegemony and its holistic environmental

paradigm on bureaucratic and decision making concerns.

In examining the socio-economic, decision making and environmental ideologies and practices

critically, the object of my inquiry in the theoretical chapters is to assess the role of education in its

"dialectical totality" (Gregory, 1978) as a determinant and potential modifier of the existing status quo.

The transformative role of education in the semi-hegemonic domain is given attention. By doing this an

understanding of the need for an effective semi-hegemony to convey a relevant and holistic

environmental education in South Africa will emerge.

Chapter four outlines the method of quantitative analysis followed in answering the research questions.

The research rationales, procedures and definitions are outlined.

In Chapter five an assessment and comparison of seven major universities is presented with a view to

answering the hypothetical questions outlined. A quantitaive and qualitative analysis of environmental

education at the university level is undertaken and the status of environmentalism in the South African

semi-hegemony is presented.

The sixth chapter centers around the problems with and possibilities for the incorporation of

environmental educative input into university departmental and degree syllabi. Suggestions for an

improvement in the status and application of environmental education are presented. The possibilities

for interdisciplinary contributions and liaison in providing an holistic environmental education will also

be dealt with.

The thesis concludes with suggestions on how universities could perform their role as bipolar

intermediaries in respect of the hegemonic and counter-hegemonic domains. Suggestions on how this

role may be strengthened both in the national and international arenas, will be outlined.

CHAPTER 2

EDUCATION AS DETERMINANT AND POTENTIAL TRANSFORMER OF EXISTING SOCIO-ECONOMIC AND ENVIRONMENTAL IDEOLOGIES AND PRACTICES

2.1. Introduction

> " The educational relationship should not be restricted to the field of the strictly "scholastic" relationships by means of which the new generation comes into contact with the old and absorbs its experiences and its...values and "matures" and develops a personality...which is historically and culturally superior. This form of relationship exists throughout society as a whole and for every individual relative to other individuals........**Every relationship of "hegemony" is necessarily an educational relationship**" (Gramsci, in Adamson,1980:142).

In this chapter, a theoretical overview of education as both a determinant and potential transformer of existing socio-economic, environmental and decision-making ideologies and practices, as well as consumerist ethics is provided. With education being one of the major catalysts for change in society as a whole, it is important to examine its role in order to explain the current status of environmentalism and the prospects for change.

2.2 The Nature and Role of Education in Society - an Overview

Whereas education can be viewed in a functionalist sense as maintaining the societal, economic, administrative and environmental status quo, education is also a vital link to a society's dynamism.

Education as a **process of change** is the key to the generation of ideologies. Education and its relationship to the natural and social **environment**, is dialectically related to the economic bases of the ideologies that arise. Environmental education in the holistic sense, should therefore be viewed as a process of change forming a crucial relationship between the environment and the socio-economic status of a society. The nature and impact of environmental education in the future will constitute the material determinants of a new set of socio-environmental ideologies.

2.2.1 Environmental Education - towards a Definition

Before embarking on an assessment of education as a determinant and dynamic transformer of the existing socio-economic, environmental and administrative ideologies and rationales, it is necessary to define what is meant by an holistic environmental education.

Environmental education in essence is

> "..a process aimed at producing citizenry that is <u>knowledgeable</u> concerning the <u>total</u> <u>environment</u> and the role of (people), able to <u>participate</u> in activities for maintaining and improving the quality of the environment, while meeting human <u>needs</u>...." (Saveland,1976:201.Parentheses, my own).

Furthermore, environmental education can be perceived as the

> "...process of recognizing values and clarifying concepts in order to develop skills an attitudes necessary to understand and appreciate the inter-relatedness among (people), (their) culture and biophysical surroundings" (Briceño and Pitt, 1988:115).

Environmental education also entails "...practice in **decision making** and self-formulating of a code of behaviour about issues concerning environmental quality" (Cerovsky,1971 in Saveland,1976; Carson, 1978).

From a societal perspective environmental education would have as one of its aims the synthesis of close, mutual interactions between people and the environment. Another aim would be the changing of values and ethics that guide societies' present day interactions and relationships with the environment. The result would be a shift towards `symbiotic connectivity' between society and the environment in its **totality** (Sayer, 1984; Scott, 1988).

Environmental education, in accordance with these aims has the task of resolving crises which are occurring in present day society, ie. (1) the **physical** crisis (ecological destruction, destruction of human and non-human habitats, increasing industrialization, overpopulation, poverty, war,

unemployment, health issues); (2) the **psycho-social** crisis (social and psychological pathologies and illnesses); (3) the **aesthetic** crisis (degradation of urban environments, lack of harmonious human-environment relationships); (4) the **intellectual** crisis (the `scientistic', technological, specialist emphases in education, lack of moral and ethical competence and guidance); (5) the **spiritual** crisis (the increasing irrelevance of present-day religious practices and the search for stronger spiritual-environment links) (Braham, 1988).

2.2.2 The Fragmented Nature of Education

The ignorance on the part of society to take cognisance of environmental concerns can in part be attributed to the division of labour in society. Industrial society, in accordance with its emphasis on bureaucratization and social hierarchies, relies on a rational division of labour upon which the administration of the modern social and economic order depends. In order for education to achieve this goal, fields of specialization have to be delineated. Intellectuals have to confine themselves to the rigorous exposition of exclusive subjects and disciplines (Weber, in Giddens, 1972).

Weber perceives the internalization of objectivity and neutrality in education as a counter force against the dissemination and indoctrination of value judgements. Within this perspective, universities and educational institutions can only advance value positions if all points of view are represented (Weber, in Giddens,1972: 48-50). Should this not be the case, then schools would become state institutions for the training of a loyal body politic and universities become state institutions for the training of loyal administrators and practitioners (Giddens,1981:143-44).

Whereas Weber's approach to education could be viewed as an attempt to arrest education from the political arena and from its use for propagating certain value-judgements in society, it is nonetheless utopian. Education in whatever form is a determinant of the nature and dynamism of society. Education, with its current emphases on subject and career specialization, skills training, differentiation and scientific, technological knowledge (see Jungk, 1972) has halted the infiltration of

an holistic environmental input. This has served merely to impede the transformation of social policy

and knowledge (Sandbach, 1980, in Short, 1985). Contemporary education continues to justify (1) the

continued expansion of bureaucratic structures and resultant decision making rationales and practices

in the productive and administrative spheres; (2) the socio-economic and technological rationales of

industrial development and natural resource management with the concomitant environmental

denudation; (3) the expansion of commodities in terms of varieties and quantities in order to satisfy

consumerist ethics and appetites; (4) the placing of environmental studies as a separate field of study

divorced from its real potential as a interdisciplinary phenomena with environmental issues and

problems being resolved at the restricted, cosmetic level; and (5) the division of society in terms of

class hierarchies, status groups and access to societal privileges in South Africa. This is ultimately a

reflection of the means and relations of production. This particular point is elaborated upon in chapter

three.

2.3 Education and Bureaucracy

Bureaucracies are a dominating component of any modern, industrializing society since they in essence

guide and administer the society in respect of the macroeconomy, planning, development, state and

local administration and the environment. Education as a creator, maintainer and potential

transformer of bureaucracies is focused on especially as it relates to their role in the environment.

2.3.1 The Nature of Bureaucracies

Hegel views bureaucrats as delegates of political power legitimated by technical competence. Weber

elaborated upon this theme by considering bureaucracy to be a product of industrial society and as a

result of the need for professional expertise. Bureaucracies[1] were " formally the most rational known

---

1 Bureaucracy may be equated with centralized administration or officialdom (Concise Oxford
Dictionary, 1976) in the public and private sector. Bureaucracies are synonymous with modern state
apparatuses based on the emergence of "...expert officialdom, based on the division of labour" (Weber
in Giddens, 1981). Bureaucracies tend to perform a centralizing function in society, with the result that
the public administration and the economy are becoming increasingly more corporate in nature (Short,
1982:103).

means of carrying out.... domination over human beings" (Rudolph and Rudolph, 1979).

Human society is replete with irreconcilable values, which in turn demand political decisions as to what costs will be accepted for what benefits (McNeil, 1978). The bureaucrat believes that public issues can be resolved in terms of rational objective standards of legality or of technical practicability (Peters, 1981).

Bureaucracies are run in accordance with rigid rules and procedures through positions which individuals occupy. These positions are arranged in hierarchies and hiring and promotion of personnel is based on technical competency and specialized qualifications (Hall, 1963). This aura of bureaucratic control produces increasing stability in the sense that

> "...(w)orkers comply with company rules because of the possibility of promotion through this finely graded job structure. Promotion procedures are highly formalized with the criteria known to workers" (Murray and Wickham, 1985).

Though they may be part of an impersonal apparatus, bureaucrats, by believing in their own objectivity in interpreting the national interest, can assume enormous power. This power lies in their specialized knowledge and experiences and in the cloak of <u>secrecy</u> surrounding `official' knowledge with which they conceal their operations and which is only available "...through means of the administrative apparat" (Weber, in Beetham, 1974).

There is the tendency then for bureaucracies such as state apparatuses to exceed their advisory and executive functions and to come to control the <u>determination of policy</u> as well. Taking the area of public policy making for example, there has been a concern expressed with the authoritative, intentional allocation of values for a society (Nadel, 1975).

The public has become increasingly alienated from governmental and corporative decision making because there are often no channels of communication for transmission of information or expression of views. There is increasing apprehension when decisions which affect the lifestyle, social relationships

and aspirations of the individual are made without consultation (Derrick Sewell and O'Riordan, 1976). Environmental issues and policy making particularly suffer from bureaucratic inertia, bias and accepted procedures (Peters, 1981).

2.3.2 <u>The Role of Education in Bureaucracies and the Potential Role of Environmental Education</u>

When examining the nature and impact of bureaucracy, the role of education in its creation and propogation becomes clear. It is ironic that given the scientific, technological and atomised nature of knowledge required and implemented in bureaucratic structures, bureaucracies have not been neutral implementors of policies. As Gramsci pointed out, bureaucracies are a political and a technical fact. While the ruling classes and groups require loyalty to the state and to their policies from the bureaucrats, the subordinate classes and groups can demand of them only technical efficiency in the exercising of their functions (Migliaro and Misuraca, 1982).

Though councillors in local authorities are elected by the body politic, these representatives come face to face with the complex structures of local authorities and the technical expertise of officials upon which they become dependent (Dennis, 1972 in McCarthy and Smit, 1984). Councillors have to often make faulty decisions based on information that is far too technicist and jargonistic for comprehension (McCarthy and Smit, 1984:127-128).

At the level of **planning**, environmental considerations are also manipulated in such a way as to favour the upper income groups. For example, "...low income housing projects are located in areas where they cannot harm the `environmental quality' of upper income neighbourhoods" (McCarthy and Smit, 1984).

Likewise, developers and landowners are able to wield influence on planners and decision makers in bureaucratic institutions in order to create a physical milieu which suits them. This is because they have "..superior information resources to impress their cases upon decision makers" (McCarthy and Smit, 1981) as opposed to the local politicians and the body politic.

It becomes apparent that there is an inextricable link between class and group domination and the functioning of state and corporative apparatuses, with education either maintaining or transforming this link.

This linkage must be perceived in the light of the coercive and adaptive roles of the state. The state is identical with the government, the apparatus of class domination with its coercive and economic functions (Poulantzas, in McCarthy and Smit, 1984). This class/group domination is exercised through state apparatuses such as the police and the administrative bureaucracy. But this coercive function of the state cannot be separated from the adaptive and educational role of the state which has the aim of

> "...creating new and higher types of civilization; of adapting the `civilization' and the morality of the broadest masses to the necessities of the continuous development of the economic apparatus of production" (Gramsci, in Buci Glucksmann, 1980:92).

Given this nexus, it appears that environmental education as an instrument in economic and social transformation has been slow in gaining momentum. It remains in the interests of the hegemony to relegate environmental education to a minor position in the educative realm as well as in its other bureaucratic institutions.

There are always social and political imperatives behind environmental action. The economic and social systems under which we live determine our capacity to meet basic human needs. Redclift (1984:130) defines these determinants as `inner limits' and asserts that

> " (w)ithout changing these systems radically, the inner limits will continue to press on resources in ways which are more harmful to some groups than to others (ie. unequal distribution of and access to resources). Conservation will continue to be seen as a management exercise, designed to ensure that a privileged population has access to a privileged environment" (Parentheses my own).

The contention here is that environmental education and its ideological facets can only become important when they can be translated into "collective" social forces:

> " For a mass of people to be led to think coherently and in the same coherent fashion about the present world, is a `philosophical' event far more important and

`original' than the discovery by some philosophical `genius' of a truth which remains the property of a small group of intellectuals" (Gramsci, in Boggs, 1976:33).

Environmental education and its incumbent philosophy must move away from an elitist stand and must appeal to the majority of the body politic. It remains the role of the semi-hegemony in its pivotal role, to provide an environmental education that can appeal to the counter-hegemony. At the same time it must be seen by the hegemony as a valuable tool in bringing about reform into the environmental sphere without being seen as detrimentally subversive. Within the hegemonic domain, one area of reform resulting from an holistic environmental education would be in the realm of decision making in the economic, social and developmental spheres.

2.4 Education and Decision Making Practices

Decision making and the resultant policies and practices in the productive, social and developmental spheres have been guided by political and socio-economic imperatives that deny necessary environmental input. Resultant decision making rationales at all levels of administration and in any sphere of South African society have been inappropriate, destructive and functionalist with regard to the environmental dimension.

The nature of education practiced impinges directly on the nature of decision making rationales, techniques and resultant actions that occur. In other words, it can be gauged from the nature of decision making practices to what extent education supports and enhances an existing economic, political and environmental set of ideologies and practices; or attempts to treat the symptoms of existing problems in society without diagnosing the causes.

In support of the assertion that education can serve to support the status quo ideologies, it can be observed that decision making at every level of administration and in every sphere of society (private and public) continues to justify the exploitation and neglect of the environment. There are countless `decision makers' who out of ignorance take actions that damage and deplete our natural resources

and destroy our natural and built environment. The farmer, chemist, planner, builder, industrialist, engineer, the medical and health professionals, civil servants, members of parliament and local authorities are all in a position of power to transform and act upon the environment but lack a knowledge of environmental principles. " When we add to these the great mass of the population...without even a rudimentary knowledge about their environment, we should be amazed at our own stupidity..." (Broad,1969, in Carson, 1978:ix). Society seems "...unable to say yes to its future because it does not say YES to the activity on which that future depends" (Coggin, 1979:4), ie. environmental conscientization and action.

Common omissions and flaws in decision making procedures would include:

(1) a failure to include the full scope of risks, costs and benefits in decision processes that affect public interest;

(2) a bias toward decision considerations for which numerical data exist reflecting the magnitude of societal impact, and away from those that are qualitative;

(3) a tendency towards avoiding controversial considerations that frustrate closure in the decision process;

(4) a deference toward a level of decision making that omits important potentially persuasive key facts resulting often in mere assertions of opinion;

(5) a common tendency to develop estimates of costs and benefits based on historical information rather than on forecasting;

(6) a failure to address inherent conflict between equity considerations and the common good of society in policy development;

(7) an assignment of analytical responsibilities into narrowly defined categories resulting in the lack of an interactive, interdisciplinary analysis (Spangler, 1985).

Such inadequacies are just as applicable in environmental evaluation practices and resultant decision making. Present evaluation techniques lack comprehensiveness. Assessments misinterpret the feasibility, efficiency and ordering of choices. Environmental assessments have been too scientific and

technicist, creating technological and value conflicts which create and heighten social problems (Davos, 1977).

However, an interactive approach to decision making where scientific and technological considerations and social, political and environmental considerations are equally and interactively investigated and worked upon, remains an illusion because of the lack of an holistic knowledge. Ignorance on the part of the planners, bureaucrats and the citizenry brings about inappropriate decision making.

One solution to breaking this deadlock would be the fostering of a new environmental education which should attempt to actively change the status quo supporting characteristics of education. The ideological bases of society would be questioned and attempts made to challenge and alter the existing environmental status quo. Furthermore environmental education would seek to diagnose and act upon environmental problems. Decision making rationales and policies in every sphere of society would be guided by this critical education.

The underlying question that has been asked up to this stage is why education has had little impact in changing the nature of bureaucracies, decision making practices and the fragmentation of disciplines/knowledge, especially in respect of the environment. The answer to this question lies in the function of education with the capitalist, industrial context, which is now examined further.

2.5 Education as Maintainer of Socio-Economic and Environmental Ideologies

Education within the capitalist, industrial context has attempted to produce and maintain:

1) compliance by the majority of society with the economic, developmental and environmental decisions and rationales of professionals, managers, officials and politicians.

2) a low number of intensely alienated persons who are willing to challenge societal institutions and to question the larger structural and superstructural effigies of society.

3) "A supportive social structure and body politic on which the separate organizations..of the technostructure can depend to furnish the needed reservoirs of manpower, credit, social order, and other requisites of success" (Miles, quoted in Giarini and Louberge, 1978:97).

Harping on point one above and taking the examples of cost-benefit analyses and impact statements into account, a link can be established between education and various forms of decision making criteria.

Cost-benefit analysis has been a narrow approach used by decision makers in investigating environmentally related matters. Only those elements that can be translated into cash terms are included in such an analyses. The major reasons given by decision makers for this, have been the high costs and the technical difficulties of investigation. A scientific and economistic approach has been utilized with less quantifiable environmental and social effects being ignored resulting in poorly conceived, misguided environmental decision making (Sandbach, 1980). Emphases is on the `here and now' as opposed to more futuristic thinking. thinking. Decision making is viewed as resource allocation solely with political aspects of decision making and public policy making being disregarded (Dror, 1967, in Sandbach,1980:58).

As such, cost-benefit analyses as well as other "objective", quantitative evaluative techniques must be seen as a product of the type of education practiced. Education in this sense ultimately reflects the needs of the capitalist economy and its societal ramifications, such as the bureaucratic decision making practices which it produces.

Policies can only claim to be legitimate if judged against the fundamental beliefs and political principles of the community and to be responsive as they purport to satisfy the basic needs of the society as a whole (Manzer, 1984). However these fundamental values and `basic needs', are also determined by the process of education and so often policies are accepted without any critical questioning by the body politic.

In essence what is lacking is public participation and consultation in the decision making processes which would (i) provide more holistic and systematic appraisal of environmental impacts; and (ii) enable the general public to contribute in a meaningful way to the decision making and planning processes for developments having a direct effect on their future environment (Jain,et.al, 1981; Lee and Wood, 1978).

2.6 Consumerism

In South Africa as in any other industrialized and industrializing society, the tendency to divorce socio-economic factors from environmental realities is manifested in the **consumerism and commodity fetishism**[2] of the society.

Media and communication techniques have resulted in people in industrial nations purchasing and relying on commodities and resources that stretch far beyond what is in fact required to fulfil `basic' human needs, ie. a weather proof shelter, essential clothing and nutritious simple foods and liquids. With the market system operating on the basis of financial transactions it can be expected that the discrepency in `welfare' between the upper and lower classes will continue, having very real impacts on the environment. The rich will continually exploit the market and create `needs' in order to sell their products at greater profit which in turn promotes the extraction of further raw materials.

An increasing middle class with rising salaries become accustomed to having more commodities to fulfil their consumerist appetites. The working class, constantly bombarded with media and

---

2 The attainment of commodities and acquisitions as a basis or expression of social relationships. Society becomes obsessed by and tied to the production and exchange of commodities with a myriad of use values, thus creating new demands, more competitiveness and ultimately individual alienation (Marx, in Harvey, 1973:156-157; Harvey, 1984:17-18).

advertisements as well as a desire to upgrade their standards of living, attempt to utilize their labour power to its fullest. This is an advantage to capital owners not only in terms of the increased productivity, but also because the working class will buy back the very products they as a class are responsible for producing. The spiral of profiteering, the exploitation of raw materials and denudation of the environment as a result of rampant urbanization and exploitative development, continues unabated (Harvey, 1982).

With an increase in wages or alteration in the value of labour power which the workers constantly strive for, consumerism is likely to increase (with the conversion of luxuries into necessities) with the constant contradiction between the importance of buyers of commodities for the market, and the tendency of capitalist society to keep labour power at a respectful minimum price (see Capital, Vol.2,p.341; Vol.3, p.188, in Harvey,1982:90). Education and more particularly educative media can be viewed as a major catalyst in this spiralling crisis.

The **advertising** industry is indispensable to the **creation of demand**. Advertisements, television and other educational media directly determine consumer patterns and dominate consumerist trends (Baudrillard in Lash and Urry, 1987:288). These consumerist demands have fueled the growth of industries that do the most polluting and in which resource-wasteful technologies are concentrated (Roberts, 1979).

The Frankfurt School of critical theorists (Adorno, Horkheimer, Marcuse, Lowenthal) attribute the formation of a new cultural `industry' to new techniques of cultural production and reception such as printed media, radio and television. The new products of `mass culture' (mass transportion and communication, housing, food, clothing, luxury goods, entertainment and advertising) serve to satisfy the material needs and wants of people, as well as enhance political and social control, `cementing' mass audiences to the socio-economic status quo (Held, 1980; Marcuse in Bowie and Simon, 1977;

Marcuse in MacIntyre, 1976).

Furthermore, in Marxian terms, it is in the interests not only of capitalists but also the state to create a demand for goods by optimizing the consumer habits of the lower classes. Every effort is made to educate and train these subaltern classes and groups with the necessary mental and moral `powers' in order for them to become `rational' producers and consumers (see Harvey, 1984:90-91). Education is designed and executed in such a way that people become culturally `hypnotized' into accepting the socio-economic status quo.

In this context, the nature of environmental education will be such that it does not question the consumerist economy in which we live, other than in very cosmetic terms. For example, anti-litter and pollution campaigns and awareness programmes will look only at effective ways in which commodity litter and other pollution can be disposed of or reduced. What is left unquestioned are problems relating to the mass use of resources for mass production; the production of wasteful, unnecessary products; built-in-obsolescence of products and the non-decomposing composition of synthetic materials. Most importantly, the societal and economic rationales for the exploitation and despoilation of environmental resources and the reasons for the lack of environmental awareness amongst the broader populace are left unquestioned and unresolved.

2.7 The Gramscian Conception of Education, the Related Status of Environmentalism in Education and the Role of a Critical Education

Though the issues of why environmentalism has been slow in its incorporation into the educational structures; and the particular nature of this environmental basis in education as practiced today have been given consideration, further elaboration is required. Hence attention is now given to the role of critical education and its relevance for environmental education.

In answering these questions, it has to be borne in mind that individuals are born into a world in which there is a dominant ruling class or group/s which have assumed an hegemonic position in society. Such a group or class will try to retain political legitimacy by weaving its own outlook deeply into the social fabric. To pursue this purpose it will place its own organic intellectuals or transmitters of ideas within civil society at vital points within the cultural, economic and social apparatuses of the society. This has the effect of inculcating particular world views into the realm of high culture which will "(t)rickle down and solidify into "common sense", the `folklore of philosophy'" (Gramsci, quoted in Adamson, 1980).

This notion of `common sense' represents the point from which a genuine political and environmental education must depart. Common sense can be viewed as a built-up storehouse of "knowledges" drawn from earlier ideologies, past phases of history and culture and from a variety of social classes (Hall, Lumley, and McLennan, 1983).

Common sense could be perceived as a series of stratified deposits continually transforming, enriching itself with scientific ideas and with philosophical opinions which have entered everyday life. Because of its stratified character, and being anchored to the interests of the ruling class, common sense is more likely to incorporate philosophical challenges such as environmentalism as new sedimentations, than it is to be exposed and overthrown by them. Taking the problem of inequality to illustrate this assertion, Smith (1979:69) reflecting on American society, maintains that this problem has

> "...arisen and remained unsolved because of an idolatory; wealth and the power it brings are valued over persons and the varieties of human need. <u>Were it not for our commitment and devotion to existing economic arrangements and institutions</u>, novel ideas and novel ways of organizing and managing wealth and of eradicating poverty might emerge. Our great difficulty in conceiving new ideas and ways may only indicate the measure to which the old idolatory holds us captive".

To supersede the present common sense notion of the environment, the body politic must be led to a `series of negations' which expose, challenge and repudiate the prevailing common sense. This can be

accomplished by a formal and informal political and environmental education in whatever institutional

setting.

Gramsci envisaged intellectuals playing a key role in the development of a climate of change, a

movement which would be the result of a gradual change of individual consciousness. Gramsci

extended the concept of revolution into the term `subjective revolution'. This entailed not only

change in class and group relationships but in people themselves, in their way of thinking, living and

relating to other human beings (and their environment), their culture as well as their role in society.

People have to educate themselves about the real meaning of wanting a new society and must

understand and be ready for all the implications of creating a new order (Giachetti, 1972: parentheses

my addition).

In this sense everyone is an intellectual. By the exercise of a skill, by knowledge of a language, every

person

> "...carries on some form of intellectual activity ,that is...he participates in a particular
> conception of the world, has a conscious line of moral conduct and therefore
> contributes to sustain a conception of the world or to modify it...." (Gramsci, in Joll,
> 1977:91).

In essence then, people can formulate general ideas about the world on the basis of their experience.

New experiences lead to new ideas leading to correction or expansion of existing ideas (ideologies)

over time (Roberts,1979). Education does not only play a crucial role in the legitimation of the

dominant hegemony. It can also establish a counter-hegemonic culture. Gramsci recognizes human

beings as the vehicle by and through which change can be developed (Robinson, 1981).

Within a class or group there are organic intellectuals who provide that class or group with its

homogeneity and an awareness of its own function, not only in the economic but also in the social and

political fields (Gramsci, in Adamson, 1980). Gramsci included the scholars, the writer, the teacher,

academics and lecturers, and other **transmitters of ideas** within civil society as organic intellectuals. Under capitalism, organic intellectuals would include specialists in management and industry; state, provincial and local administrators and personnel; and other professionals in various fields such as education, planning, commerce, religion, culture and conservation. For the subaltern classes and groups, intellectuals and intellectual sources would include trade union leaders, student movements, shop foremen, political movements and activists, community movements, alternative education bodies and so on.

According to Gramsci, ideas cannot be understood outside their social and historical context. As it applies to human nature there is no such thing as unchanging human nature, but only historically variable social relationships. In the various dimensions of the `superstructure', eg. education, social classes and groups become aware of their position and opportunities and are able to change the social conditions of which they become conscious. This is a continuous process of removing ideological obstacles in the form of social practices, ethics and morality (Kolakowski, 1978; Hindess and Hirst in Skillern, 1985).

The question to be asked then, is why environmental education has not assumed its important role in contributing to economic and societal change? The answer can be found in the inadequate, restricted and status-quo maintaining incorporation of environmentalism into education. Environmental concerns have evidently not moved beyond the surface level of consciousness of a comparatively few, enlightened individuals. It is seen as primarily a concern that those who are materially well-off can afford to indulge in (Redclift, 1984). Environmentalism as an holistic paradigm, has not been included in the collective social consciousness. Present-day environmentalism is a concept molded by the

> "...material conditions of existence....from the conflict existing between the social forces of production and the relations of production (as well as)...such elements as intellectual activity, political and ideological factors" (Goldberg, 1981:37-38 - Parentheses, my own).

An environmental education which divorces itself from social and economic realities and focuses on important but mundane topics such as preservation of existing natural and wildlife sanctuaries stressing ecological, biophysical concerns, is doomed to maintain an isolated, subservient status. As O'Riordan (1981:309) states:

> "If all groups of labour are to continue to improve their financial well-being..., then the only `exploitable' resources that can continue to suffer without...political backlash are the natural environment and the amenities of our social existence. Faced with the choice between a definite curtailment of real income and increased environmental stress which will be the less acceptable? In the absence of major institutional and political reform, the majority will opt for the latter course.....I can only visualize a period of continued environmental disruption.... which would entail an enormous commitment of resources, effort and enterprise that would all but preclude the possibility of attending to quite radical alterations in technology and economic activity which might well be our only salvation".

O'Riordan's statement serves to highlight the need for social and economic justice and change to occur together with moves for new environmental policies and practices. Inequalities in society need to be narrowed and just social and economic policies instituted so that the less advantaged populace need not have to bear the unequal burden of policies for protecting the future (Green, 1985). Gramsci is of the belief that as long as the social and material bases as well as the environmental morality remained entrenched in the structure of the bourgeois state, no matter what changes took place in the political organization of a given country, the relationships between people were bound to produce the same quality of life. This would include the exploitation of people, mismanagement of the environment, ambitions of an individual type instead of a collective type, and a reproduction on a different level of all the wrongs that have been perpetrated in industrial society (Giachetti, 1972: inclusion of environmental components, my own).

It is apparent that a holistic environmental education (presented via educational institutions, political, environmental and cultural bodies, trade-unions and media) is going to have to be deployed throughout the social domain in order to address the present environmental malpractices and issues as being inextricably linked to the social, economic, political and technological realms of society. This link

is going to have to be considered if we wish to create a world environment which we need to strive for -

cooperation over conflict; controlled fertility over uncontrolled population growth; a clean, preserved

environment over a destroyed environment; a narrowing of the gap between the developed and

developing countries and regions; ensuring social and economic justice over denial and discrimination;

resource conservation and management over the denudation and mass exploitation of resources; and

needs meeting production and limited growth over mass consumerism and unlimited growth ethics.

This can be achieved only if people are conscientized. Chandrasekhar (1976:63) implicitly elucidates

the urgency with which environmental conscientization needs to be inculcated into society:

> "What then is the solution? It is not ignorance as much as our irrational refusal to
> face facts. It is...obvious that we...cannot have everything. We can plunder the planet,
> despoil the environment and exploit the weaker segment of our population and boast
> of our `highest standard of living'. But it cannot go on forever. The handwriting on
> this fragile habitat is obvious for those who can react".

A critical environmental education has an integral role to play in changing the existing social structure

or formation. The effects of such an education could, with time, alter material conditions propping up

the existing social structures, for example mass utilization and exploitation of resources; huge

inequalities in access to resources; mass consumerism and unlimited growth ethics in respect of the

economy.

> "Mankind thus inevitably sets itself only such tasks as it is able to solve since closer
> examination will always show that the problem (social, economic and environmental)
> arises when the material conditions for its solution are already present or at least in
> the course of formation" (Gramsci, in Forgacs, 1988 - parentheses and words within,
> my own).

The material conditions are indeed present. It remains the task of society to solve its environmental,

economic and social problems, through an holistic environmental conscientization.

2.8 The Role of the Semi-Hegemony in Society

is going to have to be considered if we wish to create a world environment which we need to strive for -

cooperation over conflict; controlled fertility over uncontrolled population growth; a clean, preserved

environment over a destroyed environment; a narrowing of the gap between the developed and

developing countries and regions; ensuring social and economic justice over denial and discrimination;

resource conservation and management over the denudation and mass exploitation of resources; and

needs meeting production and limited growth over mass consumerism and unlimited growth ethics.

This can be achieved only if people are conscientized. Chandrasekhar (1976:63) implicitly elucidates

the urgency with which environmental conscientization needs to be inculcated into society:

> "What then is the solution? It is not ignorance as much as our irrational refusal to
> face facts. It is...obvious that we...cannot have everything. We can plunder the planet,
> despoil the environment and exploit the weaker segment of our population and boast
> of our `highest standard of living'. But it cannot go on forever. The handwriting on
> this fragile habitat is obvious for those who can react".

A critical environmental education has an integral role to play in changing the existing social structure

or formation. The effects of such an education could, with time, alter material conditions propping up

the existing social structures, for example mass utilization and exploitation of resources; huge

inequalities in access to resources; mass consumerism and unlimited growth ethics in respect of the

economy.

> "Mankind thus inevitably sets itself only such tasks as it is able to solve since closer
> examination will always show that the problem (social, economic and environmental)
> arises when the material conditions for its solution are already present or at least in
> the course of formation" (Gramsci, in Forgacs, 1988 - parentheses and words within,
> my own).

The material conditions are indeed present. It remains the task of society to solve its environmental,

economic and social problems, through an holistic environmental conscientization.

2.8 The Role of the Semi-Hegemony in Society

hegemonic and counter hegemonic structures, either (a) the economic, political and environmental status quo will remain intact, or (b) there will be reform and change in the existing hegemony resulting in alternate socio-economic and environmental ethics, policies and practices, and democratic decision making practices.

It is thus vital that environmental education in the semi-hegemonic realm takes on an holistic framework stretching across disciplinary boundaries and taking on an hegemonic and counter-hegemonic relevancy. Environmental education is likely to move away from its elitist and isolated state and pro status quo leanings by becoming part of the collective social consciousness. To achieve this collective social consciousness intellectuals from the semi-hegemony are required to ensure the permeation of new education and knowledge into the broad social strata:

> "Such `intellectuals' should have their presence in the `whole social mass',
> performing the functions of organizations in the broad sense: whether in the realm of
> **production, culture** or **public administration**" (Gramsci, in Buci-Glucksmann, 1980).

2.8.1 Problems and Prospects Facing the Semi-hegemony in Adopting and Implementing a Holistic Environmental Paradigm

The permeation of the environmental paradigm through society would be a gradual process. Environmental education has to a greater extent been treated as a specialized category - optional, specific and divorced from the disciplines that do or could incorporate knowledge of the `environment' in its holistic sense.

To the extent that higher institutions of education address the right questions is obviously going to depend on whether they can carry out their intermediary functions without leaning too heavily to either the hegemonic or counter-hegemonic side of the spectrum. The following quote highlights the multi-faceted role which universities simultaneously embody:

> "For some, the university is the detached, rational, questioning, non-practical centre
> of knowledge and research. For others, the.... university is both a symbol of and the

embodiment of tradition and the stability of values and culture. Still others view the university as a seedbed of revolution, either in politics or behaviour. For some, the university is on the idea frontier of technological, social and economical changes. For others, the university is the not-too-efficient handmaiden to society"(Horowitz, in Schwass, 1986).

This bifaceted role of the university should be exercised just as pertinently in its adoption of an holistic critical environmental paradigm. Environmental education needs to adopt a two pronged strategy in order for its transforming impact to be felt. On the one hand, environmental education needs to create a number of skills, the most important being

"....demanded by science, technology and politics. Science and technology offer the power to modify environments, and politics is partly about the application of this power in the light of whatever social, economic and ethical priorities prevail" (Department of Education and Science, 1981:7).

On the other hand, environmental education needs to bring about changes in social, economic and ethical priorities for "...it is the question of values and attitudes as they affect decision making that lie at the heart of environmental education" (Department of Education and Science, 1981:7).

It is inevitable that environmental education in the semi-hegemonic realm would have to seriously address and work toward transformations in the capitalist economic organization and its social and environmental ramifications. This appears to be a tall order to fulfil, but it should be remembered that universities (as an integral component of the semi-hegemony) have always been the catalysts for change in society in whatever form. Anderson (1983:69-70) backs this assertion up by explaining the rise of 19th century European nationalisms:

"...the nineteenth century was....a golden age of vernacularizing lexicographers, grammarians, philologists and litterateurs. The energetic activities of these professional intellectuals were central to the shaping of nineteenth century European nationalisms....And much of their immediate clientele was no less inevitably university and pre-university students. Hobsbawm's dictum that `the progress of schools and universities measures that of nationalism, just as schools and especially universities became its most conscious champions, is especially correct for nineteenth-century Europe, if not for other times and places".

Just as nationalism was bred and shaped by universities then; so in the present day an holistic environmental education should be bred, shaped and deployed into society by these institutions.

Only when environmental education can propagate itself throughout society by bringing about the union of economic, political and environmental aims, as well as intellectual and moral unity on a 'universal' plane (Gramsci, in Showstack Sassoon, 1980), can it be seen as a genuine tool in bringing about meaningful social environmental change.

Having discussed the role of education in society in broad terms, it can asserted that the presence, dissolution and creation of ideologies in society is dependent on the nature of education/conscientization being practiced. This assertion is applicable to the field of environmental ideologies.

CHAPTER 3

ENVIRONMENTAL IDEOLOGIES AND THEIR IMPACTS ON SOCIETY AND
EDUCATION IN SOUTH AFRICA

3.1 Introduction

"There is one thing stronger than all the armies in the world, and that is an Idea
whose time has come" (Victor Hugo, 1980 in Dlamini 1988:42).

Ideologies exist in society to act as a set of guiding principles that determine the existence and
maintenance of certain socio-economic, political, educational, developmental and environmental ethics
and practices. Alternatively, there are conflicting ideologies that exist in a society which challenge the
dominant ideologies and their consequences. Environmental ideologies will align themselves with
socio-economic and political ideologies in determining the nature of society. Education must be seen
as either supporting or having the potential to transform existing ideologies in society.

The three main environmental ideologies as identified by O'Riordan (1981) are discussed in this
chapter, ie. the technocentric, accommodatory and ecocentric ideologies. The influence of these
ideologies in the South African milieu is reviewed in order to gain an idea of the status of
environmentalism in the country. The influence of education in determining the status and nature of
environmentalism prevailing, is given particular attention. The chapter concludes with some
possibilities for the incorporation and strategic execution of an holistic environmental paradigm into
the broader South African society, via the semi-hegemonic realm.

3.2 The Technocentric (Instrumentalist) Ideological Approach

In furthering the aims and objectives of introducing an holistic environmental education into
universities and other higher institutions of education, it is the contention here that a shift occur away
from a purely Cornucopian or technocentric environmental ideology. This technocentric ideology has
extreme optimism as its base, with beliefs that any obstacle to progress can be overcome given

continued resource exploitation, adequate finance, commitment and political support. Furthermore,

scientific and technological development as well as continued economic growth rooted in industrial

capitalism will continue to provide solutions. Further to this, there is the belief that technological and

scientific expertise[1] will provide advice on matters relating to the economy, public health, safety and

environmental problems (O'Riordan, 1981; Scott, 1988).

The technocentric approach thus treats environmental problems at a very symptomatic level, without

challenging the causes. The environment is treated as a separate entity not linked to economic, social

and development concerns. The material bases of existing social and economic ideologies are not

brought into question (see Rothenberg, 1987).

Decision making regarding economic growth, development and planning is more often than not

considered in light of models or derivatives formulated to varying extents from scientific and

quantitative means. However, the environmental component inevitably gets distorted. For example,

models projecting the future demand for resources (based on rates of population increase, economic

growth and demand) are derived from assumptions that environmental resources are not fixed

endowments, ie. finite. Rather, the supply of resources is determined by the level of their prices and

the state of technology. Technological development holds the prospect of future exploitation of and

exploration for resources. It is also assumed that as resources become scarce, so the prices for those

resources will rise, which will reduce demand and encourage the use of substitutes (Gregory, 1979).

----

1 The scientistic outlook engendered by this ideology becomes evident when an attempt is made by
economists, developers and planners to merge the environment and economics in a series of models in
order to establish relationships between them. Four possibilities of achieving this are outlined by van
de Ploeg (1976):
a) By **reduction** - reducing the theory of one science (eg. environmentalism) to another (economics).
Inductive theorizing and the empirical-scientific construction of models are used in this instance.
b) By using one science as an **auxiliary** - the use of parameters, models or theories from one science in
another.
c) By **analogies** - the assumption that things from different classes in the two sciences have similar
qualities, especially in terms of `structure' and `behaviour'. Simulation models are used in this
instance.
d) By **synthetic models** - mathematical and statistical models which are built on parameters from these
two sciences, in order to describe `reality' better.

In South Africa as in other industrial countries, environmental policies remain subservient to economic interests. "The underlying policy direction is still towards exploitative resource development and material growth" (Rees, 1985:391).

To illustrate this technocentric ideology further and linking technological rationales with environmental concerns, the field of **engineering** provides a superb example. Engineering textbooks, for example one written by Peavy, Rowe and Tchobanoglous (1985) on the subject of environmental engineering, have certain statements illustrating certain suppositions. One such supposition gleaned from this book is that

> "Environmental Engineers are committed to **protecting humans from** the threats a polluted environment pose to human health, aesthetics and cultural enjoyment, and economic well-being".

And furthermore,

> " (e)nvironmental engineering.....is concerned with protecting the environment.....and **improving environmental quality for human health and well-being**" (Peavy, Rowe and Tchobanoglous, 1985).

The guiding principle here would appear to be **man and the environment,** both treated as separate entities with man manipulating and changing the natural and built environment to benefit the social environment. The solution to environmental problems are technically based. The root causes of the problem are accepted as fait accompli with measures being built around the surface manifestations.

These Cornucopian ideals are embedded in the ideologies of both the hegemony and counter-hegemony. These ideals can be seen to arise from a threefold problem pertaining to environmental attitudes and values. The first of these problems is the **anti-organic** bias, ie. society's failure to recognize its interrelations with the environment (Leff, 1978). The second problem is that of a paternalistic **hierarchical orientation** of people in their environment. Society tends to view itself as being dominant over nature, with the ability to `master' the environment to suit its purposes. The

third problem is **resourcism**, ie. viewing the environment as a collection of resources to be expropriated and used at will, without any foresight as to the consequences (Leff, 1978).

If the universities as bipolar intermediaries are to also assume a technocentric stance, the ability for a critical environmental conscientization to permeate through society is going to be thwarted. The existing socio-economic, administrative, environmental and developmental status quo will remain largely intact.

3.2.1 The Nature of Education in South Africa as a Reflection of the Technocentric Ideology

It is of importance to examine the nature of education in South Africa with a view to explaining the lack of a critical environmental paradigm in education as a reflection of the status quo oriented technocentric ideology prevailing.

The education system in South Africa has resulted from the apartheid ideology pertaining to the separation and differentiation of race groups. The education system in South Africa directly serves the interests of racial capitalism, producing the knowledge and skills required to fulfil the requirements of the labour market (Davies, 1984; Kallaway, 1984).

The nature of black education in South Africa has in large been determined by the Black Education Act of 1953. Some of the implications of the act were outlined by Dr. Hendrik Verwoerd, the then Minister of Native Affairs, in an address delivered in the Senate on 7 June, 1954. He stated that black education would be located in black areas and within black communities, with the blacks' entrance into the white community being dictated by "certain forms of labour" (Geber and Newman, 1980).

Further to this,

> "A Black pupil must obtain knowledge, skills and attitudes in the school which will be useful and advantageous to him and at the same time beneficial to his community....The school must equip him to meet the demands which the economic life of South Africa will impose upon him" (Verwoerd, in Behr, 1984:183).

The creation of a race based education system then, was to produce a cheap labour market for the capitalist system.

In opposition to this view, the liberal reformist elements in South Africa would observe the statement that all national education systems indoctrinate the oncoming generation with the basic outlooks and values of the political and social order (Zeigler and Peak, 1974), in this case, those of the Apartheid system. For the reformists, the whole political question revolves around the issue of race rather than the dominant economic system.

> "It is the assumption that lies at the base of the liberal assumption that economic inequality can be overcome by mass education. The solution to the problem is thus seen not in questioning the economic system, but in allowing more of the poor, the black, the disinherited to the middle class through improved education"(Shapiro, 1981:108).

This improved education shall, through equal education standards and opportunity, be a key to equal economic opportunity (Brown, 1985). Two newspaper excerpts illustrate this liberal stance further. Both articles called for a democratic, non-racial, universal education that would result in the broadening of South Africa's democratic base and ensure the stability of society in order for commerce and industry to endure and prosper. An upgrading of the labour force through education would accelerate the development process through a process of increased industrialization and tapping of South Africa's development potential (Sunday Times, 1/5/87; Natal Mercury, 4/7/87).

It thus becomes increasingly evident that liberals do want certain changes brought into the socio-economic and political structures of our society, which will not in fact result in **social change**. Racial discrimination may be removed but social inequality is likely to remain (Shapiro, 1981), with blacks remaining predominantly the subaltern[2] or oppressed class in the overall relations of production. A

---

2 Subaltern - Gramscian term synonymous with subordinate, non-ruling, counter-hegemonic classes or groups of people in a society.

widening division of labour and a rationalistic, materialist culture will remain intact (see Shipman,

1980).

There has been an increasing liberal trend in recent education policy reports, such as the De Lange,

Syncom and Buthelezi Commission reports. New directives for education policy were drawn up by

academics, education bureaucrats, civil servants and representatives of private enterprise (Buckland,

1982). These reports indicate that these people had a scant knowledge of, and misinterpreted the value

of environmental input into education for the following reasons: (i) the desire for economic growth and

development; (ii) development of a skilled manpower base; and (iii) the enhancement of social and

economic stability by inculcating appropriate values and morals (Buckland, 1982). A brief examination

of the De Lange report illustrates the points made.

It was the 1976 and 1980 black uprisings and education crises in South Africa that revealed a profound

crisis in the educational structure for the hegemony:

> "For future workers to be produced with the required **level of skill**, and with the
> requisite **societal values** it has become imperative for their consent to be won, and for
> at least some of their demands to be met, even if in changed form" (Chisholm, 1982).

The De Lange Report (1981) conducted under the auspices of the HSRC, recognized the need for a

more comprehensive policy of mass schooling and proposed the principle of `equal quality' in

educational provision. It proposed a move away from traditional formal schooling patterns, with a

system of formal academic education running parallel to a non-formal vocational structure. But as

Gramsci (in Adamson, 1980) has pointed out, this maintains a system with different levels of

educational provision thus reproducing class and group differences. The fact that the cost of formal

education will be shifted on to parents and that of vocational education to capital, is likely to result in

the majority of the black working class being channelled into technical education (Chisholm and

Christie, 1984).

It becomes more evident that education, while attempting to don the semi-reformist cloak in South Africa, has done nothing more than further enhance economic growth with the resultant exploitation of human and natural resources. Education is career and trade skills oriented in relation to the job market, weaving people into the socio-economic fabric of society. It is thus not surprising that the environmental paradigm has not had a place in our society. Education plays an important role both at the technological and ideological levels.

> " Not only must the technological needs be supplied, but this must be done in the context of an ideological perspective which ensures that those who receive least of the educational and material resources available accept this unequal distribution as being `natural' and `right'" (Shapiro,1981).

This is tantamount to the viewing of capitalist productive processes, resource management and allocation practices along with the resulting environmental denudation and exploitation, as being natural and right. The nature of black education thus lends itself to a pro-status quo, technocentric ideology. The Syncom report proposes an education

> "...designed to harness schooling in the interests of capitalist development; knowledge is reduced to a set of skills with a clear hierarchy so that `basic natural sciences are seen as `educational essentials' and `soft subject areas' - psychology, sociology, arts - as `educational desirables'...." (Buckland, 1982a:26).

This technocentric mentality is further borne out by the De Lange Report:

> "South Africa is a developing country that is changing...rapidly....Modern science, technology and management skills which are the most powerful resources that man has ever had at his disposal to enable him to change his environment, are not yet the cultural assets of significant sectors of our population" (Buckland, 1982: 46).

It is not difficult to see just how powerful a grip the hegemony has on the education realm. The hegemonic structures and superstructures may be so dominant that the proper role of the bipolar intermediaries can be diminished somewhat in favour of the dominant socio-economic system. This is partially reflected in the nature of education which tends to be specialized, scientific and economistic, dealing with content that prepares the student to be accommodated into the economic and environmental status quo of society.

It is this preparation for specialist roles in society that has been viewed as a reason for the many environmental problems in the present day. With the emphasis on reductionist methods, specialists are unable to perceive problems in their totality (see Fuggle, 1983:5). A dilemma is faced where the "...expert can only argue from the relative position of the specialist" (Coggin, 1979:5). This lack of ability on the part of the "thinkers" or intellectuals to disseminate an holistic message to executors or "doers" (SACHED, 1985), results in the perpetuation of the present environmental and societal status quo.

3.2.2 The Lack of Environmental Conscientization in the South African Counter-Hegemony

The counter-hegemony have attempted to institute their own education committees and bodies with a view to creating an education that would serve as a means of transforming the social, political and economic status quo of society.

In an article in the Natal Mercury (18/6/87), the role of teachers as developers of **critical**, autonomous individuals were highlighted by Professor Kogila Moodley. Adaptation to a new South Africa in transition would involve not only the improvement of pupils' faculties and their identification with the institutions of society and the legitimacy of the education system; but also an anticipation of and participation in such a transformation.

In an article in the magazine "Frontline" entitled "Professors and the People" (March 1987), Eric Molobi of the National Education Crisis Committee (NECC) reflects on this concept of `people's education':

> "Social consciousness is a product of economic and social conditions. Every epoch of society has always developed its own ways of...preparing children...to assume an appropriate part in production and social life....Where Bantu education attempted to instil an acceptance of oppression, People's Education is therefore education for democratic people's power. People's education therefore wishes to bring in the ordinary worker, the student, the parent, the trade-unionists, the teacher, to sit with academics in deciding on the content and quality of our common education...

> In our People's Education Commission you find priests, students, activists and parents, working with intellectuals to construct the content.
> People's Education hopes to remove the distinction between working and learning. Every child should take part in <u>knowing what production is all about</u>. People's Education realizes that there is a need to achieve a high level of education for everybody....(T)his can only be successful if we can replace the rote learning methodology of Bantu education with a methodology that promotes an **inquiring** and **critical mind....".

It is disturbing to notice that even within the two above cited articles, there is an overriding concern for political, social and economic justice and freedom to the neglect of environmental concerns. An examination of the Freedom Charter (People's Charter) around which most counter-hegemonic concerns in South Africa stage their struggle, provides further evidence of this trend:

> "The national wealth of our country, the heritage of all South Africans, shall be <u>restored to the people</u> ;
> The mineral wealth beneath the soil, the banks and monopoly industry shall be transferred to the ownership of the people as a whole;
> All other industries and trade shall be controlled to the <u>well-being</u> of the <u>people;</u>
> All people shall have equal rights to trade where they choose, to manufacture and to enter all trades, crafts and professions;....
> All shall have the right to <u>occupy land wherever</u> they choose" (Freedom Charter, 1955).

It is plain to see that environmental conscientization will not readily be implemented through this charter together with the social and economic concerns listed. Continued over-exploitation, denudation and irrational perceptions of the environment will more than likely remain with continued state capitalism, industrialisation and unplanned urbanization and consumerism. This would ultimately have the effect of decreasing the standards of living of the populace in the long term as the resource base of the country becomes eroded.

It is not being advocated that industrialization and development be halted altogether or that it be severely curtailed. This proposal is surely no more than utopian in a society that has evolved around industrial development. Rather, present forms of industrialization and development need to be reviewed. With the increase in environmental problems, there will be an increasing need to pool and share equally all resources to fulfil essential human needs and to restrain purely consumerist profit-motivated production and expropriation of resources (Pepper,1985:17-18).

3.3 The Accommodatory Approach to the Environment

The intermediary **accommodatory** or `wise-use' environmental ideology, though in essence still a technocentric ideology (Scott, 1988), could be seen as a transition zone between the Cornucopian and critical, ecocentrist ideologies. The accommodators would accommodate demands made by the ecocentrists (to be discussed in section 3.3) without upsetting the existing status-quo (O'Riordan, 1981). Emphasis is placed on alleviating the symptoms of the Cornucopian instrumentalist approach[3]. Accommodatory tactics would include:

i) The adjustment of economic practices making them more environmentally attuned.

ii) Environmental law and enforcement of environmental policies.

iii) The creation of and participation in environmental management policies and concerns at all levels of administration.

iv) Allowing greater public participation in environmental decision making.

v) The adoption and implementation of project and development appraisal techniques and environmental monitoring.

vi) Compensatory arrangements for those in society adversely affected by damage or degradation of the social, built and natural environments (O'Riordan, 1981).

Despite its genuine desire to move away from viewing the environment as merely a "...resource to be exploited, consumed or controlled by society" (Scott, 1988:8), the accommodatory approach still has as fundamental premise the belief that economic growth and exploitation of resources can continue unabated. In this sense it is an **anthropocentric** ideology that seeks to <u>solve environmental problems for the ultimate benefit of human beings.</u>

---

3 As Deutsch (1977:14) maintains, peoples' actions in their environment have become too enormous and widespread for their effects to be ignored. As a result, "(s)ystematic foresight and the organized provision for contingencies are no longer luxuries but necessities".

3.3.1 Environmental Legislation and the Status of the Environment in the South African Public and Private Bureaucracy - an Example

Decision making at the local and national level in the state and productive sectors of South Africa has tended to adopt the instrumentalist ideology (Fuggle and Rabie, 1983). In being technocratic, scientific and economistic, decision making has justified the mass exploitation of resources and resulted in the continued denudation and deterioration of physical and social environments. This is particularly evident in decision making regarding development projects which have not considered the natural and social environmental impacts to any significant extent in the design and planning stages (Lee, 1985:ix; Scott and Diab, 1989).

Until relatively recently, there has been no formal statement of environmental policy in South Africa. There were no strict legal requirements or policies requiring environmental matters to be considered in the formulation of development plans and projects. This situation together with public administrative secrecy, was the rule and publicity and participation the exception. The net effect of this situation was that plans and projects with potential environmental impacts were not subject to Environmental Impact Assessments (EIA) and Social Impact Assessment procedures. Expressions of public concern over aspects of environmental degradation could only be made after decisions had been taken and projects were fait accompli (Fuggle, 1980). However, in recent years there has been an increasing shift towards a more accommodatory ideological approach to the environment on the part of the state.

The Environmental Conservation Act (Act 104 of 1982) was an initial step in this direction. The act requires EIAs to be executed along the coastal margins of South Africa (Monitor, 1987 in Scott and Diab, 1989). However the nature and the requirements for EIAs are not specified. Public participation is also not catered for.

The Council for the Environment established as a result of the Act, is purely an advisory body to the Minister of Environmental Affairs. The Minister in turn has no jurisdiction or co-ordinating powers

over other state departments and statutory bodies. There is also no strictly defined national policy on environmental conservation and management (Rabie and Erasmus in Fuggle and Rabie, 1983). Administrative decision making and action concerning the environment has therefore not changed much in essence up to the present time (Scott and Diab, 1989).

It was only in 1989 that the Council for the Environment outlined the concept of an **Integrated Environmental Management procedure** (EIM) which it was hoped, would be the guideline for a national environmental policy. The basic principles involve:

a) the concept that **environmental conservation** and **development** are linked insofar as development of the environment and conservation of the environment should directly contribute to "human well-being and survival";

b) the notion that all actions affect the environment both biophysical and socio-economic and that environmental considerations be taken into account in development projects from the early stages of proposing to the final implementation stage;

c) that all actions be investigated "in some way" and that environmental assessments be cost-effective and appropriate (Council for the Environment, 1989:6-7,30).

Besides the fact that such legislation has not yet been promulgated, critical scrutiny of the IEM procedures reveals certain flaws that could ultimately be exploited by bureaucrats in continuing to augment the existing status quo regarding the environment. In the first instance, the whole environmental ideological basis surrounding the proposed legislation and the Integrated Environmental Management concept remains in the technocentric, pro status-quo mould. The environmental ideological framework of state and private bureaucratic structures will essentially remain the same.

Secondly, what constitutes human well-being and the improvement thereof is not clearly defined. There is no definitive balance between development and conservation, just as long as it benefits human `well-being'[4].

Thirdly, there are problems in defining what is meant by `significant' impacts on the environment. The concept of `significant' is bound to be underplayed especially if it may mean the consideration of alternate proposals and major modifications to existing development plans. Unless legislation is environmentally <u>holistic</u> (Scott and Diab, 1989), environmental practices are likely to remain cosmetic and ineffectual.

Lastly, the IEM proposal states that actions affecting the environment should be investigated. It is proposed that these investigations (i) be brief, (ii) take a short time to assess and (iii) be cost-effective. This might result in the exclusion of more complex, time-consuming **social impact assessments** from investigation as well as relegating environmental assessments to simple, `must be done' bureaucratic procedures.

In conclusion, it can be stated that these four flaws ultimately find their source in the nature of education to which bureaucratic personnel, professionals and decision makers are exposed. Environmentalism has been divorced from socio-economic and political issues in South Africa and this is reflected in the low status of environmentalism in education. Even in the event of educational reform, there will be a continued rationalization and justification of the modes and relations of production, with environmental concerns being centred around various minor accommodatory approaches such as conservation of existing `worthy' natural areas, improved amelioratory legislation, and so on.

---

[4] It would also be in order to mention that social `well-being' would be tinged with the reality of class and race inequalities with certain portions of society benefitting more than others.

Moreover the role of bureaucracies as administrators for the state links them up directly with the hegemonic political economy being practiced. It is not surprising that the bureaucracies have played little or no role in questioning and changing the prevailing environmental practices and rationales in operation within the South African society.

3.3.2 The Accommodatory Approach and the Development of Environmental Groupings

The spate of environmental groupings coming to the fore in South Africa in the late 1980's would appear to be adopting the accommodatory ideological approach. Earthlife Africa is an environmental group that was launched in June 1989. Branches of this organisation have spread to the major centres throughout the country with a membership close to 1500. The Earthlife Newsletter (August, 1989) outlines the Earthlife Constitution or manifesto which includes the following concepts:

(1) The idea of **pragmatically** applying knowledge of the human-environment relationships to our interactions with nature and amongst ourselves;

(2) The idea of a "wise, respectful **stewardship** in our biosphere";

(3) The concern for **ecological** devastation as a threat to the quality of life for future generations.

Out of a single incident involving the mining of St.Lucia's eastern shores, three further groups have been formed. These are the Zululand Environmental Conservation Committee (ZECC); the St.Lucia Action Group (SLAG) and the Zululand Environmental Action League (ZEAL)(Sunday Tribune, October 1, 1989).

The strategies adopted by environmental bodies in South Africa in promoting and fighting for the environmental cause are laudable. But most of the emphasis is on tackling issues and problems at the symptomatic rather than at the diagnostic level as well. Scientific investigations such as collecting and analyzing data; participation in community environmental issues and campaigns; publicising issues through the media; lobbying support from concerned people; being able to explore ways of solving problems and taking action in the local community; and educating themselves about biospheric issues are an important first step (Earthlife, 1989). However, further steps are required, ie:

(1) The eventual merging and strengthening of splinter groups and organizations to create a unified, forceful mouthpiece for the broad general public.

(2) The deployment of a holistic, critical environmental education throughout society;

(3) The awareness and involvement by the counter-hegemonic spectrum in respect of relevant, environmentally related issues;

(4) Tackling problems and issues of an environmental nature at the broader societal level, as opposed to purely the local level.

3.3.3 The Accommodatory Approach and the Business Sector

It is interesting to note how the business sector is slowly coming out in support of environmental conservation and sponsoring or promoting corrective conservation programmes. However, little of this good intention is put into practice as Fuggle (1988) has established:

> " In conversation with a senior executive from a large company that fosters a corporate image of being `concerned for conservation', I asked from genuine interest: `In what way is your company able to practice conservation principles in your day to day affairs'? `Oh, we don't try to practice conservation ourselves', was the reply, `we only support conservation by giving money to the XXXX, it's their job to do the conservation" (Fuggle, 1988:153).

Even in instances where businesses do attempt to implement environmental conservation principles (as in the case of a major discount supermarket chain in South Africa) (Earthlife News, October 1989), these policies serve more to (1) bring about more public support for the business concerned and (2) bring about superficial environmental measures in that the principles adopted would not affect its profit margins, business ethics or modus operandi to any appreciable extent.

3.4 The Ecocentric, Critical Environmental Ideology

In contrast to the technocentrist environmental ideology is the critical, **ecocentrist** ideology which moves beyond the status quo confines of the accommodatory approach. The central theme in this

ideology would be the inextricable link between human beings and the environment, where human society and the environment are in partnership. It is assumed here that people do not dominate the environment. Critical educative themes and action guidelines pertaining to this ideology would include critically examining the implications of <u>materialism</u> and mass production as perpetrator of environmental problems.

In addition, solutions to environmental problems lie not in remedying symptoms but in long term solutions brought about by the <u>changing of values, morals and ethics</u> through education. Such an education would seek to create people - environmental relationships and attitudes that link society and the total environment symbiotically. The results of such a critical education would result in needs-meeting production and resource management; equitable welfare distribution; holistic environmental and planning policies; community and workplace health, the creation of safety and non-alienating environments; demographic policies and education; democratic participatory and decision making techniques and policies.

As opposed to the anthropocentric rationale of the environment being conserved and utilized for the benefit of mankind, it is believed that the environment is an **equal partner** with its own controlling abilities over itself and over society.

Within the ecocentric framework, natural and environmental conservation and management would include (a) the protection and maintenance of ecological processes upon which human survival and needs-maintaining development depend; (b) the respect and preservation of all life forms, ie.biorights; (c) the exercising of restraint and effective management in the use of natural and human resources with emphasis being placed on the **quality of life** and not the higher **material standard of living** (O'Riordan, 1981; Scott, 1988; Fuggle, 1988).

In essence, critical ecocentrists would take the stance that education, enlightenment and consciousness-raising are necessary to produce the `emancipated' citizen. A critical environmental conscientization would provide the beginnings of change in our existing cultural ideologies. Hooker

(1974:178-79) maintains that

> "...we are locked into a culture in which it is "obvious" that the appropriate response is one of technological efficiency because we are locked into our set of social institutions....(I)f one would....try to understand the conceptions of human beings, the ethical judgements which lie behind institutional design....to understand the way in which the working of the market and the non-market institutions are connected to one another, then one can perhaps begin to get a grasp on the depth of change which environmental problems indicate. They indicate that we need to re-think the institutional assumptions which structure our lives,...and the conceptual image of human nature and human society that we carry".

As a result, the society would be

> "...far more ready to recognize the longer term advantages of collective self restraint, and to support what they believe to be necessary radical reforms that would lead to a much more communally oriented politics based on environmentally and socially sustainable self-reliance" (O'Riordan, 1989:411-412).

However, higher institutions of education should attempt to avoid falling into the trap of moving entirely to that side of the environmental ideological scale that advocates anarchical ecocentrism[5]. It is contended here that Environmental education cannot afford to have utopian environmentalism as its ideological foundation. Anarchical influences, for example the concept of "smallness" in respect of communities, communities which will be non-hierarchical and non-authoritarian as well as totally self-sufficient, must be viewed as nothing other than unrealistic. There is no room for anarchistic attitudes to nature, not that this school of thought should not be included in courses on environmental philosophy and ideology.

----

5 This expressivist perspective believes the state is responsible for rationalizing society. The state is repressive, serving to alienate people, divorcing society "...from the spiritual, imaginative and non-rational aspects of ourselves and our world" (Bennett, 1987:139). The state should therefore not exist, because technocratic and socialized control by the state is also the major reason for present-day environmental ethics and practices.

Rather, it is posited that what higher institutions of education should be doing is attempting to coalesce

important, realistic aspects of ecocentrism together with relevant, practical aspects of the other two

ideologies into a holistic environmental paradigm which would steer an attendant, relevant

environmental education[6]. Technological and scientific analyses and solutions to society's

environmental problems, should be balanced and "softened" with behavioural, political, social and

economic analyses and solutions. With this softening there

> "...comes also a trend towards philosophical analysis of the basic principles of
> Western technological society. Here, the question "why?" begins to replace the
> question, "how?", and environmentalists, from being accused of "elitism," begin to link
> up with other groups who share their reservations about the philosophical and
> ideological bases of society...." (O'Sullivan, 1986:101-102).

Neither should these perceptions and analyses of, and solutions to society and its environmental status,

rely on an idealist, humanist or a purely economistic, structuralist framework. Society has also to

develop a new environmental consciousness. This would

> "...happen primarily via the reform of the individual and of the values and attitudes
> which he and she holds towards nature, towards technology and progress and towards
> spiritualism and materialism." (Pepper,1985.16-17).

This new environmental education could be accomplished through a wide range of institutional settings

be it universities, schools, technikons, the press, political, cultural and environmental bodies, trade-

---

6 It is suggested here that neither one of the three ideological perspectives outlined should be adopted
in its entirety for the following reasons:
1) Technocentric and accomodatory approaches are symptomatic in their approach to solving
environmental problems, whereas the ecocentric approach by itself would be too diagnostic, with
solutions being too unrealistic.
2) Universities, in their pivotal role as disseminators of a holistic environmental education, cannot be
seen to be status quo oriented or completely counter-hegemonic. Therefore a cross-ideological
compromise, with the critical, but practical components of these three ideological perspectives is
required.

unions and so on. The intellectuals and leaders involved in these institutions play a key role in the development of a climate of change which would result from a slow change of individual consciousness (Gramsci, in Adamson, 1980).

3.4.1 The Counter-Hegemony and the Possible Adoption of the Ecocentric Approach

Though critical environmental conscientization in the counter-hegemony is seriously lacking, it appears that the basic foundations of an ecocentric approach could possibly be adopted by the counter-hegemony when they gain hegemonic status.

In this regard there may be a glimmer of hope appearing in the form of the new Constitutional Guidelines of the African National Congress (ANC) in respect of the economy, which would have the potential effect of being environmentally pertinent. Amongst the guidelines are, (i) that the economy will serve the interests and well-being of the entire population; (ii) that the state could "define and limit the rights and obligations attached to the ownership and use of productive capacity" and (iii) that co-operative forms of economic enterprise, village industries and small-scale family activities would be supported (New Nation, 18-24 August, 1989:7).

More evidence of a slow shift towards an ecocentric ideological train of thought has come to light in a recent statement by the ANC on the environment. In essence, the statement links the problems of land degradation, overgrazing, soil erosion, the lack of a rational ecological protection policy, pollution in the townships, nuclear power and toxic waste to the ideology and manifestations of Apartheid. Furthermore, the ANC "...is in the process of formulating policy on the environment" (Weekly Mail, 1-7/12/89).

However, as the above mentioned article elucidates, such an environmental policy will tend to be more instrumentalist than ecocentric in seeking solutions to environmental problems. Since industrial

development is not questioned, it is further stated that technological innovations would provide the solutions to pollution control and preservation and energy sources and provision. Conservation of wildlife and natural environments would be the responsibility of the communities themselves to implement to varying degrees, depending on whether they perceived the natural environment and wildlife to be assets or as economically beneficial (Weekly Mail, 7/12/89).

The socio-cultural climate of South Africa has done little to foster the environmental paradigm. In South Africa at the present time with the conflict amongst the hegemonic and counter-hegemonic organizations and parties, there has been an overwhelming preoccupation with racial, political and economic issues to the neglect of environmental issues.

However, environmental concerns have an important bearing on the very concerns that are issues with the broader mass of the populace. These issues would include working conditions; housing conditions; community welfare; wage increases; the standards and quality of life; the cost of living; and social and economic justice and equality (Dlamini, 1988:47-48).

Translated into environmental concerns these issues would probably take on the following forms:

(i) The **needs** of the people in respect of the **workplace** -conditions of working environments, health, safety and environmental risks and other ergonomic considerations.

(ii) The needs of the people in terms of their respective **communities** - suitable built and social environments; non-alienating living environments; suitable standards of community and environmental health.

(iii) The **unequal distribution** of wealth and welfare from environmental resources.

(iv) The **exploitation of resources** by owners of production for their own material gains and profits.

(v) Questioning and acting upon the deeper reasons for the **wasteful practices** and **neglect of the future** practiced by the present day industrial society.

Macun and Myers (1987), writing on the environmental concerns relating to health and safety in the workplace, point out that it has only been since 1986 that union activity and management agendas have concentrated to any extent on health and safety issues. Moreover, these issues have received consideration only in response to certain crises, for example the Kinross mine disaster. However, initiatives have been taken, such as:

1) The establishment of an Industrial Health, Safety and Education Project in East London and an Industrial Health Unit at the University of Natal. These bodies work with unions in the area of occupational health.

2) By means of the Machinery and Occupational Safety Act, safety structures have been implemented in most sectors of industry.

3) Unions, for example the Chemical Workers Industrial Union, the National Automobile Association Workers Union and the Metal and Allied Workers Union, as a result of strong shop floor organization, have initiated research and awareness programmes. These have taken the form of mass health screening, industrial hygiene evaluations, engineering changes and increased worker awareness of and participation in health and safety organization and work organization and conditions.

Still much needs to be accomplished in this area, for example, (a) education and training in workers' health and safety organizational skills beyond the rudimentary level; (b) the need for education in respect of industrial hygiene and safety engineering expertise; (c) increased national union (eg.COSATU) involvement in health and safety policy formation and implementation, and (d) far less of a top-down approach from management dominated Safety Committees and Safety Representative structures (Macun, 1988:113-114).

Returning to the issue of **People's Education**, environmental education could become one integral part of the new curriculum especially with its prospectus on "process". This process would involve

participation and interaction between students, youth groups, civic and street committees, trade unions and moreover academics, universities and other higher education institutions in bringing about a relevant education (Muller, 1987).

In conclusion then, South Africa needs to move towards a critical, holistically based environmental education in which environmental issues are linked to socio-economic, political, administrative and cultural issues, for example Apartheid, social inequality, industrial capitalist ethics, the education system, development and planning ethics and practices and so on. Environmental issues need to be politicized with a critical environmental education ensuring that the underprivileged recognize environmental issues "...to be intimately linked with such perennial concerns as housing, public transport, welfare and unemployment" (Huckle, 1983). In other words, the `political struggle' for the environment would be a stage in the larger struggle.

It is important to bring the environmental message to the subaltern classes and groups especially as it relates to (i) their role in the present denudation of the environment; (ii) their future role in the economic system that guarantees their welfare in terms of **need** provisions and (iii) the rational use of resources for the common good.

If strategies are adopted that seek to tackle problems and issues at the diagnostic and symptomatic level, then there will be a ground swell support and the assurance that the environmental platform will not collapse into elitism and insignificance. An environmental education is needed that appeals to both the hegemonic and counter-hegemonic priorities, lest it be seen as elitist, reactionary or revolutionary. It is the contention of this thesis that the semi-hegemonic tertiary education domain is the source from which this set of strategies may arise, via the adoption of an holistic environmental paradigm.

3.5 The Potential of the South African Semi-Hegemony towards the Creation and Execution of an Holistic Environmental Paradigm

In order for environmental education to be successfully deployed throughout South African society, it will initially be necessary for members representative of the diverse racial and cultural groups to organize and infiltrate their respective groups and realms (hegemonic - predominantly white; counter-hegemonic - predominantly black).

The reason for this becomes all too evident when one observes, for example, that the black consciousness movement rejects white participation. Though this appears to be racist and reactionary, the reason given is that "...only the oppressed can liberate themselves". Nefolovhodwe (General Secretary of the Black Allied Mining and Construction Workers' Union) elaborated:

> "...for genuine freedom to be accomplished it must be under the command of an **independently organized** black working class. This is a task to be tackled by blacks without white interference".

Furthermore,

> "We do not reject white participation (in the political struggle). It depends where they participate. We believe they have a role to play in their own communities in order to prepare them for change. Why do they want to organize blacks?" (Golding,1984:35-36).

In the semi-hegemonic domain however, with its central pivotal role, participation on the part of both the hegemonic and counter hegemonic groups can be established in bringing about a relevant environmental education. With time this attendent environmental education, together with the social and political changes slowly coming to the fore in South Africa could reduce the polarization between the hegemony and counter-hegemony with a new societal and environmental order being established. If this is to occur though, all higher institutions of education across the colour line are going to have to adopt an holistic environmental paradigm.

In essence it becomes evident that in the semi-hegemonic realm, it is possible for groups from both the hegemonic and counter-hegemonic interfaces to meet and coalesce in the search and execution of a successful environmental educative input in every sphere of life, be it in education, politics, planning, industry, agriculture, law, health, administration and so on. In this way the path can eventually be paved for the participation of both blacks and whites, bringing about an juxtapositioning that would determine the nature of social and environmental change.

This process may experience obstacles, one of the main problems being the discrepencies pertaining to the nature and quality of education in both these realms. These discrepencies have had the effect of keeping the academics and students from universities, with higher education standards (predominantly the `white' and `open' universities) away from `ethnic'[7] universities which have certain political and social stigmas attached to them and where education infrastructures and standards are poorer (Absolom and Vilakazi in Webster, 1985); but which nonetheless have the potential for conveying and creating a substantial, critical environmental educative input.

This unequal education system has had the effect of weakening the position and role of the bipolar intermediaries. However this situation is changing with the increased intake of blacks into `white' and open universities throughout South Africa. Furthermore, the standards and nature of education and

----

7 This categorization of universities occurred directly as a result of the Extension of University Education Act, 1959 (Act 45 of 1959) in which state controlled universities were created alongside state-aided universities, and where universities were deprived of the right to set their own requirements for student admission. State universities were set aside exclusively for whites or blacks (with universities being created for different `ethnic' and `cultural' groups). However, the Universities of Cape Town, Wits, Rhodes and Natal chose to adopt an `open' university approach in which they "...dedicated themselves to the principle of freedom of association and of the right to determine who shall be taught, who shall teach, and what shall be taught and how it shall be taught, without regard to any criterion, except academic merit" (Behr, 1987:3).

syllabi at black universities are gradually improving. The strong white hegemonic presence at these ethnic universities is also slowly diminishing. These are certainly encouraging trends toward a unified semi-hegemony which is vital if its mediating function is to reach full fruition.

The semi hegemonic intellectual offspring with their environmentally informed knowledge will have the task of permeating the social strata explicitly or implicitly bringing about environmental conscientization. For this to occur the tertiary educative institutions have the need to adopt explicit environmental programmes.

Moreover, environmental education must take on a flavour pertinent to the African milieu which would include (a) the contextualization of "...(the) status of the African environment vis-a-vis man's role as proponent and exponent of pertinent activities" and (b) the development of curriculum possibilities that would be pertinent to a "...rational and sustainable development within the framework of a sound environment", not divorced from historical, social-cultural contexts and consideration of the total environment (Okot-Uma and Wereko-Brobby, 1985).

In order to achieve these goals, universities in South Africa need to adopt a coherent undergraduate philosophy that would inform the degree programme, especially in terms of teaching standards and curriculum development. The strict discipline autonomy, together with this lack of a guiding philosophy, results in a lack of coherence and contextualization in the degree programme (File, 1986). It is proposed that an holistic environmental paradigm needs to be adopted as a guiding philosophy.

In addition, tertiary institutions should be conducting more research into developing alternatives to our present state of existence, especially in the fields of education, law, economics, engineering, medicine, planning, politics, psychology, sociology, natural resource utilization and management, ergonomics and so on, with an holistic environmental paradigm as the source of inspiration (see De Bell, 1971:96).

```
                    ┌─────────────────────────┐
                    │   ENVIRONMENTALISM      │
                 ┌──┴─────────────────────────┴──┐
                 │   ENVIRONMENTAL EDUCATION     │
               ┌─┴───────────────────────────────┴─┐
               │   BIPOLAR INTERMEDIARIES          │
               └───────────────────────────────────┘
```

Content Areas	Procedures for educational involvement.
Problem oriented issues and concerns (social, political, technical, cultural, environmental, economic, health). Discipline sources. Interdisciplinary units	Mass media; curricular activities; extra-curricular activities; teacher education /adult ed.; voluntary organizations; political party and organizational social and economic policies; trade union activity; professional careers; education and training; public health; development projects and schemes

Target Populations
School pupils (Traditional and People's Education-hegemonic and counter hegemonic). University, College, Technikon students (semi-hegemonic). Bureaucrats, Civil servants and planners/decision-makers. Adults (from hegemonic and counter hegemonic groups/classes, and across the broad spectrum of occupational and economic activities). Environmental action groups.

Evaluation Procedures
1) Content Evaluation; (2) Formal Testing; (3) Informal /relevance testing (Appreciation of environmental concerns and willingness to take appropriate steps/ actions and environmentally sensitive decision making. The extent to which environmental educative content is successfully integrated on a holistic basis with other societal concerns); (4) The underlying environmental ethics/philosophies and ideologies predominantly adopted.

Model 1   Model depicting the strategic execution of environmental education in South Africa

Based on certain statements of a strategy for environmental education from Ben-Peretz (1978) (content areas, procedures for educational involvement, target populations, evaluation procedures), and adding my own (the semi-hegemonic component and additional components under the four strategic components outlined), it becomes possible to construct a model on how environmental education could perhaps be strategically executed within South African society (Model one).

3.6 Possibilities for the Incorporation of an Holistic Environmental Paradigm into Education at the Semi-Hegemonic Level

In attempting to assess and analyze the extent to which environmentally related education has been incorporated into the syllabuses of universities as well as how environmental education could be incorporated into these institutions, certain points need to be made.

Firstly, a major move away from discipline exclusivity is unlikely to be achieved quickly, especially as the careers market is itself so diversified. Likewise, the problem pertaining to the creation of a coherent `environmental science' with the integration of disciplines will pose problems related to theoretical bases, subject matter, data relevance and so on.

Rather, the environmental paradigm should as far as possible be integrated into existing disciplines. These disciplines would incorporate environmental ideologies, issues and relevance in three different ways:

1) By disciplines coming together organizationally (Case 1:Figure 2). Each discipline is conducted and researched as an entity, but elements are included which seeks to link it to environmental concerns, thus linking it directly or indirectly with other disciplines (pluridisciplinarity).

2) By disciplines retaining their identity and content, but including environmental education as an additional element in the curriculum. The environment is included separately as a section to make

people aware of wider issues such as environmental chemistry; environmental law; environmental

psychology (Case 2: Figure 3).

~~~
┌──────────────────┐
│ Discipline d₁     │
├──────────────────┤
│ Environmental     │
│ relevance         │
└──────────────────┘
        ↕ ↕ ↕
┌──────────────────┐        ┌──────────────────────────┐
│ Exploration      │ ←────→ │ Review and systemization─│
│ of links         │ ←────→ │ of relevant links        │
└──────────────────┘        └──────────────────────────┘
        ↓ ↓ ↓
┌──────────────────┐
│ Environmental     │
│ relevance         │
├──────────────────┤
│ Discipline d₂     │
└──────────────────┘
~~~
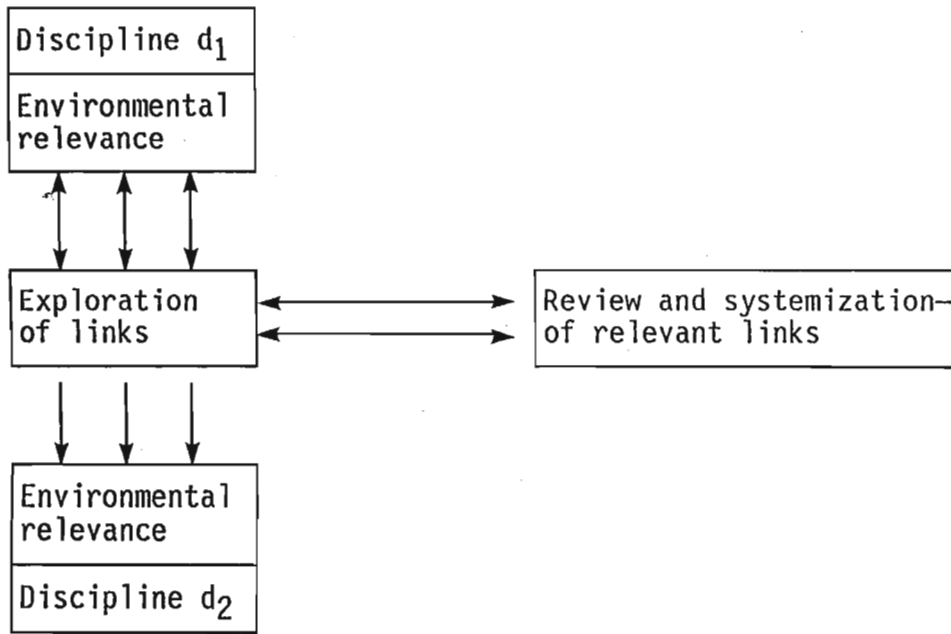
Figure 2   Case 1 - Pluridisciplinarity (Moss, 1986)

~~~
┌──────────────────┐
│ Discipline d₁     │
├──────────────────┤
│ Broader           │
│ education         │
└──────────────────┘
        ↕ ↕ ↕
┌──────────────────┐        ┌──────────────────────────┐
│ General          │ ←────→ │ Environmental issues      │
│ Studies          │ ←────→ │ and problems             │
└──────────────────┘        └──────────────────────────┘
        ↕ ↕ ↕
┌──────────────────┐
│ Broader           │
│ education         │
├──────────────────┤
│ Discipline d₂     │
└──────────────────┘
~~~
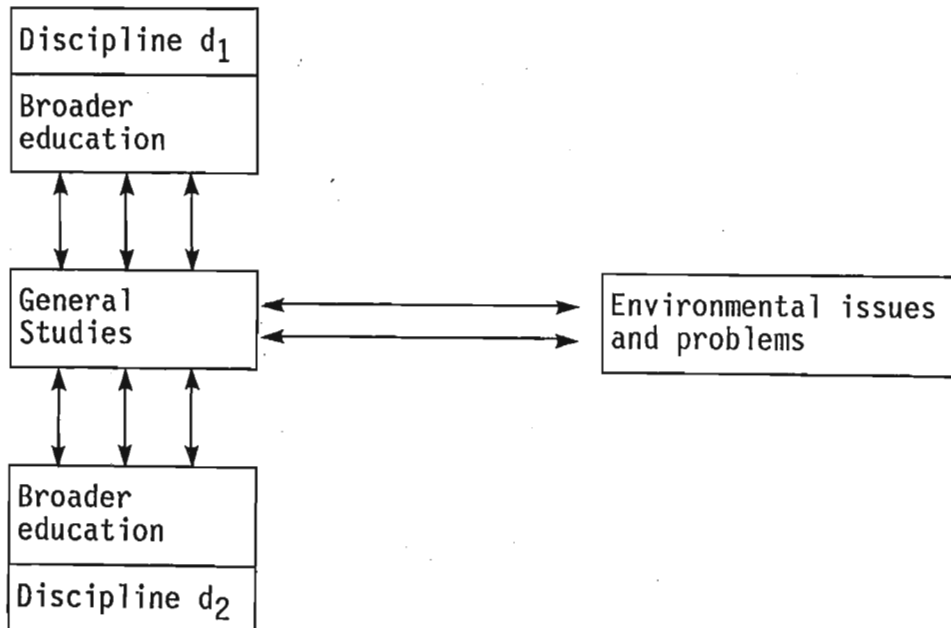
Figure 3   Case 2 - Multi-disciplinarity (Moss, 1986)

This multidisciplinary approach would tend to encourage continued specialization and separation of disciplines.

3) What has been happening to lesser but slowly increasing degree at university level has been the development of disciplines so as to broach their contexts and content and emphasize their relevance in the environmental context (interdisciplinarity).

The whole discipline gets conceived in environmental terms and clothed in the environmental paradigm (Case 3: figure 4) (Moss,1986). However, given the entrenchment of disciplines and a rather conservative academic establishment, multidisciplinarity and pluridisciplinarity are likely to be adopted more rigorously than interdisciplinarity for the foreseeable future.
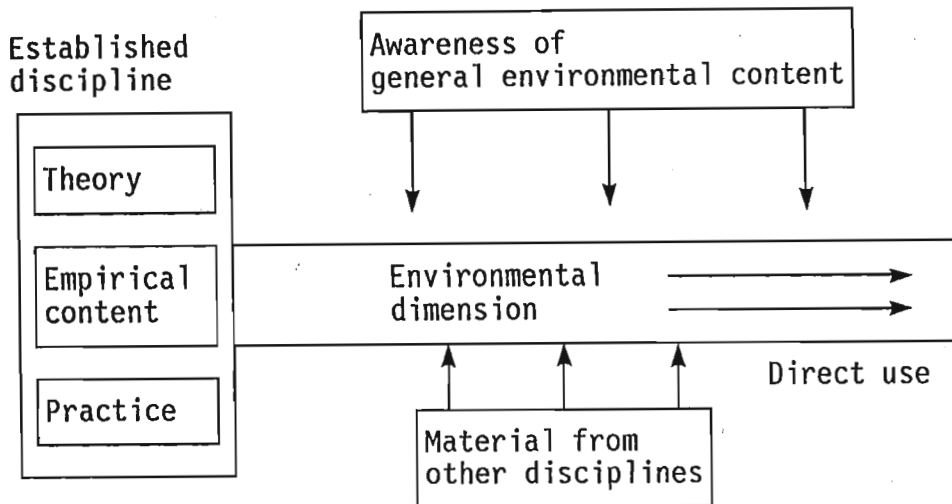
Figure 4 Case 3 - Interdisciplinarity (Moss, 1986)

If these paths of development are employed, an effective environmental education will gradually be unveiled, with hitherto divorced disciplines moving towards one another and sharing input related to environmental issues and problems. This can eventually pave the way for the development of a holistic environmental paradigm owing to the development of a new consciousness.

3.7 The Potential Influence of the Semi-Hegemony and an Holistic Environmental Paradigm on Bureaucratic and Decision Making Concerns

To the extent that there can be complementarity and meaningful liaison between bureaucratic institutions, politicians and the public in the decision making realm will depend on ideological change, brought about by a new consciousness of the people inside and outside these organizations (see Brunsson, 1982).

This ideological change can be brought about through an awareness of the problems with existing ideologies. In this sense, environmentalism could be adopted as a paradigm and an ideology in an education that would reach the society at large. This educative function remains the task of the semi-hegemony.

An holistic environmental education would firstly make all decision makers aware of the environment as a whole entity involving and encompassing natural, social and political parameters. Secondly, it will draw the majority of the body politic out of the everyday common ignorance about their environment, making them critically aware and responsible for future changes, by the process of interaction and participation with planning, administrative and political decision makers. Until this occurs, one is going to have a continued separation and a polarization between the body politic, the administrators, the planners and the politicians which will simply allow the present environmental practices to perpetuate (see Alston and Freeman, 1975).

Furthermore, the semi-hegemony in its pivotal role has the responsibility of ensuring that environmental objectives are more socio-political, redistributive and integrative. The link between the political economy (the more equitable distribution of resources in society) and environmentalism is important for an appropriate, sustainable development (Redclift, 1984). Wulfson (1987:36) argues that,

> " ...the environmentally orientated should realize that sustainable development is predicated on equitable political economic relations: and on the other hand those of

the political economic persuasion should realise that the methods of industrialism and modernism preclude the possibility of sustainable development".

Without the appropriate education, political, economic and environmental concerns will remain divorced from each other with the result that inappropriate development and planning will continue in a society that would not have completed the full cycle of change.

It remains to be assessed to what extent the bipolar intermediaries (in this instance, the universities) have progressed in advancing this strategic execution of an holistic environmental education. Chapter five sets out to assess the present nature and status of environmental education in South African universities. Having assessed this, models can be outlined that could act as a set of basic guidelines towards the advancement of this goal. This model is advanced and discussed in chapter six.

CHAPTER 4

METHODOLOGY

4.1 Introduction

The broad underlying aim of the research methodology adopted in this thesis is to establish to what extent the provision of an holistic environmental education has come to fruition in the South African semi-hegemonic realm. Universities were used as case-studies, since they offer a wider range of academically based disciplines in general. Universities can also be regarded as being conducive to educative innovativeness, creativity and diversity. Universities, throughout the course of history, have always been the `traditional' catalysts for societal change in whatever form. Universities thus have the potential to bring about change within a society, including its perceptions of, interactions with and management of the `environment' and its resources in the broadest sense.

The research techniques adopted were twofold: firstly, an intensive content analysis and quantitative analysis of several university syllabi, and secondly, a mailed questionnaire survey conducted with all identified departments at the case-study universities. Ten steps outlined in the next ten sections were executed before arriving at the final results.

4.2 Selection of Case-Study Universities

Seven universities were chosen as case study examples. These were:

1) The University of Natal (Durban) - English, liberal, `open'.

2) The University of Natal (Pietermaritzburg) - English, liberal, `open'.

3) The University of Durban-Westville - Indian, Black.

4) The University of Zululand - Zulu, non-independent `homeland' (Kwa-Zulu).

5) The University of Fort Hare - Xhosa, independent `homeland' (Ciskei).

6) The University of the Western Cape - `Coloured'.

7) The University of Pretoria - predominantly White, Afrikaans.

Time constraints restricted the use of any more case-study universities. The reasons for choosing these particular universities were firstly, that all three status types (ethnic, white and open universities) were considered for assessment. The increasing enrolment of different race groups at the open universities may lessen the necessity for this criterion (Universities Amendment Act, 1983 (Act 83 of 1983) - Behr, 1984:350). The second reason for this choice was to provide a **comparative** analysis of the nature and levels of environmental educative content. This becomes an important reason in light of the fact that "(l)iaison and cooperation between White and Black universities in South Africa is limited. For the most part, the Black universities work in isolation" (Behr, 1984). The third reason was to ascertain the extent to which a common `environmental' thread is found in the syllabi of these universities, thus providing the basis upon which links can be established in order to disseminate a broad, relevant environmental education in the semi-hegemonic domain.

4.3 Construction of Definitions Pertaining to the Selection Criteria of Environmental Educative Content in Syllabi

Two selection criteria were chosen in order to discriminate and screen off environmentally applicable content in the university syllabi. Environmentally applicable content was classified according to whether it was explicit or implicit and according to whether it was important or had the potential to be important.

Environmentally **explicit** content is content that is <u>directly</u> relevant to the social and physical environment; or can be <u>readily translated</u> into environmentally relevant material, be it positive or negative in connotation (see appendix 1 for examples).

Environmentally **implicit** content is content that is <u>indirectly</u> relevant to the environment; or can be <u>reinterpreted</u> within an environmental educative framework, be it positive or negative in connotation (see appendix 1 for examples).

Environmentally **important** content is content that has a <u>direct bearing</u> on and <u>implications for</u> the environment, be it negative or positive in connotation (see appendix 1).

Environmentally **potential** content is content that has an <u>indirect</u> or <u>hidden bearing</u> on the environment. With reinterpretation and contextualization, such information could become environmentally important, be it positive or negative in connotation (see appendix 1).

Such definitions can be seen to encompass a broad classification of environmental education. It must however be borne in mind that these categories do not separate discipline contents in terms of their environmental **ideological** leanings (O'Riordan, 1981; Huckle, 1983). They merely serve to discern environmentally relevant content.

4.4 <u>Selection of Environmental Educative Material from University Syllabi</u>

University calendars were used to gain access to departmental and degree syllabus contents. The advantages of the university calendars are that they have adequate <u>descriptive content</u> on the whole for the different courses offered by each department for each year of study. The <u>duration</u> of the courses, including the exact number of lectures, tutorials and practicals are provided and stipulations are provided in respect of <u>compulsory, elective and optional</u> courses. In addition, departmental staff names are provided. <u>Rules and stipulations</u> regarding each degree and its syllabi are also provided.

The limitations of the calendars are that course syllabus contents are lacking in sufficient detail in some cases and are only relevant to the year of publication, though syllabi may not change significantly from year to year. The 1988 calenders were utilized for data collection.

In the selection process consistency was maintained in order to achieve objectivity in classifying courses in terms of their environmental content though as Newman (1981:111) points out,

"The problem comes in knowing what to leave out - for every discipline you will find a purist who asserts it is all necessary or will be at some future time. But for sheer practicality the decisions must be made and it is the environmental educator who must do it. Of course, because of the breadth of materials to choose from, each group of educators tends to develop their own emphasis in answering the questions (of environmental problems) (Parentheses my own).

Content was selected within the confines of the definitions of environmental education provided in chapter two.

4.5 Construction of a Questionnaire and Set of Definitions

The general goal of the questionnaire was to ascertain the similarity between universities in terms of the nature and content of courses and the ideological bases of environmental education, as well as their potential in terms of participating in an interdisciplinary environmental education. The questionnaire was constructed with the use of closed questions[1] in order to obtain quantitative data for statistical analysis (Sayer, 1984).

Appendix 1 indicates a set of definitions that accompanied each questionnaire. It was considered vital that each respondent become familiar with the frames of reference of the research in order to maintain consistency in the responses.

Questions one and two required the respondents to either delete or add to the number of environmentally applicable courses or content within courses already cited as pertaining to their departments.

---

[1] The closed question appears to be best adapted to situations where (1) there are a limited number of known frames of reference from which the respondent can answer the question; (2) within these few possible frames of reference there is a known range of possible responses, and (3) within this range there are clearly defined choice points that approximate well the positions of respondents" (Connell and Kahn, 1968 in Smith, 1975:173).

Question three of the questionnaire was particularly designed to try and assess environmental **ideological** trends within various disciplines. The question (Appendix 1) is divided into six sections. Responses to the first two sections (i and ii) would indicate a leaning to the **technocentric** status quo approach. Responses to the third and fourth sections (iii and iv) would indicate a tendency towards **accommodatory** approach; while responses to the fifth and sixth sections (v and vi) would indicate a move towards the **ecocentrist** ideological approach.

A multiple choice of sections or sub-sections on the part of respondents would perhaps indicate a state of <u>ideological flux</u> or change. The ultimate question being asked is whether such disciplines are adopting an ideological stance which

> "may offer diagnoses and prescriptions which appear to explain environmental
> problems and offer solutions yet are often a means of....maintaining the existing form
> of economy and society" (Huckle, 1983).

Conversely are they adopting ideologies which are more morally based therefore inviting an education in responsibility based on the notion of an intergenerational common good (Brown, 1987:63) which would require the changing of the existing economy and society?

Question four was designed around the notion that an holistic environmental education needs to be interdisciplinary in nature. Question four serves to elicit two further findings, that is, the <u>strength</u> of cross-disciplinary links and secondly, the extent to which the natural and physical, social, engineering and planning, and health sciences can be <u>mutually beneficial</u> to one another. What is being looked at here are potential sites for <u>synthesis</u> in terms of producing a broader, holistic environmental education. As Sayer (1984) points out,

> "...different types of knowledge are appropriate to different functions and contexts;
> for example, engineering for the task of making nature move to our designs, ethics to
> the harmonization of the conduct of the people in society. <u>But these contexts are not
> mutually exclusive but overlapping</u>".

4.6 <u>The Preparation of Data Sheets and the Recording of Discipline Courses and Content</u>

Two data sheets formed the basis of the content survey. Both data sheets were used to record data from the content analysis manually[2]. These manually completed sheets were then stored in formatted files using the Dbase3+ programme package (see Appendices 4, 5 and 6).

4.7 The Distribution of Questionnaires and Recording of Data from Questionnaires Using the Dbase 3+ Processing Package

Questionnaires were sent to a total of 314 departments. The number of questionnaires sent to each university are listed below:

a) University of Natal (Durban) - thirty-four

b) University of Natal (Pietermaritzburg) - twenty-four

c) University of Zululand - thirty-six

d) University of Durban-Westville - thirty-six

e) University of Fort Hare - forty-two

f) University of the Western Cape - forty-eight

g) University of Pretoria - ninety-four

Out of the total number of questionnaires sent out, approximately 197 were returned or replied to; which would represent approximately 63 percent of the total number of questionnaires sent out. 175 questionnaires were filled in adequately enough to be utilized in the questionnaire analysis (56 percent).

Questionnaires were mailed to the respondents. The obvious reasons for mailing the questionnaire were that there was a considerable saving of money; that it provided access to the widely separated

---

2 Revisions to these data sheets were made after my first evaluation of discipline course contents for one or either of the following two reasons.
(1) Respondents to the questionnaire either added to or deleted courses or content from that which I had evaluated as having environmentally applicable content.
(2) A re-evaluation of the syllabi in accordance with a clearer, broader conception of environmental education which I had gained while conducting the research.

case-study universities; and that the time savings were enormous compared to the time that would have been utilized with personal interviews. Factors such as anonymity, the respondent's convenience in responding, the minimization of interviewer bias, and so on, were also obvious advantages (see Bailey, 1978:134-5) within the framework of an extensive research design.

The fairly reasonable response rate could be attributed to the fact that a covering letter with telephone numbers (Appendix 2) and a self-addressed envelope were inserted together with the questionnaire. Follow-up letters were also sent out to remind respondents. Copies of questionnaires were posted to respondents who had misplaced their original copy (see Bailey, 1978:144,146).

Possible reasons why the response rate was not higher were:

a) The time and concentration needed in filling in the questionnaire fully. The questionnaire was fairly complex.

b) Some respondents possibly could not see the link between environmental education and their respective disciplines at all.

c) Lack of personal communication with the respondents.

The Dbase 3+ programme was used to store the data from the questionnaires (see appendix 3)[3].

4.8 The Questionnaire Survey

Questions three and five of the questionnaire could be statistically compared, involving nominal data. Modes were used to obtain measures of central tendency pertaining to questions three and five. Two levels were measured:

----

3 Questionnaire respondents had their discipline courses and the nature of environmental course contents recorded in Appendix 3. Non-respondent discipline courses and the nature of course contents were recorded in appendix 5.

1) A cumulative and inter-university analysis and comparison, based on the total number of responses (per university).

2) A social science and humanities - physical and natural sciences - engineering and planning sciences - medical and health sciences (defined in section 4.8.1) comparison at the inter-university and cumulative levels.

An association was sought between **environmental educative category** and the **ideological choices** (question 3)(see table 28 and 29 - chapter 5). Tests of significance were also conducted to test the association between **environmental educative category** and the **importance** of role in an holistic environmental education (question 5)(see table 30 - chapter 5).

The **chi square** (X^2) significance test was applied to test the distributions observed in these data tables (tables 28 and 29), in order to compare the differences between two sets of data. The <u>Contingency Coefficient</u> was used in each association, to measure the extent of association between two sets of variables. This test of correlation is particularly relevant because it is applicable to categorical (nominal scale) information (Siegel, 1956:196; Blalock, 1981:305-306; Hammond and Mc Cullagh, 1980:170-71, 245-246).

4.8.1 The Divisions and Definitions of Environmental Educative Categories

The choice of categorical streams in environmental education is riddled with complexities, as a result of differing perceptions of what environmental education entails. However four categories are proposed to define the realms of university education in which environmental education has some relevance. Although course content from some departments may straddle a number of these categories, each department is classified within one category in order to maintain mutually exclusive categories for the purpose of statistical analysis.

i) <u>The Physical and natural sciences</u> - This category could fall into the category of **environmental sciences**, and would include the life sciences (living/non-living system interactions) and the earth

sciences (physical systems).The catch phrase here would be education <u>about the environment,</u> with a largely ecological, biophysical emphasis.

ii) <u>The Social Sciences and Humanities</u> - This category could fall into the division of **environmental studies,** and would include disciplines concerned with peoples' <u>interactions</u> <u>with</u> the environment - natural, built and social. Included in this category would be the social, economical, political, philosophical, educational and theological subjects.

iii) <u>Engineering and planning sciences</u> - This category would incorporate all facets of engineering. The planning component would include the architectural sciences; town and regional planning and development; building economics and management; quantity surveying, and so on. The guiding principle here would be <u>people and the environment</u> - both treated as separate entities, with people manipulating, changing and enhancing the natural and built environment, ultimately to benefit the social environment.

iv) <u>Medical and health sciences</u> - The fourth stream could fit into the category of **environmental health sciences.** The impinging philosophy would be that of <u>people in the environment,</u> with the relationship between people and environment being linked, and where a mutual equilibrium is achieved between environment and society. Under this category would fall public and community health; health services and facilities; health education; nutrition; industrial health and working conditions; nursing; dentistry; veterinary sciences; physio- and occupational therapy; disease and pest control; pollution monitoring and control (Lee, 1985; Newman, 1984; Wigston, 1977; Coker, 1978).

All the disciplines or departments cited fitted neatly into these four categories. Difficulty was experienced in deciding on whether geography should be placed under the social sciences or physical sciences, geography traditionally being divided into human and physical components. Upon reflection however, it could be concluded that geography revolves around the question of **human-environment relations** (Haggett, 1979:6), whether the `environment' be classified in the physical, social, political or

cultural senses. It was thus decided to place it under the social sciences category. **Home economics and dietetics** was placed under the health sciences, though it could have been placed under the social science category. The reason for this decision was that from the nature of the course contents, it could be ascertained that the syllabi course contents of these departments were primarily aimed at creating the expertise required for ensuring the physical, psychological and social health and well-being of the individual and his/her social unit (family, institution and community) in the environment.

Appendix 7 lists the disciplines cited as having environmental content according to educative categories for each case-study university.

4.8.2 The Construction and Analysis of Matrices in Order to Establish the Nature and Strength of Alignment between Departments

Matrices (Figure 5) were constructed in order to quantify results from Question 4 of the questionnaire[4].

Analysis and comparison is undertaken at two levels, ie. (i) at the inter-university level on a departmental basis and according to the four categorical streams already outlined, and (ii) at the cumulative level with a cumulative matrix including the cumulative number of alignments and mean strengths of alignments.

4.9 Content analysis

The datasheet analysis dealt with the following aspects of data collection:

1) Ascertaining the number of disciplines and degrees which have environmentally applicable content.

---

[4] These matrices are not presented in the results chapter. The results from the matrices are presented in tabulated form under section 5.7.(interdisciplinary alignments) of chapter 5.

DEPTS.RESPONDING TO QUESTIONNAIRE

		Geog	Hist	Biol	Arch	Agri	A	B	C
Depts.to which responding depts.do or could align.	Anthro.								
	Educ.								
	Zool.								
	Geog.								
	Socio.								
Cumulative alignment Score (A).									
Total no. of align- ments (B).									
Mean strengths of alignment (C).									

Figure 5 Matrix depicting the nature and strength of cross-disciplinary links that could be established in providing for a holistic environmental education at the tertiary education level

2) Ascertaining the <u>number of courses</u> within each discipline or degree which have environmental educative content.

3) The proportional percentages of **explicit/implicit** and **important/potential** environmental content to be found in each discipline or degree cited as having these four divisions of environmental content.

4) The proportional percentages of explicit/implicit, important/potential environmental content to be found in **all** disciplines and degrees irrespective of whether they have or do not have certain of these categories of environmental content.

5) Calculating the number of <u>lectures,</u> tutorials or practicals per discipline or degree course that the environmental educative content comprises and the **proportional percentage** that such content comprises of the total pool of content available.

6) The average proportion of content per <u>course</u> that has environmental applicability.

7) The proportional average percentage contribution of a course to a discipline/degree.

A comparative analysis is conducted between the social sciences, the physical and natural sciences, the engineering and planning sciences and the health sciences at the inter-university, intra-university and the cumulative levels. Cumulative results of content nature proportions, exclusive of environmental educative categories are also included.

All discipline departments (respondents and non-respondents to the questionnaire) cited as having courses with environmentally applicable content are included in the content analysis.

4.10 Establishing of Associations between Variables

Use was made of cross-tabulations in assessing the associations between two variables. Cross-tabulations are an essential way of discovering whether there is a relationship between the variables, and what the form of that relationship is (Gilbert, 1981). In addition to the cross-tabulations outlined in section 4.8. (questionnaire survey), the following cross-tabulations were established:

1) Explicit and implicit environmental educative content by important and potential environmental educative content (per courses).

2) Environmental ideological leaning (question 3 of the questionnaire) by importance of a department's contribution to environmental education (question 5) (per disciplines).

3) Environmental educative category with the nature of environmental content (per courses).

4) The importance of a department's contribution to environmental education by the nature of environmental educative content (explicit/implicit and important/potential) (per courses).

5) Environmental ideological leaning by the nature of environmental content (per courses).

Results are presented at the cumulative level initially, followed by an inter-university comparison where applicable.

The Chi Square test (X^2) and the Contingency Coefficient (C) were used as significance tests to test the extent and strength of association in each bivariate relationship.

4.11 Establishing the Interaction between Three and Four Variables Using Loglinear Analysis

A relationship between three variables is termed interaction.

> " When three variables are related in a way such that the association between two of them changes according to the level of the third..." (Gilbert, 1981:31).

Loglinear analysis is the best method of analysing three and higher variable tables. Loglinear analysis can be used favourably with categorical (nominal) data. The research data of this thesis lends itself favourably to the use of loglinear analysis. The loglinear analysis method requires a number of steps, but in brief, it is used to construct a model table which includes those relationships specified in a model. Our first model in this case is to establish whether there is any interaction between (i) the nature of the course content; (ii) environmental ideological leaning and (iii) the importance of a discipline's or department's contribution to and role in an inter-disciplinary environmental education.

The second model seeks to establish whether there is any interaction between four variables, ie. (i) the categorical divisions in environmental education; (ii) the importance of a discipline's contribution to an holistic environmental education; (iii) the nature of the course content and (iv) ideology.

The model tables derived as a result of loglinear analysis can be compared with the data tables to see whether this model is a good one (whether there is any relationship or interaction between these variables).

Model table frequencies are calculated by using a method known as <u>iterative proportional scaling</u>. Use was made of the SPSS programme package for loglinear analysis (PC) (SPSS/PC manual B: 219-).

The model table that is produced has some specified marginals that will be identical to those in the data table. These fixed or identical marginals are those that indicate a relationship between the three variables (See Gilbert, 1981).

In conclusion, the methodology adopted in this thesis has the aim of analyzing largely nominal data in as rigorous a manner as possible in order that trends can be recorded regarding the nature and status of environmental education in South African universities and their potentials for the adoption of a holistic environmental paradigm.

CHAPTER 5

THE NATURE OF ENVIRONMENTAL EDUCATION IN SEVEN SOUTH
AFRICAN UNIVERSITIES AND THE POTENTIAL FOR THE ADOPTION OF
AN HOLISTIC ENVIRONMENTAL PARADIGM

In accordance with the assertion that the semi-hegemonic domain is the most important catalyst in the

dissemination of an holistic environmental paradigm through the broader society, it would seem fitting

that an analysis regarding the current nature and strength of an holistic paradigm be undertaken in this

domain. In this chapter, South African universities as one of the most important representatives of the

South African semi-hegemony are assessed. In attempting to accomplish this task, some hypothetic

questions posed in chapter one and indicated below are answered:

(1) To what extent do the technocentric, accommodatory or ecocentric ideologies prevail at South

African universities?

(2) To what extent do university departments have an important role to play in an interdisciplinary

environmental education?

(3) Does ideology affect the importance of a discipline's role in a holistic environmental education?

(4) Is environmental educative course content largely of (a) an explicit or an implicit nature and (b) an

important or potential nature; and what influence do the educative categories have in determining the

nature of this content?

(5) Do the environmental ideologies of departments affect the nature of environmental content?

(6) What bearing does the nature of environmental content have on environmental educative

importance?

(7) Is there potential for interdisciplinary liaison and linking in respect of an holistic environmental education in general and within the range of educative categories?

(8) Do what extent do the environmental ideologies prevail within the four educative categories (social sciences, physical sciences, planning sciences, health sciences)?

(9) Do the educative categories have a bearing on interdisciplinary potential?

(10) Is there a significant relationship between environmental ideologies, educative categories, the nature of environmental educative content and interdisciplinary potential in determining the outcome of environmental education at South African universities?

(11) What is the overall status of environmental education in South African universities?

The research results are discussed under elevan sections in accordance with the hypothetical questions outlined.

5.1 Environmental Ideologies and their Prevelance in South African Universities

The crucial component in any assessment regarding the nature of environmental education in South African universities is to ascertain the ideological perspectives adopted by discipline departments, as revealed in the responses from questionnaire participants (see table 1). Although the results from the questionnaires indicate that there were more respondents who responded to the **technocentric** ideology (195 responses), there appears to be an increasing trend towards a critical, **ecocentric** approach (178 responses) (see table 1).

The smaller number of responses to the accommodatory ideology could indicate an ideological shift towards a bipolarity of ideological leanings with the accommodatory ideology occupying an intermediary position[1].

TABLE 1.- Ideological Responses from South African Universities

| UNIV. | Q3(i) | Q3(ii) | Q3(iii) | Q3(iv) | Q3(v) | Q3(vi) |
	technocent		accomodatory		Ecocentrist	
FortH	11	9	8	3	14	10
Zulul	8	7	6	3	5	7
UDW	11	10	11	9	11	13
UND	14	11	6	6	4	7
UNP	9	6	8	3	12	10
UWC	11	9	6	6	10	9
PRET	47	32	31	27	31	35
Total	111	84	76	57	87	91

Mode: Technocentrist.

Comparatively fewer departments identified a single ideological leaning as a foundation upon which to base their discipline content and teaching rationales (see table 2).

By way of example, the following three questionnaire responses from participants highlight a shift from a purely technocentric approach to a more accommodatory approach.

---

1 Only four departmental respondents chose an accomodatory rationale as their sole criteria for imparting an environmental education.

TABLE 2.- Ideological Leanings of Questionnaire Respondents

(a)	(b)	(c)	(a+b)	(a+c)	(b+c)	(a+b+c)
37	4	17	14	19	14	65

Key:
a = Technocentrist.
b = Accommodatory.
c = Ecocentrist.

1) Economic History: "I think if the economic history of this region contained more environmental ideas and thinking, it would come to the fore more. Economic history should itself absorb and include thinking on human interaction with the environment necessitated through economic forces and changes.

2) Business Administration: From the perspective of the management of a business, environmental involvement and concern is summed up well by Andrews when he says:

> "Soundly responsible behaviour is the intelligent and objective concern for the welfare of society which restrains individual and corporate behaviour from ultimately destructive activities, no matter how profitable, and leads to the direction of positive contributions to human betterment".

This implies that business involved with the environment especially in South Africa covers the whole range of explicit, implicit and potential contributions. Businesses can and do contribute substantially to the physical, social and cultural environments in both negative and positive ways, through input into the physical environment, involvement with community projects; and sponsoring of cultural events. All these aspects are addressed in various ways by our department".

3) Botany: "...unless adequate conservation measures are adopted, this will result in destruction of large areas of our vegetation. We feel we have a role in creating greater awareness of the problems and in providing information on which planning can be based".

5.1.1 Inter - University Comparison

None of the universities have the **accommodatory** approach as their key ideology. With four universities leaning slightly more towards the technocentric approach (Zululand, Durban, Western Cape and Pretoria), three towards the ecocentric approach (Fort Hare, Durban Westville and Pietermaritzburg), it is evident that the semi-hegemony is entering a stage of ideological flux. With all

perspectives finding their place in the semi-hegemony, the time is ripe for an holistic, cross-ideological environmental paradigm to be adopted.

There is no clear-cut link between the status of universities (ethnically and culturally based or `open') and the ideological patterns adopted. One might be able to reason that Pretoria university has a more technocentric stance because of its closer links with the hegemonic realm, and that Fort Hare with its liberal to radical stance has a leaning towards the ecocentric approach. However, both these universities also have a large proportion of ecocentric and technocentric responses respectively. Durban university, a liberal, critical university has a fairly strong technocentric bias. Pietermaritzburg which has on the whole been more conservative, has an ecocentric bias.

This observation lends credence to the assertion that universities irrespective of status, serve their dual purpose of (i) upholding the interests of established socio-economic and ideological frameworks of the country, enhancing economic growth and social stability by inculcating appropriate values and morals; and (ii) questioning and critically assessing the hegemonic status quo and working towards change in the socio-economic and environmental domains.

5.2 The Potential for a Broad Interdisciplinary Environmental Education

Respondents were required to rate on a continuum, the contribution their respective departments could make towards a holistic environmental education. Table 3 lists the results at the inter-university level. These results indicate that most departments responded to ratings two, three and four, signalling a willingness to incorporate and contribute to a holistic environmental education. Amongst those responding to rating one and to a lesser extent to rating two were those who either preferred to opt for discipline exclusivity, or could not envisage a strong link between their respective disciplines and the environmental paradigm.

The results in table 3 indicate that white, coloured and Indian universities tend to have more departments who think that they have an **important** or **very important** role to play in an holistic

environmental education while `black' universities accommodating students, and an increasing number of staff drawn from the counter-hegemony, tend to adopt the view that their role in environmental education is of **some importance** (ie. Fort Hare, Zululand and UWC).

TABLE 3.- The Interdisciplinary Potentials of Universities in South Africa

Univ.	Little NB(1)	Some NB(2)	NB(3)	Very NB(4)	tot.
Fhar	4	12	5	4	26
Zul.	1	10	2	3	16
UDW	0	5	9	7	22
UND	3	7	7	7	25
UNP	2	4	6	3	15
UWC	4	6	2	4	16
Pret.	5	14	17	17	55
Total	19	58	48	45	170

Mode: Some Importance (2).

This is probably not too surprising in light of the following reasons:

a) Counter-hegemonic concerns about society centre largely around the political and socio-economic domains. Interlocking environmental concerns are not considered as important relative to these central issues.

b) There is a desire on the part of black students to gain the qualifications necessary to obtain suitable jobs in the market place in order to improve their status and material well-being (Nkomo, 1984:89). These qualifications require specialized and technically oriented education. The liberal ethos of creating an expanding middle class thus maintaining the existing socio-economic and environmental status quo, is still pertinent in `ethnic' universities.

5.3 The Association between Ideological Leaning and the Potential Importance in an Interdisciplinary Environmental Education (by Number of Questionnaire Responses)

The fact that university departments could incorporate an holistic environmental education will not necessarily have an impact on these departments' ideological leanings (see table 4).

TABLE 4.- The Association between Ideological Leaning and Role Importance in an Holistic Environmental Education

	Little NB(1)	Some NB(2)	NB(3)	Very NB(4)
TECHNOCENT.	14	41	39	38
ACCOMMOD.	4	28	28	34
ECOCENTR.	7	30	39	35

This is borne out by the results in which there is no significant association between environmental ideology and the importance of a department's role in environmental education ($X^2 = 5,26$. $p = 0,7$). The contingency coefficient yields a weak overall correlation ($C = 0,12$), which indicates a positive but non-significant association between the two variables. However, the differences between the some importance, important and very important categories and the technocentrist, accommodatory and ecocentrist approaches is minimal.

It should not be ruled out that with increasing interdisciplinary input, there is a greater chance that departmental ideological shifting may occur and probably toward a more ecocentrically based approach[2].

5.4 The Environmental Content of University Disciplines and Degrees

It is the contention in this thesis that a holistic environmental education at the university level will provide the means for bringing about change in the political, environmental, economic and social realms of society. Therefore, as a preliminary analysis it is necessary to assess the existing environmental content of university disciplines and their respective courses.

The environmental content of applicable courses were differentiated in terms of two dimensions,ie. (i) the explicit/implicit nature of the content and (ii) the importance/potential importance of the content.

In order to assess the amount of environmental content and its nature (explicit/implicit or implicit/potential), it is necessary to examine the results in some detail. This will provide the basis for assessing the relative strengths of the educative categories for adopting an holistic environmental paradigm.

Each of the four educative categories will be discussed separately, accompanied by tables of results at the inter- and intra-university levels of analysis[3]. This will be followed by a discussion of results at a cumulative level of analysis for (i) the environmental educative categories (section 5.4.5) and (ii) the nature of environmental content exclusive of the four categories (section 5.4.6.).

----

2 Appendix 9 provides a case-study university comparison in terms of their ideological leanings and their potential roles in an interdisciplinary environmental education. It is encouraging that all universities had low numbers of respondents who believed they had little or no role to play in an holistic environmental education.

3 In Appendix 8 are entered the names of the disciplines and degrees for each university according to environmental educative categories. Included are the number of courses and number of lectures corresponding to each discipline or degree.

5.4.1 Environmental Content of Disciplines and their Courses in the Social Sciences

In table 5 the explicit and implicit environmental content percentages of courses in the social science disciplines are indicated. Within the social science category there is a predominance of implicit environmental educative content - (27 percent of a discipline's or degree's content) as opposed to explicit content (11 percent) (see table 5).

TABLE 5.- The Explicit and Implicit Content of University Disciplines and Degrees in the Social Sciences

Univ	No.d	No.c	Exp1	Imp1	Exp2	Imp2
Zulu	36	165	15	22	3	22
UNP	21	148	13	23	7	23
UND	25	160	11	31	3	30
Fhar	31	129	10	30	4	30
UWC	29	261	8	37	4	37
UDW	27	115	12	21	4	21
Pret	50	576	6	24	3	24
Tot.	219	1554	75	188	28	187
Mean	31	222	11	27	4	27

Key:

No.d - Total number of disciplines or discipline degrees with environmentally applicable content.

No.c - Total number of courses with environmentally applicable content[4].

Exp1 - Mean percentage of explicit content per environmentally applicable discipline/degree cited as having such content[5] (expressed as a proportion of the total discipline/degree content).

---

4 It should be borne in mind that some courses will be found in more than one degree. For example, the B.Proc. and LLB degrees share certain courses. The same applies to the different engineering degrees and so on. Therefore the actual number different courses will be less than those indicated here.

Exp2 - Mean percentage of explicit content across all disciplines/degrees containing environmental content irrespective of whether they have or do not have explicit content[5].

Imp1 - Mean percentage of implicit content per environmentally applicable discipline/degree cited as having such content[5] (expressed as a proportion of the total discipline/degree content).

Imp2 - Mean percentage of implicit content across all disciplines/degrees containing environmental content, irrespective of whether they have or do not have implicit content[5].

There is less of a discrepency between the important and potential proportions, with a tendency for potential content to be more predominant (21 percent and 16 percent of the discipline or degree content respectively) (see table 6).

TABLE 6.- Important and Potential Content of Disciplines and Degrees in the Social Sciences

Univ	No.d	No.C	NB1	Pot1	NB2	Pot2
Zulu	36	165	13	16	10	15
UNP	21	148	11	21	9	21
UND	25	160	19	25	13	20
FHar	31	129	20	22	13	21
UWC	29	261	20	23	18	22
UDW	27	115	15	21	5	20
Pret	50	576	13	17	11	16
Tot.	219	1554	111	145	79	135
Mean	32	222	16	21	11	19

---

5 The reason why there are discrepencies between exp1/imp1 and NB1/pot1 and exp2/imp2 and NB2/pot2 is that some disciplines and degrees did not have all four categories of environmental content. For example, relatively fewer social science disciplines had any explicit content. However, if the mean percentages of these four categories are sought for each of the disciplines or degrees cited, irrespective of whether they exclude certain categories or not, then one finds an equal or near equal mean percentage contribution from both the explicit and implicit variable and the important and potential variable per discipline or degree (compare the Exp2/Imp2 and NB2/Pot2 columns of tables 5 and 6). This is so, because environmental content was assessed in terms of it being either (i) explicit and important or potential; or (ii) implicit and important or potential.

<u>Key:</u>

NB1 - Mean percentage of important content per environmentally **applicable** discipline/degree cited as having such content.

NB2 - Mean percentage of important content across **all** disciplines/degrees containing environmental content irrespective of whether they have or do not have important environmental content.

Pot1 - Mean percentage of potential content per environmentally **applicable** discipline/degree, cited as having such content.

Pot2 - Mean percentage of potential content across **all** disciplines/degrees containing environmental content irrespective of whether they have or do not have potential content.

At the <u>aggregated</u> level, taking all the disciplines into account irrespective of whether they exclude certain educative content categories (Exp2/Imp2 and NB2/Pot2), it becomes clear that there is a sharper disparity between explicit and implicit content (4 percent and 27 percent of the discipline or degree content respectively) than between the important and potential content (11 percent and 19 percent respectively).

Each of the 1554 courses identified contribute on average to 4 percent of a discipline or degree's total environmental content (see table 15). This results from the number of courses contributing to a discipline or degree in the social sciences (seven to eight full or semesterized courses).

These results would tend to back up the assertion that social sciences have been preoccupied with social, economic, cultural and political concerns with less explicit environmental input.

5.4.2 <u>The Environmental Content of Disciplines and their Courses in the Physical and Natural Sciences</u>

There is a tendency for the physical and natural sciences to have more explicit environmental content (see table 7). It is generally accepted that the physical and natural sciences will be more environmentally explicit because of their direct links with physical and natural environments, eg. geology, zoology, botany and agriculture. **Explicit** content comprises on average, 32 percent of a discipline's or degree's content as opposed to implicit content (13 percent) (see table 7).

TABLE 7.- Explicit and Implicit Environmental Content of Disciplines and Degrees in the Physical and Natural Sciences Content

Univ	no.d	no.c	exp1	imp1	exp2	imp2
Zulu	6	23	27	6	23	3
UNP	29	265	28	5	27	4
UND	3	16	25	14	25	9
ForH	14	67	41	11	41	5
UWC	7	29	45	38	38	16
UDW	6	18	36	12	30	6
Pret	18	271	23	4	23	2
Tot.	83	689	225	90	207	45
Mean	12	98	32	13	30	6

Table 8 indicates a tendency for material to be more important in nature (24 percent) as opposed to potential (18 percent).

The results at the <u>aggregated</u> level indicate that the amount of implicit content in the physical and natural sciences may comprise only 6 percent of the discipline's or degree's total content with explicit content comprising 30 percent (see table 7). Environmental content in this category tends to be of a more important nature as opposed to a potential nature (22 percent and 14 percent respectively) (see table 8).

Each of the 689 courses identified contribute on average 4 percent to their respective discipline or degree's total environmental content. Therefore on average, one could expect to find up to eight or nine semesterized or full courses per discipline or degree with environmental content.

Though there is a predominance of explicit and important content in the physical sciences, there is still a paucity of environmental content in these disciplines, because of the exclusion of an applied environmental input into their fields of study.

TABLE 8.- Important and Potential Content of Disciplines and Degrees in the Physical and Natural Sciences

Univ	no.d	no.c	NB1	pot1	NB2	pot2
Zulu	6	23	25	11	17	9
UNP	29	265	22	11	21	10
UND	3	16	24	15	24	10
ForH	14	67	34	19	29	18
UWC	7	29	33	30	33	21
UDW	6	18	19	30	16	20
Pret	18	271	14	12	14	12
Tot.	83	689	171	128	154	100
Mean	12	98	24	18	22	14

5.4.3 The Environmental Content of Disciplines and their Courses in the Engineering and Planning Sciences

Within the engineering and planning sciences there tends on average to be marginally more **explicit** content (11 percent of a discipline or degree's total content) than implicit content (9 percent) (see table 9). The engineering and planning sciences have as their guiding principle, the manipulation and changing of the natural and built environments to fulfil the needs of society. In South African universities there is still the tendency amongst the engineering sciences to view the environment as subservient to society, as reflected in the low proportions of environmental content in discipline courses.

There is a tendency for environmental content in this category to be more **important** in nature than potentially important (13 percent and 8 percent respectively) (see table 10). At the aggregated level of comparison, there is a similar set of mean percentage scores as in the non-aggregated level for explicit/implicit (see table 9) and important/potential content (see table 10), which would indicate that

most of the disciplines and degrees cited have explicit, implicit, important and potential content in similar proportions.

TABLE 9.- Explicit and Implicit Content of Disciplines and Degrees in the Engineering and Planning Sciences

Univ	no.d	no.c	exp1	imp1	exp2	imp2
FHar	4	12	26	14	26	14
UND	12	121	6	8	5	8
UDW	4	26	4	2	4	2
Pret	16	297	9	12	9	12
UNP	1	16	11	7	11	7
Tot.	37	472	56	43	55	43
Mean	7	94	11	9	11	9

TABLE 10.- Important and Potential Content of Disciplines and Degrees in the Engineering and Planning Sciences

Univ	no.d	no.c	NB1	Pot1	NB2	Pot2
Fhar	4	12	31	11	31	8
UND	12	121	8	7	6	7
UDW	4	26	4	2	4	2
Pret	16	297	11	11	10	11
UNP	1	16	9	9	9	9
Tot.	37	472	63	40	60	37
Mean	7	9	13	8	12	7

Each of the 472 courses identified contribute on average to 1,45 percent of a discipline or degree's total content (see table 15). The largest number of semesterized or full year courses contributing environmental input to any discipline or degree content will be approximately thirteen to fourteen.

Bearing in mind that most engineering degrees extend over four years with numerous half courses in each year of study, this number of courses is not an unrealistic estimate. On average, the courses offering environmental material have a relative paucity of environmental content, which is a matter of concern especially since these sciences have a direct impact on the environment.

5.4.4 The Environmental Content of Disciplines and Courses in the Medical and Health Sciences

Table 11 lists the results of the health science category in terms of their proportions of explicit/implicit content. Within the medical and health sciences there is on average more **implicit** environmental content than explicit content (16 percent and 6 percent respectively of a degree/discipline's total content).

With the medical and health sciences fitting into the category of environmental health sciences, the impinging philosophy being that of **people in their environment,** with close people/environment linkages, one would expect a high percentage of environmentally explicit and important content. However, this is not the case as the results show.

TABLE 11.- Explicit and Implicit Content of Disciplines and Degrees in the Medical and Health Sciences

Univ	no.d	no.c	exp1	imp1	exp2	imp2
Zulu	7	74	1	18	0,6	18
UNP	1	10	10	14	10	14
UND	8	30	3	14	1	14
FHar	4	36	7	23	7	23
UWC	10	122	10	26	8	26
UDW	9	53	5	8	5	8
Pret	25	253	7	12	7	12
Tot.	64	578	45	115	39	115
Mean	9	83	6	16	6	16

There is an equal proportion of both **important** environmental content and **potential** environmental content (11 percent and 11 percent) (see table 12).

At the aggregated level of analysis there is a similar set of mean percentage scores for explicit and implicit environmental content, as well as important and potential environmental content when compared with the non-aggregated level of analysis. This would indicate that most of the disciplines have similar mean proportions of explicit, implicit, important and potential content.

TABLE 12.- Important and Potential Content of Disciplines and Degrees in the Medical and Health Sciences

Univ	no.d	no.c	NB1	pot1	NB2	pot2
Zulu	7	74	7	11	7	11
UNP	1	10	7	17	7	17
UND	8	30	11	5	10	5
Fhar	4	36	20	10	20	10
UWC	10	122	20	13	20	13
UDW	9	53	6	8	6	8
Pret	25	253	9	10	9	9
Tot.	64	578	80	74	79	73
Mean	9	83	11	11	11	10

Each of the 578 courses identified contribute on average 2 percent to their respective disciplines' or degrees' total environmental content (see table 15). This paucity of environmental content in the health sciences point to a typical situation where problems which have an environmental link are analyzed and treated at a symptomatic level rather than at a diagnostic level.

5.4.5 Cumulative Results - Environmental Educative Categories

The results in table 13 indicate that throughout all the case-study universities in the social sciences, there is a greater proportion of implicit content as opposed to explicit content (26 percent and 4 percent of the total discipline or degree content respectively)[6].

TABLE 13.- Cumulative Table of Explicit and Implicit Environmental Content Proportions in the Educative Categories

Cat.	no.d	no.c	exp1	imp1	exp2	imp2
SocS	219	1554	10	27	4	26
PhyS	83	689	31	8	29	5
EngS	37	472	10	10	9	10
Hlts	64	578	7	15	5	14
Tot.	403	3293	58	60	47	55
Mean	101	823	15	15	12	14

The physical sciences have a higher mean proportion of explicit content per discipline or degree than implicit content (29 percent and 5 percent respectively). In the engineering and planning sciences there is very little discrepency between the explicit (9 percent) and implicit content (10 percent) per discipline. The medical and health sciences have a higher proportion of implicit content per discipline (14 percent - implicit; 5 percent - explicit).

Table 14 lists the cumulative results for important and potential content proportions in the educative categories.

---

6 At the cumulative level of analysis deviations were found between the scores in tables 13 and 14 and the mean scores in tables 5 to 12. The reasons for this were that:
a) Inter-university barriers were ignored, and the mean percentages of all the applicable courses summated and a set of grand means arrived at which were more accurate.
b) The totals and grand means in tables 5 to 12 were derived from the individual means for each university which vary not only because of the proportions of environmental educative content in each course but also because of the number of disciplines and degrees and the number of courses offering such content.

TABLE 14.- Cumulative Table of Important and Potential Environmental Content Proportions in the Educative Categories

Cat.	no.d	no.c	NB1	pot1	NB2	pot2
SocS	219	1554	15	20	11	19
PhyS	83	689	23	15	21	13
EngS	37	472	12	8	10	8
Hlts	64	578	11	9	11	9
Tot.	403	3293	61	52	53	49
Mean	101	823	15	13	13	12

The biophysical sciences have a larger proportion of important content as opposed to potential content (21 percent and 13 percent respectively) (see table 14).

Both the medical sciences and the planning sciences have a higher mean percentage of important content than potential content (11 and 9 percent and 10 and 8 percent respectively). The social sciences have more potential content than important content (19 and 11 percent).

The physical and natural sciences have a greater proportion of their total content comprising environmental educative material (34 percent) (see table 15). This is followed by the social sciences (30 percent), the medical and health sciences (20 percent) and the engineering sciences (18 percent) (see table 15)[7].

The average proportion of content per course with environmental connotations is **24 percent** with the medical and health sciences having a higher proportion (28 percent), followed by the social sciences (27 percent), physical sciences (26 percent) and the planning and engineering sciences (13 percent) (see table 15).

---

7 For the cumulative inter-university results for each educative category refer to appendices 10A, B, C and D.

TABLE 15.- Cumulative Table of Environmental Content Proportions for Disciplines and Courses

Cat.	Disc2	Tot%	Crse2
SocS	30	4	27
PhyS	34	4	26
EngS	18	1	13
Hlts	20	2	28
Tot.	102	11	94
Mean	26	3	24

Key.

Disc2 - cumulative mean percentage of environmental content per discipline or degree, both explicit/implicit and important/potential.

Tot% - proportional percentage contribution of a course's content to a discipline or degree's total environmental content.

Crse2 - cumulative mean percentage of environmental content per course across **all** disciplines.

Though the results yielded in table 15 indicate that there is a glimmer of hope for the possible incorporation of an holistic environmental paradigm at the tertiary educative level, a great deal of ground still needs to be covered. Not only does the nature and relative paucity of environmental content in all the categories warrant attention, but also the prevailing norms of treating the environment as a subservient appendage to societal needs and development[8].

5.4.6 Environmental Educative Category with Nature of Environmental Educative Content (by Number of Courses)

Tables 16 and 17 were derived from the number of courses pertaining to discipline departments, exclusive of the degrees and their syllabi. There is a significant association between environmental

----

8 "(Society) is capable of developing progressively provided its activity takes into account the tasks posed by optimization of the biosphere. This very process is in reality a form of the optimization of human activity" (Fedorov and Novik, 1977:53).

educative stream and the explicitness and implicitness of the environmental content of courses (X^2 = 487,86; α = 0,001) (see table 16). The contingency coefficient is C = 0,44, indicating a positive and fairly strong correlation between explicit/implicit environmental content and the educative categories which is significant.

TABLE 16.- Cumulative Association Scores between Educative Category and the Explicitness and Implicitness of Environmental Educative Content

	Physical sc	Social sc	Eng/plan.sc	Health sc
EXPLICIT	245	130	101	126
IMPLICIT	64	849	193	279

There is a significant association between environmental educative category and the importance and potentiality of the environmental content of courses (X^2 = 75,23; α = 0,001) (see table 17). The contingency coefficient is C = 0,19, indicating a positive, though not very strong correlation between these two variables.

TABLE 17.- Cumulative Association Scores between Educative Category and the Importance and Potentiality of Environmental Educative Content

	Physical sc	Social sc	Eng/plan.sc	Health sc
IMPORTANT	178	332	166	192
POTENTIAL	140	700	192	207

The medical and health sciences have more courses with implicit content and potential content. The engineering and planning sciences have more courses with implicit and potential content[9].

There is a predominance of implicit and potential environmental content in courses with the social sciences taking up the bulk of the courses falling in these two types. The biophysical sciences have a few more courses with explicit and important content.

5.4.7 Cumulative Results - Environmental Content of Disciplines within Individual Universities

TABLE 18.- Cumulative Proportions of Explicit and Implicit Content in University Disciplines and Degrees

Univ	exp1	exp2	imp1	imp2
ForH	24	16	25	22
UDW	13	8	16	15
UWC	17	10	34	31
UND	10	4	22	21
UNP	23	18	13	12
PRET	10	8	17	16
ZULU	16	5	20	19
TOT.	113	69	147	136
MEAN	16	10	21	19

---

9 The reason why (in contradiction to earlier predictions) the medical/health sciences and the engineering/planning sciences had a higher number of courses with potential content than important content, was that degree syllabi were excluded from this analysis section and only individual department courses considered in order to increase the accuracy of the results in this section. This was likely to have an effect on the results because the departments in these two sciences have a number of degree syllabi with courses often being found in more than one degree syllabus. However, it should be remembered that in terms of the proportions of course content identified in the datasheet analysis with important and potential environmental content, the proportions of important content were higher or similar to the proportions of potential content (tables 10 and 12).

In table 18 the cumulative mean percentages of explicit and implicit content for the **total** number of disciplines and degrees indicate the tendency for more disciplines and degrees to have **implicit** content than explicit content (19 percent and 10 percent respectively).

With the important and potential categories however, there is a near identical similarity in scores (16 percent, potential and 14 percent important) (see table 19).

TABLE 19.- Cumulative Proportions of Important and Potential Content in University Disciplines and Degrees

Univ	NB1	NB2	pot1	pot2
ForH	25	19	19	18
UDW	12	7	17	16
UWC	22	21	21	20
UND	14	11	15	13
UNP	18	16	16	15
PRET	12	11	13	13
ZULU	13	10	15	14
TOT.	116	95	116	109
MEAN	17	14	17	16

In summary it can be concluded that there is a fairly large number of disciplines or degree courses offering environmentally applicable content, this content is more **implicit** and **potential** in nature. Though the physical and natural sciences have more **explicit** and **important** content, the number of courses are significantly fewer than in the social science category.

Both the health sciences and engineering categories have lower proportions of environmental content in their disciplines and courses than the social and physical sciences and this warrants the need for these sciences to improve upon their low environmental inputs. Furthermore, the social sciences need

to become more environmentally explicit. As long as environmental education content remains implicit and potentially important and as long as environmental content is explicit and important in the sense that it has negative, detrimental and pro status-quo connotations (as observed in some of the course contents), a holistic environmental education is a long way off from being achieved.

With practical action towards the incorporation of an environmental paradigm into university curricula, the process of a paradigmatic shift could be further enhanced.

5.4.8 Inter-University Comparison

Based on the number of courses, the case-study universities (see table 20) showed the following ordering of environmental educative categories from most important (1) to least important (4) in terms of their potential contributions to an holistic environmental education.

Along with each category the dominant nature of the educative content (from tables 5 to 12) is provided (see table 20).

With the exception of Pietermaritzburg University (because of its larger emphasis on the physical and natural sciences), the social sciences show the greatest strength in terms of the number of courses in disciplines and discipline degrees with environmental content. However, in every instance the environmental content is largely implicit and potentially important.

Comparing the black, `ethnic' universities of Fort Hare and Zululand with the largely hegemonic group universities of Pretoria and the University of Natal, the ethnic universities have a fewer number of courses with environmental educative content than the hegemonic group universities (see tables 5-12).

TABLE 20.- Inter-University Comparison of the Relationship between Educative Categories on a Scale of Importance and the Nature of Environmental Content

UNIVERSITY	NB RATING	ENV.ED.CATEGORY	EXP/IMP	NB/POT
Zululand	(1) (2) (3)	Social science Medical,Health Physical/Natural	Imp Imp Exp	Pot Pot NB
Fort Hare	(1) (2) (3) (4)	Social sciences Physical science Medical/health s Engineering Sci.	Imp Exp Imp Exp	Pot NB NB NB
U.W.Cape	(1) (2) (3)	Social Sciences Medical/health Physical/Natural	Imp Imp Exp	Pot NB NB
U.D.W.	(1) (2) (3) (4)	Social Sciences Medical/Health Eng./planning sc Physical/Natural	Imp Imp Exp Exp	Pot NB NB NB
U.N.P.	(1) (2) (3) (4)	Phys./Natural Sc Social Sciences Eng./Planning Sc Medical/Health s	Exp Imp Exp Imp	NB Pot NB Pot
U.N.D.	(1) (2) (3) (4)	Social Sciences Eng./planning sc Phys./Natural Sc Medical/health s	Imp Imp Exp Imp	Pot NB NB NB
Pretoria	(1) (2) (3) (4)	Social Sciences Eng./Planning Sc Phys./natural Sc Medical/health S	Imp Imp Exp Imp	Pot Pot NB NB

The University of the Western Cape, also classified here as an `ethnic' university may have a high number of courses but the majority have implicit and only potentially significant content.

These tendencies would indicate that `ethnic' universities are likely to take longer maturing towards the adoption of a holistic environmental paradigm. These universities are lacking in environmental courses and relevant environmental content because of their largely political and social and economic preoccupations.

All the case-study universities need to address their environmental educative contents within their various disciplines in terms of the proportions of environmental content to the total discipline content, as well as the increasing of explicit and important content. Curricula transformations in respect of knowledge contents requires attention.

5.4.9 The Relationship between the Explicitness /Implicitness and Importance/Potentiality of Environmental Content (by the Number of Courses)

Cumulative results indicating the relationship between explicit/implicit and important/potential content in courses are indicated in table 21.

There is a positive relationship between these two sets of variables ($X^2 = 10,03$; $p = 0,01$). The contingency coefficient however yields a score of 0,06 which indicates a weak, randomised correlation between these two variables. Implicit content tends to be associated strongly with potential content and explicit content with important content.

TABLE 21.- Explicitness and Implicitness by the Importance and Potentiality of Environmental Educative Content

	NB	POT
EXP	489	313
IMP	506	1060

By far the majority of courses had implicit together with potential educative input. Fewer had explicit and important content. This analysis reinforces the results previously obtained. Much contextualizing and new content formation needs to be accomplished at South African universities[10].

----

10 An inter-university comparison is tabulated in appendix 11A.

If each of these four content categories are treated separately, the following trend in environmental educative content seems to be a trait in all universities with the exception of UNP (figure 6). UNP has a slightly higher **explicit** score than important score, probably because UNP has a stronger component of <u>natural and physical science</u> degrees and applicable courses.

```
IMPLICIT        POTENTIAL        IMPORTANT        EXPLICIT
—+——————————————L————————————L——————————+—
  |                                               |

Highest number                         Lowest number
of courses.                            of courses.
```
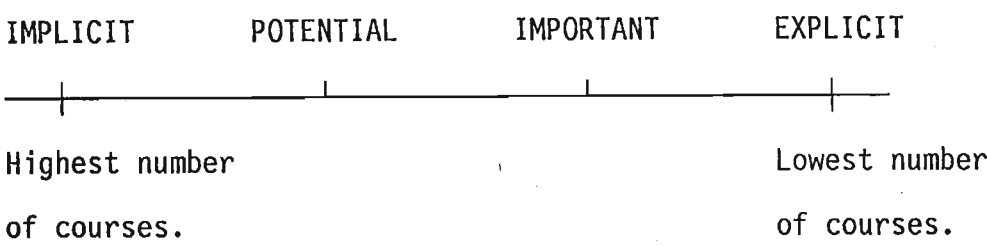
Figure 6 The nature of the environmental content continuum - university trends

5.5 <u>Nature of Environmental Education and Environmental Ideology (by Number of Courses)</u>

There is a definite significant relationship between the explicit and implicit nature of environmental content and environmental ideology (X^2 = 15,28; p = 0,001). Disciplines with more courses having **explicit** content will tend to side more with a **technocentric** ideology (see table 22). Disciplines with more implicit environmental content tend to adopt the ecocentric ideology. Ecocentrism is an emerging body of thought and is still maturing in status, as would be expected in any paradigmatic shifting[11].

The contingency coefficient is C = 0,08 indicating a randomized correlation between the two variables under scrutiny which indicates that irrespective of ideology, there is a predominance of courses with implicit content (see table 22).

----

11 "The substitution of one paradigm for another is not a matter that can be settled entirely by reference to logic or experiment. It is a matter of judgement, an act of subjective choice, an act of faith...." (Harvey, 1969:17).

There is a close parity between the technocentric and ecocentric ideologies in terms of their preponderance at the semi-hegemonic level.

TABLE 22.- Cross-Tabulation of Ideology and the Explicitness and Implicitness of Environmental Education

	EXP	IMP
TECHNO	427	456
ACCOMO	336	436
ECOCEN	341	531

This may not be unexpected in light of the gradual paradigmatic shift occurring in environmentalism at the semi-hegemonic level away from the technocentric ideology to the ecocentric and to a lesser extent, the accomodatory approach.

There is no significant relationship between the importance or potential of environmental content in discipline courses and the environmental ideology which departments adopt (X^2 = 2,77; α = 0,30)(see table 23). The correlation between the variables is weak and non-significant (C = 0,03).

It can again be deduced that in contrast to the explicit and implicit variable, the ideology type will **not** have a significant bearing on the relative proportions of important and potential content with each ideology having more courses with potential content.

As already discussed in chapter two, a relevant, holistic environmental education at the tertiary level would do well to incorporate pertinent aspects from all three ideological stances. Universities seem to be ripe for such an undertaking as evidenced in tables 22 and 23.

TABLE 23.- Cross-Tabulation of Ideology and the Importance and Potential of Environmental Education

	NB	POT
TECHNO	500	601
ACCOMO	391	410
ECOCEN	416	503

5.5.1 Inter-University Comparison

All departments in all the case-study universities adopting the **ecocentrist** approach, had more **implicit** and **potential** environmental content (appendix 11B).

The departments adopting the **technocentric** approach at Fort Hare, UNP and Pretoria had more **explicit** than implicit content (see appendix 11C). It is worth noting that UNP, Fort Hare and Pretoria in addition to science faculties, also have agricultural faculties which may account for this trend.

It is meaningful to note that all universities, irrespective of status are indicating some potential in terms of their capability in fostering an holistic, cross-ideological environmental paradigm though improvements to the nature and status of environmental educative content in courses requires attention.

5.6 Nature of Environmental Content and Environmental Educative Importance (by the Number of Courses)

The results in table 24 indicate a significant relationship between the explicit and implicit nature of environmental content in courses and the importance of a discipline's role in an interdisciplinary environmental education ($X^2 = 29,85; p = 0,001$).

TABLE 24.- Cumulative Association between the Explicitness and Implicitness of Environmental Content and Environmental Educative Importance

	EXPLICIT	IMPLICIT
LITTLE NB	21	64
SOME NB	92	211
IMPORTANT	147	232
VERY NB	218	244

The contingency coefficient yielded is C = 0,15 indicating however that the degree of correlation is positive but randomized.

There is a non-significant relationship between the importance and the potentiality of environmental content in courses and the importance of a discipline's role in environmental education (X2 = 6,52; α = 0,10) (see table 25). The relative rating of role importance is not necessarily dependent on whether the discipline's environmental content is important or potential in nature or vice versa. There is an extremely weak correlation between these two variables which is not significant (C = 0,07).

More courses were found in the **very important** section of the tables 24 and 25. There is a tendency for the number of disciplines with courses having both implicit and explicit content to increase markedly from the little importance rating to the very important rating.

TABLE 25.- Cumulative Association between the Importance and Potentiality of Environmental Content and Environmental Educative Importance

	IMPORTANT	POTENTIAL
LITTLE NB	40	47
SOME NB	138	180
IMPORTANT	167	225
VERY NB	247	243

However there is a trend for disciplines with more **implicit** content to agglomerate more around the little importance, some importance and important categories, while those with more **explicit** content courses tending to agglomerate more around the important and very important ratings. This was expected since environmental content which is implicit is only indirectly relevant to the environment and in need of reinterpretation and contextualizing.

The important and potential variable both have similar influences on what importance rating is chosen by respondents. There is also a steady increase in the number of disciplines away from the `little importance' to the `very important' rating.

The `ethnic' universities of Zululand and Fort Hare have a greater tendency to consider their role in propogating an holistic environmental education as being only of **some importance** (see appendix 11D and E), with more courses falling under the implicit and potential category.

Universities which house the hegemonic groups and classes (UND, Pretoria and UNP) tend to view themselves as having an **important** or **very important** role to play in creating and disseminating an

holistic environmental education. Pretoria and UNP had more courses with explicit content in the very important category.

UWC and UDW, both `ethnic' universities for groups (`Coloureds and Indians) which have hegemonic leanings especially in terms of economic well-being, indicate a stronger inclination towards the important and very important categories proportionally than does Fort Hare and Zululand.

In conclusion, if the semi-hegemony is to project a strong unified role in society through a holistic environmental paradigm, then the ethnic, white and open universities are going to have to move in the same direction in terms of the inculcating the environmental paradigm as an important, guiding philosophy. Inter-university liaison and knowledge sharing between academics and students may be a useful starting point.

5.7 Interdisciplinary Alignment Potential and the Influence of Environmental Educative Categories

Questionnaire respondents were required to list which departments their own departments could or did align with in providing an interchange of environmental ideas, content and courses. They were also required to rate the strength of alignment on a scale of one to three. In analysing this data, certain interesting results come to light:

i) The average alignment strength for all the 407 interdisciplinary links is two, ie. a **good alignment strength.**

ii) In placing the responding departments and the departments to which they do or could align themselves, into the four educative categories, the data in table 26 is attained, indicating the nature and number of alignments.

There is a stronger tendency amongst social science and physical science disciplines to seek possible links with disciplines from the same educative categories, though there is a healthy linking of these two categories to other educative categories (see table 26). There is a stronger tendency amongst the

medical and health sciences to establish links with the social and physical sciences than amongst

themselves.

TABLE 26.- Nature and Number of Alignments between Environmental Educative Categories

a+a	b+b	c+c	d+d	a+b	a+c	a+d	b+c	b+d	c+d
86	115	33	16	19	24	24	39	43	8

Key:
a = Physical and natural sciences
b = Social sciences and humanities
c = Engineering and planning sciences
d = medical and health sciences

The engineering and planning disciplines tend to seek slightly more links with the social sciences than

amongst themselves. These results indicate a trend towards softening the emphasis on subject

specialization, and a willingness to adopt a more interdisciplinary approach, as it relates to an holistic

environmental education.

In comparing between the four environmental educative categories for (a) cumulative alignment

scores, (b) the total number of alignments and (c) the mean strengths of alignment at an intra-

university level, the results were recorded in table 27.

The mean alignment strengths were found to be very similar for all four categories. The **social sciences**

fetched the **highest** cumulative alignment score and number of alignments (333), followed by the

physical and natural sciences (234). The engineering and planning sciences and the health sciences

were found to be lower (133 and 113 respectively). The reason for such a discrepency between the

social sciences and the physical sciences on the one hand and the planning and health sciences on the

other are that whereas all the case study universities had arts, law, commerce, education and science

faculties, not all of them had engineering, architectural, or medical and health faculties.

Fort Hare has no engineering or medical faculties. The University of the Western Cape has no

engineering or planning science faculty and the University of Zululand does not have an engineering or

medical science faculty.

TABLE 27.- Interdisciplinary Alignment Potential between Environmental Educative Categories

Uni	Social scie. (a) (b) (c)			Physical sc. (a) (b) (c)			Engineer.Sc. (a) (b) (c)			Health sci. (a) (b) (c)		
UND	90	40	2,3	9	21	1,4	88	44	2	33	14	2,4
UNP	17	12	1,4	63	34	1,9	2	1	2	4	2	2
UWC	50	24	2,0	19	8	2,0	/	/	/	33	15	2,2
UDW	118	59	2,0	47	24	2,0	37	15	2,5	32	16	2
FHA	132	58	2,3	104	52	2,0	10	5	2	2	1	2
ZUL	48	24	2,0	58	29	2,0	1	1	1	15	9	1,7
PRE	230	116	2,0	122	66	1,9	108	67	1,6	116	56	2,1
TOT	685	333	14	442	234	13	246	133	11	235	113	14,4
MEA	98	48	2,0	63	33	1,9	35	19	1,9	34	16	2,1

Key:
(a) cumulative alignment scores
(b) the total number of alignments
(c) the mean strengths of alignment
at an intra-university level.

It comes as no surprise that the engineering and planning sciences, and medical and health sciences,

are to a greater extent the domain of the hegemonic groups in South Africa, whose heavily subsidized

university infrastructures can cope with the logistics of having numerous faculties. It is also the more

privileged elements of society who receive a thorough, comprehensive schooling which provides an

adequate foundation for the scientific and physically based disciplines. Lastly, the economic and social stratification in South Africa has always determined that blacks largely remain workers as reflected in the nature of black education. Only a minority become white collar workers and members of the petty bourgeosie (small business entrepreneurs). Even fewer become professionals in the medical, planning, legal, educational, engineering and commercial worlds proportionally speaking (Nattrass, 1988). The ethnic universities are no less responsible for producing this state of affairs than primary and secondary schooling.

The second reason for the discrepency between the educative categories is that the social and physical sciences have a wider range of disciplines with environmental educative input than the engineering sciences and the health sciences. Despite this however, the health and planning sciences can be emphasised just as effectively as the social and biophysical sciences in an holistic environmental education as indicated in table 26.

The nature, number and mean strengths of alignments (table 26 and 27) point to the semi-hegemony's strong potential to fulfil its role as developer and disseminator of a holistic environmental education in South Africa.

However, for this to occur white, `open' and `ethnic' universities in creating a strong semi-hegemony, need undertake new curriculum development to `Africanize' and overhaul curricula designed by hegemonic bureaucracies in the past. In the case of `ethnic' university curricula designed by the University of South Africa and by the previously all powerful white dominated administrations of these universities, transformations should begin in terms of making these curricula more relevant and critical in nature (Kgware, 1977; Nkomo, 1984).

An interesting observation is that only Pretoria, the University of Natal (UND and UNP combined) and to a lesser extent UDW are at present in a stronger position to launch an holistic environmental

education programme. These universities as indicated in table 27 have fair proportions of possible alignments from all four environmental educative categories.

The existing situation of a differentiated university structure in South Africa will have to change if an holistic environmental paradigm is to permeate the `ethnic' universities in South Africa. Engineering, planning and medical faculties are going to have to be developed and strengthened in these institutions and ongoing bridging programmes developed at all universities in order that the present serious shortcomings of black students' schooling may be overcome.

5.8 Environmental Ideologies and their Prevelance within the Educative Categories

If the responding departments are divided into the four environmental educative categories (see appendix 7), it is even more apparent that universities are in a state of ideological shift. Table 28 indicates the ideological stances by educative category[12].

TABLE 28.- Relationship between Environmental Ideology and Environmental Educative Category (by the Number of Responses)

Ecat.	Q3(i) Q3(ii) Technocent.		Q3(iii) Q3(iv) Accommodatory		Q3(v) Q3(vi) Ecocentrist		tot.
SocSc	53	34	38	28	46	48	250
PhySc	21	17	20	9	17	12	115
HlthS	22	19	10	12	15	21	97
EngSc	15	14	8	8	9	10	64
Total	111	84	76	57	87	91	526

---

12 Though the number of responses are recorded for each of six ideological questions, the technocentric questions (i) and (ii) for example were combined when calculating the Chi square values, as were the accommodatory and ecocentric approaches.

Modes: Technocentrist and social sciences

Though the modes in Table 28 indicate the social sciences tend to be more **ecocentrist** (ninety-four responses) and the physical, engineering and health sciences more **technocentrist** (thirty-eight, forty-one and twenty-nine responses respectively), they are not significant relationships ($X^2 = 4,78$; $\alpha = 0,7$). The contingency coefficient (C) is 0,10, which indicates a randomised correlation between ideology and educative category which is non-significant.

Table 29, based on the number of disciplines as opposed to the number of responses, back up the results from table 28 ($X^2 = 3,93$, $\alpha = 0,7$; C = 0,11).

TABLE 29.- Cumulative Association Scores between Environmental Educative Category and Environmental Ideology

	Nat/phys.sc	Social sc	Eng/plan.sc	Medical sc
TECHNO.	25	60	19	26
ACCOMM.	20	46	8	17
ECOCEN.	17	60	11	22

Though the social science scores appear higher this can be attributed firstly to the fact that more social science departments responded to the questionnaire. Secondly the social science departments seem to be attached to no particular ideology as many responded positively to more than one ideology.

It is interesting to note from table 28 and 29 that all educative categories have disciplines which are adopting one or more of the three ideologies. To illustrate this ideological flux across the four educative categories, examples from questionnaire respondents' remarks are cited to illustrate the range of ideologies within educative categories:

1) <u>Social science/technocentric</u>: "What we are concerned with is accountacy for the costs incurred in the manufacturing process and by costs we mean those that have arisen as a result of financial

transactions and are therefore measurable in money terms. The deleterious effect that a manufacturing process has on the surrounding environment is not accounted for unless a cost has to be incurred in repairing the damage" (Accountancy).

2) <u>Social science/accommodatory</u>: "The business economics department educates (potential) managers who are decision-makers:- an acute awareness of the implications of environmentally unsound decisions may engender a sense of responsibility among managers when deciding on products, processes, equipment and pollution control as it may affect their enterprises and or the ecosystem" (Business economics).

3) <u>Social science/ecocentric</u>: "In the narrower sense of ecological issues, economics as presently taught.... would seem to have little direct bearing. If a broader definition of environmental issues is considered (ie. socio-economic well-being, efficient allocation and conservation of resources), then economics can help in providing an understanding of the problem and can suggest solutions" (Economics).

4) <u>Physical and natural sciences/technocentric</u>: "We are more concerned with the natural (biotic) ecosystems than those manipulated by man, agricultural and urban; similarly our focus is on fundamental principles and concepts from a scientific/academic perspective rather than from an educational one per se" (Zoology and Entomology).

5) <u>Physical and natural sciences/accommodatory</u>: "Our approach to agricultural education is emphasis on subsistence and commercial production...in a way which is self-sustaining ecologically and environmentally" (Horticultural science).

6) <u>Physical and natural sciences/ecocentric</u>: "Being an institution which is striving for effective education at essentially a third world environment, our philosophy is to teach `ecological' principles with an emphasis on their sociological importance rather than an `ivory tower' or `elitist' approach" (Botany).

7) <u>Engineering and planning sciences/technocentric</u>: "Civil engineering is a profession that helps to <u>modify</u> the environment for the <u>betterment of mankind</u>" (Civil engineering).

8) <u>Engineering and planning sciences/accommodatory</u>: "Engineers, especially chemical engineers, have a vital role to play in <u>managing and looking after the environment</u>. Engineering by its nature exploits the natural resources for the <u>benefit of society</u> and engineers should ensure that this exploitation is done in such a way as to minimize the damage to the environment" (Chemical Engineering).

9) <u>Engineering and Planning sciences/ecocentric</u>: "This department is constantly evaluating (and reshaping where necessary) the courses it offers (in recognition of the fact, of human error and shortcomings) with the aim of including all aspects of the environment (social, political, physical, economical, ecological, etc.) and highlighting the impact of each of the above on the others. At present there is a strong gearing towards the Third World situation in view of the present state of affairs in this country and its neighbouring states" (Town and Regional Planning).

10) <u>Medical and health sciences/technocentric</u>: "Students in parasitology are made thoroughly aware of the importance of the environment:

i) The spreading of parasites and vectors can be determined by environmental conditions.
ii) Environmental factors can make animals more receptive to infection.
iii) Environmental conditions can play an important role in the transfer of parasites from animals to people" (translation) (Parasitology - Veterinary sciences).

11) Medical and health sciences/accommodatory: "Dietetics and Home Economics involve the education and welfare of the individual, and also with regard to the family and the environment. The mission of the home economist is to help the individual to improve his/her quality of life and to have a good, healthy interaction with his/her environment...." (translation) (Home economics).

12) Medical and health sciences/ecocentric: "Health is inextricably linked to an environmental perspective and vice-versa....An interdisciplinary approach is strongly favoured by some staff..." (Nursing).

5.9 The Environmental Educative Categories and Their Potential Importance in Contributing to an Holistic Environmental Education

In table 30 the responding departments are divided into the four educative categories. The following results are evident. With a X^2 value of 15,05 with an associated probability of occurrence of $\alpha = 0,10$, there is no significant difference between the four categories of environmental education and the importance which these categories could have in contributing to an holistic environmental education.

TABLE 30.- The Effect of Environmental Educative Category on the Choice of Importance Rating

Category	little NB(1)	Some NB(2)	NB(3)	Very NB(4)	Tot.
Soc.Sci	10	33	21	20	84
Phys.Sci	2	8	6	14	30
HealthSc	6	11	14	4	35
Eng.Sc.	1	6	7	7	21
Total	19	58	48	45	170

Modes: Social Sciences - Some NB
  Physical Sciences - Very NB
  Health Sciences - NB
  Planning Sciences -NB,Very NB

The contingency coefficient (C = 0,29) indicates a positive but not very strong correlation between environmental educative category and interdisciplinary importance rating. All four categories are moving away from considering environmental education as being of little relevance.

However, despite the insignificant association it can be ascertained that more social science departments responded to category two (some importance); more physical and natural science departments responded to category four (very important); and more health science departments responded to category three (important). These results indicate the possibility for adopting an holistic environmental educative paradigm at the tertiary level, with emphasis on pluridisciplinary and interdisciplinary liaison amongst and content restructuring in all university faculties.

5.10 The Relationship between Environmental Ideology, Environmental Educative Category, the Nature of Environmental Content and Interdisciplinary Potential

Associations or relationships were sought for (i) three and (ii) four variables by utilizing the loglinear method of analysis. It must be borne in mind that all counts used for the data tables were of courses and not of disciplines[12].

5.10.1 Three Variable Analysis

The following three variables were assessed in the three variable analysis:

    1) Environmental ideology.

    2) Importance of environmental educative

      role.

    3) Nature of environmental educative

      content[13].

----

12 The rationale for this was that the nature of environmental educative content variable could only be assessed correctly by considering course contents.

13 For computational purposes, these three variables were divided into their various sub-variables which were treated as values. For example, the technocentric, accommodatory and ecocentric ideologies were treated as values of the ideology variable. All possible combinations between the different values in the three variables have to assessed in loglinear analysis.

The SPSS loglinear programme package produced a preliminary model of all sets of relationships between these three variables:

a) ideology - nature of environmental educative content;

b) ideology - importance of environmental educative role;

c) nature of environmental content - importance of environmental educative role.

The first set of variable relationships were deleted from the model, that is, ideology and nature of the environmental content, because this set of variables weakened the goodness-of-fit between the data tables and the model table (Significance of p = 0,59)[14]. The remaining two sets (b) and (c) were seen as suitable for the final simplified model. When evaluated together there was a significant goodness-of-fit between the expected count of the model tables and the observed count of the data tables. There is a probability of 72,6 percent that there is an interaction between the nature of environmental education, ideology and the importance of environmental educative role. If any one of these two sets are removed or if one variable is removed, the goodness-of-fit between the model and data tables will be reduced.

For example, those departments adopting a **technocentric, accommodatory** or **ecocentric** ideology and having courses with **explicit content** tend to reply less to the **little importance** role option than do those departments with courses containing implicit and potential content. However the technocentric ideology has a higher number of courses with explicit content and so departments adopting the this ideology are more unlikely to respond to the little importance rating.

It would seem that in the association of these three variables, the importance of environmental educative role factor is associated with both the ideology and nature of environmental educative content variables, especially as this variable is found in both sets.

----

14 Loglinear analysis as outlined in chapter 4, attempts to arrive at a model table to which the data tables will most closely fit. This may involve certain combinations of variables being deleted in order to arrive at a model that comes close to having a 100% probability of fitting with the data scores.

Regardless of the ideology or importance of environmental educative role, the courses display higher

proportions of implicit and potential content over explicit and important content.

```
┌─────────────┐              ┌──────────────────────────┐
│             │              │ NATURE OF ENVIRONMENTAL  │
│  IDEOLOGY   │ - - - - - -  │                          │
│             │              │ CONTENT.                 │
└──────┬──────┘              └────────────┬─────────────┘
        \                                /
         \                              /
          \                            /
           ↓                          ↓
        ┌──────────────────────────────────┐
        │                                  │
        │  IMPORTANCE OF ROLE IN           │
        │                                  │
        │  ENVIRONMENTAL EDUCATION         │
        │                                  │
        └──────────────────────────────────┘
```
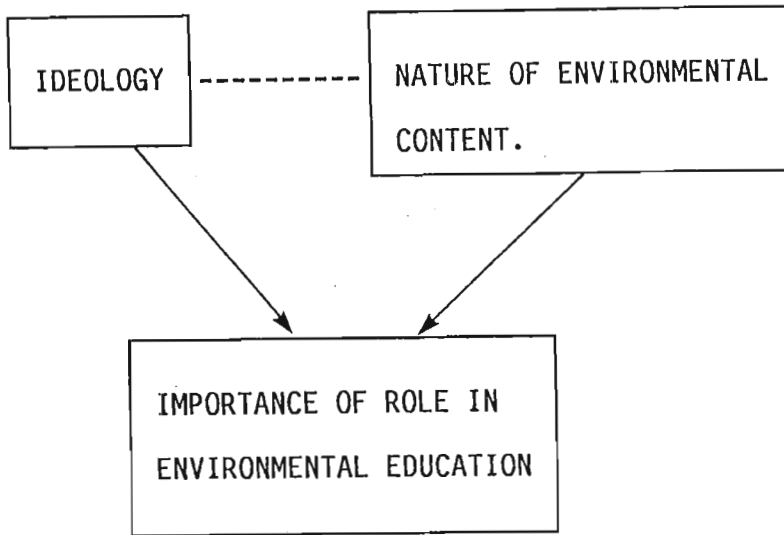
Figure 7 Causal diagram typifying a three variable relationship

Key:

------ - Weaker link

____ - Stronger link

However, the numbers and proportions of courses with such content falling under the three different

ideologies, differ. Numbers and proportions of courses falling under each of the four importance

categories will also differ with ideology.

Ideological standing and nature of environmental educative content will have an influence on the

distribution and proportions of courses in the four importance categories. In this way the three variable

relationship is established (see figure 7).

5.10.2 Four variable analysis

The four variables assessed for association probability were:

1) environmental educative category;

2) ideology;

3) nature of environmental educative content;

4) importance of role in environmental education.

The following four sets of possible interactions were:

a) environmental educative category - ideology - nature of environmental education;

b) environmental educative category - ideology - importance of environmental educative role;

c) environmental educative category - nature of environmental content - importance of environmental educative role;

d) ideology - nature of environmental content - importance of environmental educative role.

With all four sets of interactions there is a significant goodness-of-fit between the model tables and the datatables of 99,50 percent. However, the set (d) is identified as producing an association which is not as strong as the first three. As in the three variable test, interaction or association between ideology and nature of environmental education was found to be not significant enough to affect the goodness-of-fit if left out.

The fact that the model table, based on the sets (a), (b) and (c) proved to be powerful in terms of goodness-of-fit with the data tables (100 percent), would indicate that the addition of a fourth variable, ie. environmental educative category, strengthened the probability of association or interaction between ideology, nature of the environmental educative content and importance of environmental educative role assessed in the three variable test.

Environmental educative category is associated with the ideology and the nature of environmental educative content adopted. The interaction between these three variables will determine the

importance of the environmental educative role. For example, the **natural and physical science** departments adopting a **technocentrist** ideology and having courses with **explicit** content tend to have a higher probability of believing that they have a **very important** or important role to play in an holistic environmental education as compared to physical and natural science departments who have courses with implicit content.

Under the **physical and natural** sciences and **engineering and planning** sciences, with departments adopting the **accommodatory** and **ecocentric** ideologies, there are **no** courses that are of **little importance.**

In the **engineering and planning sciences** in the <u>technocentric</u> and <u>accommodatory</u> ideologies, there are more courses falling under the <u>very important</u> category as opposed to the important category with more courses having <u>explicit</u> content.

In the **social sciences** there are a larger number of responses to the `little importance' category with the <u>technocentric</u> and <u>ecocentric</u> ideologies having the same number of courses in this category. There is a predominance of <u>implicit</u> and <u>potential</u> course contents in this category which might explain the larger response to the `little importance' category. In the **medical and health sciences** under the accommodatory ideology, there are no courses of `little importance'.

There seem to be some trends evident, as part of a gradual paradigmatic shift, towards associating the ecocentric and accommodatory approaches with more important environmental content and concepts than the technocentric ideology as evidenced for example, in the medical and health sciences. In addition, engineering and physical science departments are moving gradually towards adopting the ecocentric and accommodatory approaches, perceiving themselves as having an important or very important role to play in an holistic environmental education. A causal diagram (Figure 8) can be constructed to explain the relationships between environmental educative category, ideology,

importance of environmental education and nature of environmental education based on the results of the loglinear analysis.

The environmental educative category will have a causal set of relationships with ideology, the nature of environmental content and importance of role in environmental education with the importance of role variable being influenced by the other three variables.
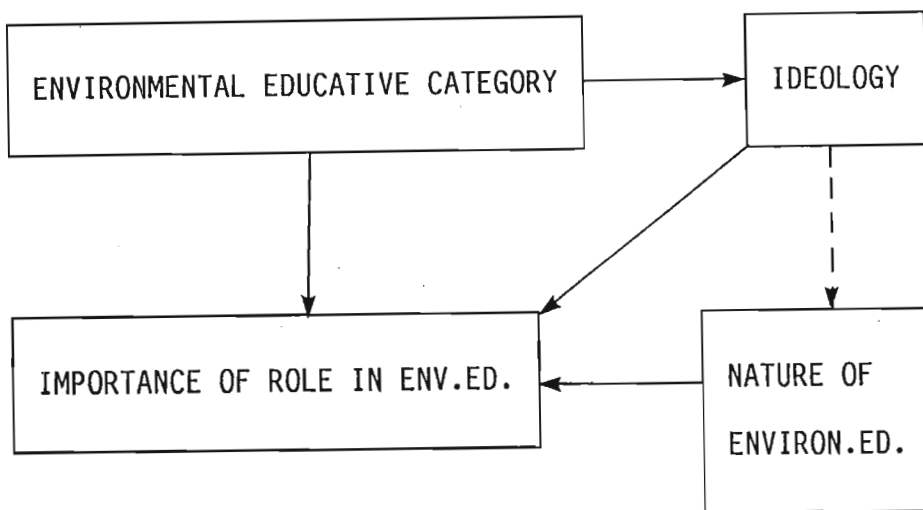
Figure 8 Causal diagram typifying the nature of a four variable relationship

Key

_____ - stronger link

------ - weaker link

It would, in the light of these results, be necessary for an holistic environmental paradigm to be incorporated into the departments of all the educative categories, in order to initiate a more holistic ideological shifting and alterations in knowledge contents at the university level.

5.11 An Assessment of the Status of Environmental Education in South African Universities

It appears that the semi-hegemony in South Africa are standing on the threshold of a new environmental ideological paradigm. Yet such a situation is likely to remain static unless conscious action is taken to implement such an environmental paradigm. It is true to say that universities   in

South Africa tend to reflect the political and socio-economic climate (both hegemonic and counter-hegemonic) prevailing to the neglect of holistic environmental considerations. This is reflected in certain comments from the respondents to the questionnaire:

1) Philosophy of Education: "I am constitutionally suspicious of any attempts to promote a single concept to the status of the guiding factor in education".

2) Comparative Education: "For as long as people defined as "non-white" are treated and schooled as second-class citizens, so long will their broad interests in the physical environment be utilitarian. They as politically marginal people are least likely to be found in voluntary organizations concerned with the environment".

Universities still to some extent reflect cultural biases which serve to uphold the socio-economic status quo. In white or `open' universities for example, it is less easy to address the bias in the curriculum and subject content of academic programmes, which reflect the values and needs of the ruling white group. The South African university in the reality of the present is, according to Boulle (1988:9) "...a system that is deeply segregated, discriminatory, politically controlled, cost ineffective and socially disruptive". Moreover, many departments are still locked into the pro-environmental status quo trap, more often exacerbated by an unwillingness to part with strict discipline isolation.

It is imperative that universities as an important sector of tertiary education should not neglect their semi-hegemonic role in South Africa. Universities cannot afford to be criticized as `elitist', isolated, and as furthering the attitude of self-importance, success and status improvement in students in opposition to the ideals of serving the community in a meaningful way. University departments are increasingly beginning to realize this as evidenced by this remark to the questionnaire:

> "Environmental psychology as a course in second year could be very well continued to third year and honours with attempts to integrate community psychology as a field of interest. More in the way of nationally relevant research needs to be done and much greater attention accorded to different perceptions and attitudes of people according to cultural differences" (Psychology).

Universities should also not be seen encouraging the transfer of Western ideologies with all its socio-economic and environmental stigmas and operating as imported, Eurocentric institutions (Hinchcliffe, 1987:43).

Though on the face of it, anything up to 26 percent of a discipline's or department's content may have environmental connotations, any one course may contribute only 3 or 4 percent of the total discipline content, which means that many courses within disciplines or degrees do not have an adequate amount of environmental educative content. Moreover as established, more of the courses cited had **implicit** and **potential** environmental content. Students continue to leave university with little knowledge of environmental issues and problems other than in the implicit sense. The environmental ideological status-quo and ultimately the socio-economic status-quo remain largely intact resulting in the continued nature of decision making practices and rationales in respective of environmental issues in the public and private sectors.

However, despite these setbacks the results indicate that tertiary educational institutions could quite positively perform their role as the semi-hegemony in South African society. It can be detected that there is a growing awareness of and support for environmental concerns especially as it relates to each respondent's department. Most importantly, universities are not stuck in a technocentric, pro-status quo ideological milieu but in their dynamic way indicate a state of cross-ideological flux in the environmental arena. A definite move in the direction towards a bipolarity between the technocentrist approach and the ecocentric approach with a moderate input from the accommodatory approach is in progress at present.

This movement towards a cross-ideological stance is reflected in this comment from a questionnaire respondent:

> "I agree with the general drift of your analysis namely that philosophy courses have a contribution to make in the implicit and potential dimensions. Ethics/moral philosophy, however, could make a more direct impact....(M)oral problems/dilemmas raised by environmental concerns could be addressed directly...Thus, my 3rd year applied ethics course addresses moral problems relating to our treatment of animals, environmental concerns in general, nuclear power, and the like...Still, the basic contribution of philosophy is in the area of the analysis of arguments and the clarification of concepts. And in respect of environmental issues that would mean understanding the topic of arguments about environmental issues, and clarifying the concepts involved. Also, it would mean understanding the moral considerations (principles, rules, etc.) involved (Philosophy).

Within the realm of religion, a shift from a technocentrically inclined Judaeo Christian ethic[15] to a more ecocentrically based set of ethics is coming to the fore:

> "We examine critically the ways religious belief affects life-styles and cultures including assumptions about the environment. Since these beliefs affect large masses of people, greater critical awareness and environmental sensitivity are of obvious importance" (Religious Studies).

An environmental paradigm in tertiary education based on this trend could form the foundation for the challenging and modifying of the existing environmental status quo, diagnosing and acting upon environmental problems and ultimately guiding decision making policies in every sphere of society.

In addition to the increasing trend of many departments responding across the ideological spectrum, even the various environmental educative categories will ensure that this cross-ideological situation remains. The physical sciences, engineering and planning sciences and health sciences although ensuring that the technocentrist ideology does not diminish in influence are increasingly adopting the ecocentrist and accommodatory ideologies. The social sciences though fostering the ecocentric approach on the whole, have strong leanings towards the technocentrist and accommodatory approaches as well.

Another encouraging trend at the university level, has been the shift of all four environmental educative categories towards playing a very important role in environmental education. This discovery enhances the probability that an holistic environmental educative paradigm could be adopted at the semi-hegemonic level[16]. Such a trend would also indicate a diversion from educative specialization and

----

15 This ethic involves such concepts as (i) society's God-given stewardship over the environment and (ii) society's right to exploit an environment provided for society's material benefit by God (Boyd, 1984; O'Riordan, 1981).
16 "Viewing man's life holistically requires alignment with other departments. Social welfare needs and problems are related to the life circumstances and conditions of the people concerned. We are concerned with improving the housing and other environmental resources, conditions and services to enable people to improve their living conditions" (questionnaire respondent - Social Work).

fragmentation which negates an interdisciplinary environmental educative paradigm from coming into fruition.

Another interesting conclusion gleaned from the results is that all universities regardless of <u>status</u> can adopt the holistic environmental ideology as a framework upon which to base their education philosophies. However, the so called `ethnic' or black universities lack faculties relating to the medical and health sciences and the engineering and planning sciences. As Nkomo (1984:75) has pointed out in relation to the University of Fort Hare, Zululand and the University of the North, "(n)one of the three black South African universities has a faculty of engineering....Most white South African universities have engineering programmes as a matter of general principle". The black or `ethnic' universities also have no facilities in the fields of chemistry, architecture, applied physics, town and regional planning and other fields of study. Moreover, the science curriculum is largely attuned to producing science teachers and not to research and applied application. Without these sciences, these universities can only go half way towards adopting a holistic environmental education.

Universities as an integral component of the semi-hegemony are going to have to have to consider broad environmental concerns as being directly linked to political, economic and societal concerns. To give insufficient attention to the environmental component is to leave out a vital link in the full cycle of change which such universities in essence hope to achieve. Environmental ideologies have strong political and socio-economic ramifications within their rationales. It would be nonsensical to assume that environmentalism is divorced from these concerns or that it is elitist in nature and a separate paradigm or field of study. That universities are beginning to realize this cannot be denied.

One can reasonably assume that in due course the counter-hegemony is likely to attain hegemonic status. If the universities of these counter-hegemonic groups do not inculcate an environmental paradigm into their education now, then the same environmental rationales existing presently will continue. The same economic and decision-making rationales will be produced justifying the economic

and technological rationales, resource management practices and environmental denudation indicative of an industrializing country.

However this is simpler said than done. The first task that besets `ethnic' universities initially such as Zululand, Fort Hare, UDW and UWC is to move away from their stigmas as `political tools', ie. as products of the Apartheid system:

> "The university violates not simply its neutrality, but precisely its own basic values when it yields to the demand to provide information selected according to particular political interests, when it makes use of political criteria in appointing teachers and in admitting students or when it bars or makes impossible free discussion in the name of these interests" (Kolakowski, 1975:80).

Only once the South African semi-hegemony in its entirety can regain its relative neutrality as a central pivot between the hegemony and counter-hegemony will it be able to create and disseminate a social and environmental education that would permeate the whole social base in South Africa. Apartheid in education with all its political and socio-economic ramifications has to be gradually dismantled at this level of education if its role is to be adequately fulfilled. Ways in which this problem can be tackled will be dealt with in the next chapter.

At the level of curriculum development within the four environmental educative categories it is proposed that the the following steps need attention:

i) That social sciences evaluate and restructure existing content and consider the incorporation of new content which is environmentally more explicit and important.

ii) That the physical and natural sciences, engineering and health sciences start moving towards increasing their environmental components within their disciplines in terms of application and new environmental content through syllabi changes.

iii) That in order to contribute to or play a more meaningful role in a holistic environmental education, **curriculum development** at the tertiary level adopt a more **interdisciplinary** flavour. The physical and natural sciences need particularly to concentrate on adopting an holistic interdisciplinary approach into their curricula, as evidenced by this questionnaire quotation:

"...I believe that our teaching is very important to environmental studies; in fact, it provides the _ecological basis_ on which environmental concerns must be based if it is to be meaningful" (Biology).

As Budlender (1977:264) states,

"All study on campus should contain a significant interdisciplinary component. The problem studied should be placed in its social and moral context. This does not mean a few lectures tacked onto a course as an afterthought - the interdisciplinary material must be part of the course as a whole, and integrated with it".

As mentioned, the average alignment strength signified that responding departments do or could have good alignments with other departments. Moreover many departments believed that alignments with other departments outside their environmental educative category were possible. Ways of bringing about this interdisciplinarity in curriculum development will be discussed in the next chapter.

A holistic environmental education developed as a result of this interdisciplinarity is vital if society's new set of decision makers leaving tertiary educative institutions are going to be able to transcend their specialized, professional barriers and to consider and incorporate environmental issues and problems into their decision making activities.

It remains the task of the last chapter to further elaborate upon these problems and opportunities and to pose problem areas, possibilities and strategies via the formulation of a model for the creation of a strong semi-hegemonic influence in a holistic environmental paradigm in education.

CHAPTER 6

SCENARIOS FOR A FUTURE ENVIRONMENTAL
EDUCATION

6.1 Introduction

In the previous five chapters, the function of education in society as a transformer and maintainer of

the socio-economic and environmental status quo in South Africa has been critically analysed. The role

of the semi-hegemony has been highlighted and assessed in terms of its potential capacity to bring

about change in society through a critically based education. With this in mind, the emphasis has been

placed on the **transformative** potential of an holistic environmental education in society and the semi-

hegemony's potential role in propogating such an education. This chapter attempts to provide a critical

examination of the problems and potentials facing the semi-hegemony (in this instance, the university)

in being able to perform its role in society, especially in respect of an holistic environmental education.

On the basis of this overview, a four stage model is posited which could provide the foundations for the

creation of a strong semi-hegemony through an **Integrated University Environmental Programme**

(IUEP).

6.1.1 An Overview of Problems and Potentials Facing the Semi-Hegemony

What has been revealed thus far, is that South African universities have the potential to execute an

holistic environmental paradigm, but that they are only beginning to reach the take-off stage in terms

of its implementation. Most environmental content within the different disciplines remain largely of an

implicit nature with only the potential to become environmentally important. Despite this however,

universities appear to be entering a phase of ideological flux. Furthermore, there is an increasing

departure from the preoccupation with discipline exclusivity, especially within the field of

environmental education.

Yet despite these potentials, South African universities have been slow in performing their semi-

hegemonic roles in society, especially in respect of environmental conscientization, actions and

policies. This lack of affirmative semi-hegemonic functioning has assured that a critical, holistic environmental education has failed to permeate the South African milieu to any appreciable extent. The result is that decision making institutions at the state and private levels have tended to pay only cursory attention to environmental concerns, thus reproducing existing planning, development and socio-economic priorities. The university can thus be criticized for neglecting its "...responsibility to the specific society..." as an "..institution directed toward change and innovation", with its social duty being the "...responsibility for focussing the community's intellectual conscience" (University of Natal Planning Committee, 1989, 1-2).

Tertiary education in South Africa has yet to devise strategies and policies that would facilitate the incorporation of an environmental paradigm as an integral ideological and philosophical foundation for a more critical, relevant education. The potential for universities to move in the direction of championing the necessity for a new environmental paradigm has not progressed much beyond any department's doors, or individual staff members' and students' implicit thoughts and beliefs.

Universities and other tertiary institutions need to take the lead in establishing a cohesive environmental paradigm in their realms through discipline content changes and restructuring, as well as inter-departmental and inter-institutional liaison and coordination. Little help has been forthcoming from the state, with the first White Paper on environmental education only being drafted in 1989. The paper is short of any definite policies and strategies in respect of environmental education, beyond suggesting broad, vague guidelines as to how environmental education might be adopted into the primary, secondary and tertiary levels of education. The only direct mention of tertiary education reads as follows:

> "With regard to tertiary education, the attention of universities and technikons is drawn to the need for the presentation and adaptation of teaching programmes relating to the environment" (White Paper - Department of Environmental Affairs, 1989:7).

The state's concern with the importance of environmental education, should be perceived in the light of the state's bias in favour of the hegemonic realm. Though it is laudable to recognize that the

Government's environmental policy shift is aligned more to the accommodatory approach in some respects, it's technocentric roots are still embedded in terms of its support for continued industrial, capitalist growth and development[1].

National policy in respect of environmental conservation also prescribes that steps be taken to provide adequate, specialized training in the engineering, planning, architectural and industrial domains at the tertiary level (Diepeveen, 1984: 5). However, in this thesis it is proposed that the tertiary educational institutions do not remain strictly specialized. Specialized training goes against the grain of an interdisciplinary environmental education policy which would deny students and academics the ability to "...seize the entirety of the dimensions of social problems such as they appear in reality" (Dominicé, 1978:35). It also ensures that such environmental "expertise" remains in the hands of the hegemonic realm. As mentioned already, the `ethnic' and black universities lack engineering, planning, architectural and medical departments whereas in `white' and `open' universities, such departments can be found in strength.

In order to draw South African universities together in the establishment of a strong semi-hegemony that can fulfil its mediating role between the hegemonic and counter-hegemonic realms in respect to the dissemination of an holistic environmental paradigm, certain steps are going to have to be taken. It is postulated here that the following stages of societal and educational transformation occur in order that a holistic environmental paradigm first of all be inculcated at the semi-hegemonic level, and from there into the national and international arena:

1) Stage 1 - **Consolidation** of the semi-hegemonic base.

2) Stage 2 - The creation of an Integrated University Environmental Programme (IUEP).

----

1 The aim of Government policy is that "...man and nature should co-exist in productive harmony to satisfy social, economic and other expectations of the present and future population". Furthermore "...the Government considers it extremely important that all individuals and institutions should have the right attitude to the environment...". In this regard it is seen as imperative that "..the actions of the State and of the private sector be co-ordinated to ensure maximum effective use of the available machinery used in all phases and aspects of education" (Diepeveen, 1984:5).

3) Stage 3 - The linkage of the semi-hegemony to the societal base.

4) Stage 4 - Taking environmentalism beyond the national arena.

6.2 Stage 1: Consolidation of the Semi-Hegemonic Base

A prerequisite for the consolidation of the semi-hegemonic level is its <u>autonomy</u> and power in being able to act effectively as catalysts in bringing about change. In order to achieve this prerequisite in South Africa, two objectives require attention, ie:

1) **Scrapping Apartheid in Universities** in terms of ethnic and racial separation. This needs to be accompanied by the abolition of Apartheid in its **totality**, accompanied by redistributionist policies in the fields of school education, housing, health, land reforms, social services, incomes and working conditions (Moll, 1988:19). A policy of creating more **open** universities, together with the attainment of parity in educational and degree standards and requirements would need to be given priority.

Engineering and planning science faculties and medical and health faculties should also be created at those universities which do not have such faculties. This objective would have the effect not only of creating a unified university structure in terms of standards, opportunities and equality, but also in terms of the ability to incorporate a holistic environmental paradigm throughout this domain.

2) **Inter-university liaison and coordination** through the creation of a federally based <u>University Council</u> coordinating university issues, policies and administration at a <u>national</u> level, with individual universities having local autonomy. This centralising concept becomes important in light of the considerable differences that exist in the content and quality of degree qualifications at universities due to the lack of central coordination and <u>excessive</u> autonomy:

> "Evaluation of the quality of the degrees of the various universities is impeded by the absence of a common standard or even a commonly accepted norm of comparison" (Du Plessis, 1987:30-31).

Student body dialogue and unity between universities would bring about the consolidation of a strong student platform from which the role of the semi-hegemony in society could be enhanced. Intra and interdisciplinary communication at the inter-university level with the exchanging of ideas and knowledge, symposia, conferences, journals, visiting lecturers, and so on would be consolidated further. It cannot be denied that this liaison and communication is occurring at present, but not with the purpose of uniting this realm of tertiary education and especially not in the sense of propogating an holistic environmental paradigm.

Though the requisites of this stage are attainable, it would be utopian to expect the full completion of this stage prior to the implementation of the other stages. This stage should as far as possible be strived for before and during the advent of the other two stages.

The next two models are presented as a set of strategies that could be instituted in creating a shift in the nature of environmental education towards a holistic paradigm which locates environmental issues in a holistic societal context.

6.3 Stage 2: The Creation of an Integrated University Environmental Programme (IUEP)

Model 2 sets out to make possible the implementation of a university based programme for change.

6.3.1 The Aims and Objectives of the Integrated University Environmental Programme (IUEP)

The Integrated University Environmental Programme concept is presented here as a model of the goals and means of achieving a gradual societal transformation through the dissemination of knowledge relating to the interrelated realms of the political economy, the environment, social life, planning, development and health (see model 2). It is based on the notion of a holistic synthesized rationale which universities require in order to achieve the goal of inculcating environmental knowledge, policies and strategies into the societal base.

INTEGRATED UNIVERSITY ENVIRONMENTAL PROGRAMME (IUEP)

1) Establish and assess the problems/issues facing the university in respect of the adoption of an holistic environmental education and the need to `Africanize' existing curricular knowledge content.

7) Environmental Education Unit to rationalize itself as a formal department/centre with its own courses or degrees, but retains function as a coordinating body between faculties in upholding the standing of Environmental education.

2) Enter into liaison /dialogue with all departments. Drawing up of new environmentally applicable curricula pertaining to their disciplines

ENVIRONMENTAL EDUCATION UNIT Director with trained, permanent personnel and cross-disciplinary standing members.

6) Over a period of time, to consolidate environmentalism, linking it in with equally important concepts and concerns for example politics, the economy, social policies and problems , development, law, education, religion, engineering,planning, public health; inter-departmental course sharing,liaison and student body organization.

3) Attempts by unit to merge such new curricula with each other on an interdisciplinary basis where possible.

4) Representatives of the unit with different disciplinary backgrounds go back to their departments with draft proposals of new inter-disciplinary curricula. Screening; adjustments to the draft.

5) Finalization of new curricula. Submission of these curricula, proposed realignments and delimitations of departments will be placed before the University administration for appraisal, consultation and ratification.

Model 2 The creation of the Integrated University Environmental Programme

It is a normative model for conceptualizing the possible route of societal transformation necessary to bring about the goals of a critical, cross-ideological approach, which is realistically attainable. It is

suggested that this approach is not utopian but `practopian' as it is "...a positive, even revolutionary alternative... (which) lies within the range of the **realistically attainable**" (Frankel, 1987:16-17).

Utopian ideals[2] are simply not feasible, being `frozen in unreal perfection', not able to determine the practical means necessary for their realization.

Universities need to move in the direction of such a programme progressively. To quote from Holroyd and Loveridge (1984: 73-74),

> "Equally awkward is the development of thinking in breadth, in terms of interrelationships over a consciously wide framework, without sacrificing the quality and gumption that goes with, and is essential to the mastery of a specialism. (T)he age of the competent generalist hardly seems to have arrived today....Within the education system itself there is a considerable degree of compartmentalization, which will need to be broken down if we are to be effective in resolving the problems of the future".

It must be borne in mind though, that this does not mean that departments would disappear into a great interdisciplinary melting pot. This would be impractical in a society that is diversely structured and requires a myriad of activities to keep it functioning irrespective of the socio-political milieu. The purpose of the IUEP is to incorporate a strong environmental component into disciplines that is both discipline specific and interdisciplinary in nature. The aim of the IUEP is to achieve a **porous complementarity** between disciplines departments.

6.3.2 The IUEP and Curriculum Development

---

2 In the field of utopian, post-industrial thought, some of the concepts outlined have been:(i) decentralization of the economy and withering away of the market economy; (ii) self-help, small scale industry; (iii) co-operative production, distribution and social reproduction aimed at achieving total self-sufficiency; (iv) a drastic reduction in duration of work and an increased, enforced period allocated for leisure and recreation; (v) the dissolution of the national state, with the replacement by small-scale `democracies'; (6) one global standard of living; (vii) anti-militarism and eventual complete disarmament (following Jones, Gorz, Bahro, Toffler in Frankel, 1987).

The IUEP model considers **environmentalism** as an **equal fifth** concern in determining curriculum development that is intended to be innovative, critical and constructively transformative. This would replace decisions about the curriculum being determined by existing political, economic, social, and cultural concerns and priorities alone (Atkinson, 1981:306-307).

This distinction is graphically presented to clarify the difference between traditional curriculum development (figure 9) and the integrated environmental concept of curriculum development (figure 10).
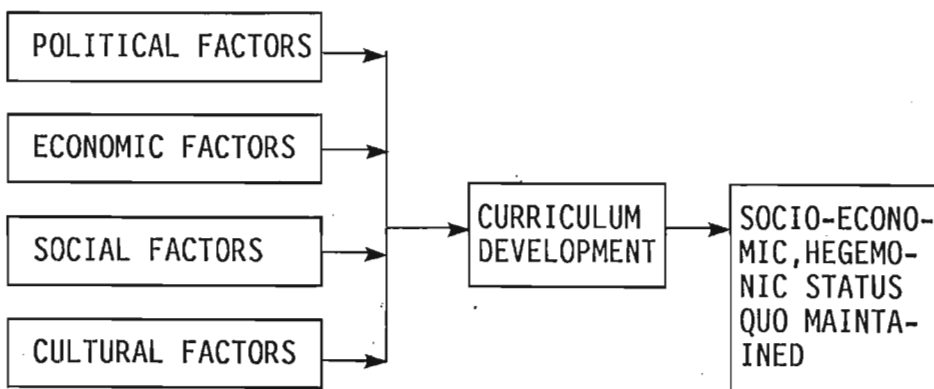
Figure 9 Traditional curriculum development
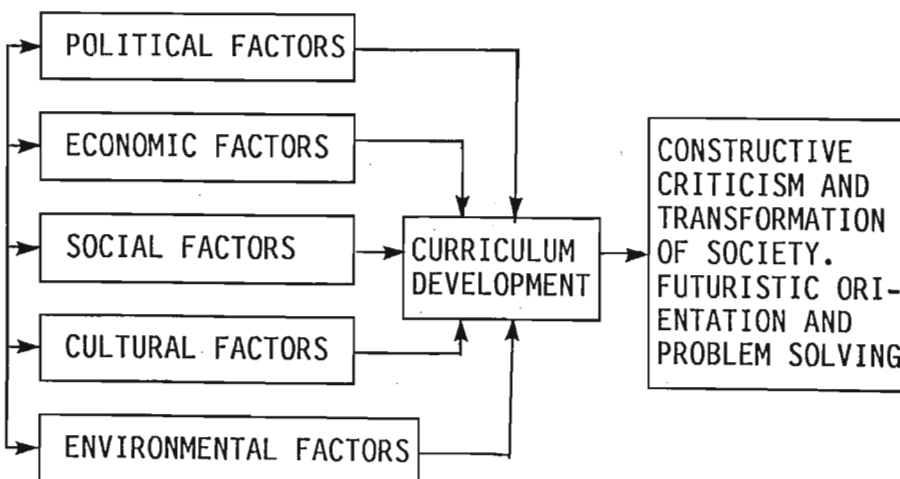
Figure 10 Environmental integrative curriculum development

Curricula, if they are to be relevant to the implementation of solutions to environmental and societal problems, need to move away from a concern with current events and problems which necessitate ad hoc solutions. Enduring relevance will be found in university curricula by studying the present in relation to the "whole of the past and the whole of the future" in a more general context (Brubacher, 1977:89). For environmental education this is particularly important, because of the necessity for realistic long term planning and responsibility to future generations (Chiras, 1985).

The model of an IUEP proposes identifying values and ethics and studying ways of changing these across the disciplinary and ideological domains. In this way, environmental conscientization will hopefully gradually permeate through the broader society.

6.3.3 IUEP and the `Africanisation' of Syllabi

The IUEP model proposes that in the South African milieu, changes are necessary in the pro-western, capitalist, eurocentric curricula knowledge inherent in universities. This form of knowledge has served to isolate universities in a sense, from their social surroundings giving them a formal, non-indigenous, elitist standing which is not conducive to a relevant, futuristically oriented education. A prerequisite for this to occur is for education to be freed from the chains of Apartheid ideology. A national political ideology which will be shared by all living in South Africa and "...which is founded on humanism, justice and peace" (Totemeyer, 1987:57) is a necessity.

The implementation of a model such as the IUEP would take some time to transpire with education being the state's principle tool for maintaining the existing socio-economic status quo. Hartshorne (in Hofmeyer and Moulder, 1988) in fact maintains that education will be the last outpost of Apartheid, with even the Group Areas Act disappearing before government control over education does.

Given this predicament, universities need to take the initiative by adopting a nationally contextualized programme such as the IUEP and deploying it, via IUEP trained or attuned graduates; student bodies;

development, research and support units/centres; and academics or professionals from various disciplines, into the community. The implication of the model as a change inducing mechanism implies a conflict ridden process as universities explore "...the interface with the <u>future for and with</u> the community" (Totemeyer, 1987:57), as allies and critics of the state. However, this tension and conflict can be conceived positively as a gauge to assess the success of its bipolar role in society.

With the advent of IUEP, ideologies of education would shift from the **conservative** ideology[3] and the **revisionist** ideology[4] to a **reconstructivist** approach which emphasises the dynamics of education "...as an important way of moving society in desired directions.." (Taylor and Richards, 1986:33-35). Such an ideology will enable environmentalism to establish itself as an integral factor and concept in critical, futuristic and interdisciplinary curriculum change and development.

6.4 Stage 3-The Semi-Hegemonic Linking to the Social Base

The semi-hegemonic domain, if it is to perform its pivotal role in society needs to link itself firmly to the societal milieu via the six broad areas outlined in model three.

6.4.1 Ideological Role in IUEP

It is clear that the university finds its presence in both the hegemonic and counter-hegemonic realms in accordance with its semi-hegemonic function. But in order to perform its role in society adequately, it is proposed that the ideological role in the IUEP be based on complementarity and porosity in ideological boundaries.

----

3 based on functionalist notions of the transmission of `high' culture, differentiation and elitist excellence

4 based on values of modernization and the creation of an efficient and diversified skilled labour force, with an emphasis on science and technology and maximum use of the country's resources

INTEGRATED UNIVERSITY ENVIRONMENTAL PROGRAMME	1) New IUEP students to permeate the social, economic, technological and planning realms of the society, slowly instilling the knowledge and ethics gained from the IUEP into their professions, workplaces and communities.
	2) Together with major environmental action and conservation bodies, construct a new set of environmental and resource management policies and strategies, attuned to the basic national development requirements and basic standards of living requirements for all.
	3) Cooperation with development and planning bodies and institutes at the state and private levels in devising and implementing development and planning rationales and policies geared towards (i) a sustainable, self-reliant economy; (ii) a balance between planning and social and physical environmental concerns.
	4) Instilling into the counter-hegemonic domain (trade unions, schools, community organizations, political groups and parties, media, and so on) the importance and nature of environmental issues as it affects them, their communities, their workplaces, the uneven distribution of resources; linking up political activism with environmental activism; and how the improvement, maintenance and wise-use of environmental resources can ultimately improve and sustain the quality of life.
	5) Education - new secondary/primary school curricula to be devised in consultation with education departments and alternative education bodies. Teacher training courses.
	6) Adult Education at university level and in the urban communities and rural areas.

SEMI-HEGEMONY

Model 3 The Semi-Hegemonic Linking to the Societal Base

As evidenced in the results chapter there is an increasing tendency for disciplines in the social,

biophysical, planning and health sciences to choose the technocentric, accomodatory and ecocentric

ideologies to varying degrees. Universities seem to be in a position to adopt an IUEP that is **cross-ideological.**

As Collier (1983:87-88) states:

> "...we need to turn a searchlight on our own presuppositions to identify our own unarticulated perceptions of society and unvoiced value-assumptions, which imprison us within ideological boundaries".

With the semi-hegemony not ideologically biased, it can fulfil its bipolar functions admirably without siding to the hegemonic or counter-hegemonic sides. In essence, the IUEP would be **critical**, but realistic, constructive and practical. IUEP recipients will be able to fit into the broad social realm, initiating transformations in the political, socio-economic, developmental and environmental status quo existing in South Africa. The IUEP model suggests that the neutrality of the university would be enhanced, rather than the university being seen as a fence-sitter (see Hofmeyer and Moulder, 1988:11). As such, the IUEP would contribute positively to the transformation of tertiary educative policies, systems and functions in South Africa by producing "...graduates with skills and attitudes appropriate to the realities of the economy, polity and society..."(Cobbe, 1988:154), as well as the environment.

6.4.2 IUEP and Adult Education

Model three essentially outlines the deployment of environmental conscientization (via the IUEP), through a number of levels and facets of society. These various strategies of environmental conscientization fall under the rubric of adult or continuing education. The model of IUEP proposes that an initiative in adult education programmes is essential if the majority of South African inhabitants are not remain ignorant of environmentalism and its crucial impacts for society. Environmental issues and problems in the social, built and biophysical spheres, need to be inculcated into the broader body of society and not within a system of values which is pro-status quo and bourgeois in nature (see Babu, 1981:136).

Adult or continuing education in the context of this thesis is broadly defined. It covers all educative activities besides those carried out within the formal primary, secondary and tertiary education institutions such as universities and technikons (adult education centres an exception).

The everyday `common-sense' notions of environmentalism and what it entails have to be transcended in order for the environmental, political and socio-economic status quo to be transformed. Therefore it is essential that adult and extra-tertiary education is given adequate attention by the semi-hegemony.

Buber (in Ben Yosef, 1987) outlines three factors which account for the primary formation (childhood and adolescent stages in life) being inadequate for the formation of adults who are capable of critically examining their environment in its broadest sense, ie. the **time** factor (having to enter public life at an immature stage); the **place** factor (physical and social environmental influences); and the **organized education** factor (the quality of schools and nature of the knowledge taught).

It is proposed therefore in terms of the model that adult or continuing education has to be reconstructive in its activities in order for the shortcomings of primary formation to be rectified. "Continuing education should be a restructuring of knowledge, attitudes and conduct" (Ben Yosef, 1987:11).

The IUEP model is in a strong position to be able to provide a major input into the realm of continuing education. The model suggests that the reconstructive ideology contained in the IUEP would bring about a relevant environmental conscientization from which the positive transformation of the existing status quo could occur. The semi-hegemony, via its intellectuals (students and academics), centres for adult education and various disciplines and units would be able to permeate the field of continuing education. Adult education is envisaged to take the form of formal and non-formal learning in work places (via trade unions, personnel training, seminars and conferences), research institutes,

teachers training colleges, rural and development projects and bodies, state and planning institutions, public health bodies and clinics, community training centres, community organizations, self-learning techniques such as the media, learning packages, distance teaching and so on (Russell, 1981:181-182).

The IUEP model would prepare universities to disseminate various environmental concerns and create strategies for dealing with them via adult education, such as:

i) Democratic participatory techniques, for example, negotiation, public participation, lobbying, ecologically and socially relevant EIAs (O'Riordan, 1981).

ii) Demography, demographic controls, and policy (Tyler Miller, 1979).

iii) Effective resources use, reuse and management (Tyler Miller, 1979).

iv) Environmentally and socially sensitive rural and urban planning strategies and decision making (Blowers, 1973; Mabogunje, 1980).

v) Community and workplace health and safety concerns and action (SACHED, 1986).

vi) Soft and beneficial technological alternatives and alternative and renewable power sources (Meadows, 1974; Eberhard and Williams, 1988).

vii) Environmental law - effectiveness, limitations and applications (Fuggle and Rabie,1983).

viii) Pollution - causes, effects, control and legislation (Tyler Miller, 1979; Fuggle and Rabie, 1983).

ix) Environmentally attuned, growth-limiting industrial, economic and production ethics and policies (Meadows, 1974).

x) Greater, more equitable social welfare policies aimed at economic, social and environmental upliftment (Haggett, 1979).

xi) Agricultural conservation policies and practices (Morgan and Kirkby, 1980).

xii) Soil erosion, preservation and rehabilitation (Morgan, 1979).

xiii) Flora and fauna conservation.

xiv) Analytical knowledge of racial, class and gender factors (Brown, 1985) and their role in either maintaining or transforming the existing socio-economic and environmental status quo.

In conclusion, the IUEP model can create an adult education in which the relationships between society and the physical environment can change as a result of a new series of collective thoughts and actions which will become embedded into society. To quote Gramsci (Femia, 1987:113):

> "If we reflect on it, we can see that in putting the question `what is man'? what we mean is: what can man become?...Man is a process and more precisely the process of his actions".

6.5 Stage 4: Taking Environmentalism beyond the National Arena

In the final stage a move away from the purely local and national level concerns to the international level may be achieved (see model four).

6.5.1 IUEP, the Semi-Hegemony and the International Forum

In moving to the international arena and the way in which environmental issues could be addressed at this level, the Gramscian approach is instructive. An attempt is made to move away from an approach that the present international developmental and environmental predicaments are determined by strongly integrated, cross-national factors and interests alone, such as the capitalist world economy (Radice, 1984 in Corbridge, 1986). Nation-states themselves also have the capacity via its intellectuals to alter their relationships on an extra-national scale (Corbridge, 1986:189), in order to achieve relative self-sufficiency and environmental resource stability, conservation and well-being.

The power and strength of countries should not be conceived solely in terms of their military, economic, financial, natural resource and human resource capabilities (Frankel, 1979:104-106), but in terms of just how **self-sufficient** they can be in terms of development and needs meeting resource utilization.

```
┌───┐        ┌──────────────────────────┐
│ I │        │ 1) Seek to lessen depend-│
│ N │        │ ability on the developed │
│ T │        │ `North' as a mass consumer│
│ E │────┐   │ of industrial commodities │
│ G │    │  ┌┤ and armaments; and as a  │
│ R │    │  ││ major supplier of raw    │
│ A │    │  ││ materials.               │
│ T │    ▼  ││                          │
│ E │ ┌──────────────┐ └─────────────────┤
│ D │ │South Africa in│ │2) Seeking regional stabi-│
│   │ │transition    │ │lility and cooperation in │
│ U │ │toward a new set│ │terms of minimising forei-│
│ N │ │of environmental,│ │gn exploitative domination;│
│ I │ │social and econ-│ │mutual economic dependence.│
│ V │ │omic and political│ │Cooperation in terms of   │
│ E │ │objectives,     │ │environmental resource co-│
│ R │ │attuned to the  │ │nservation strategies;self-│
│ S │ │sustained well- │ │sustaining, needs meeting │
│ I │ │being of the    │ │development in a regional │
│ T │ │society at large.│ │context.                  │
│ Y │ └──────────────┘ └─────────────────┤
```

```
INTEGRATED

UNIVERSITY

ENVIRONMENT

PROGRAMME
```

South Africa in transition toward a new set of environmental, social and economic and political objectives, attuned to the sustained well-being of the society at large.

1) Seek to lessen dependability on the developed `North' as a mass consumer of industrial commodities and armaments; and as a major supplier of raw materials.

2) Seeking regional stabilility and cooperation in terms of minimising foreign exploitative domination; mutual economic dependence. Cooperation in terms of environmental resource conservation strategies;self-sustaining, needs meeting development in a regional context.

3)International university liaison, particularly in the poorer,underdeveloped, exploited `South':creation of stronger international environmental concerns, knowledge and cooperation.

4) Participation in international bodies and conferences concerning the environment and development. Application of feasible international standards/laws concerning the environment into South Africa. Contributions of a regional geographic Information Systems analysis and monitoring to Global environmental monitoring, and so on.

Model 4 Taking environmentalism beyond the national arena

The `North' (first world, developed) and `South' (third world, underdeveloped) or `economic centre' and `periphery' distinction (Redclift, 1985) is unlikely to be resolved if the present status quo

regarding world development remains. Economic imperialism by the North has permeated the 'South' in terms of being import bases for raw materials and manufactured products from the South; being foreign aid and capital investors; being exporters of manufactured goods and products that encourage western style consumerism, thus justifying the presence of multinational corporations and being the providers of technologies and techniques of production (Weisskopf, 1978; Cassim, 1988:2).

The semi-hegemony has played a major role in furthering this international economic and environmental status quo, particularly in countries committed to a rapid, industrial growth and modernization. South Africa is no exception. The semi-hegemony in South Africa has adopted its role adequately in terms of political dimensions, but has neglected its role in the economic, developmental and environmental domains, siding more to the hegemonic status quo positions regarding these concerns. The national and international status quo is thus likely to remain to the benefit of industrial countries:

> "...it is in the interest of the industrial countries to maintain a North-South relationship in which the progressive destruction of the environment is an inevitable consequence" (Redclift, 1985:206)

Implicit in this statement is the notion that environmental resources are finite and scarcity the natural offshoot which brings about the creation of certain social systems.

> "Social systems whether based on reciprocity, redistribution or market exchange, or some combination of these modes, all exist to mediate this immobility (of resources) and adapt to absolute scarcity" (Brookfield, 1975:205).

However, at both the national and international levels scarcity has been more accentuated for some than for others. This situation can be changed under new forms of social organization which will arise out of a critical conscientization of people regarding the environmental, socio-economic and developmental status-quo.

The extent to which the semi-hegemony via the IUEP succeeds in implementing transformations in society (as outlined in stage three-model three), will determine the successful link between environmental concerns and political, socio-economic and developmental concerns at the national and international level.

The model proposes that South Africa, with the help of socially and environmentally attuned economic, political and planning strategists, needs to lessen its export-led industrialization in which materials are produced and processed in the country for export largely to developed countries to the neglect of domestic consumption needs and social upliftment. This form of economy brings about great social and political difficulties in its wake, because of the resultant unequal access to environmental resources (built, physical and social). The problems of creating a suitable climate for foreign investment and the private sector (eg. the adoption of economic austerity measures) often results in further unemployment, reduced social welfare, standards of living and a lack of `civil liberties' (United States Senate Foreign Relations Committee, 1977 in Frank,1987:304).

South Africa needs to develop a more domesticized, self-sustaining and convergent economic structure:

> "An economy which responds to the needs of the majority of the population is characterized by **convergence** between needs, domestic demand, investment and resource use. In other words, the needs of the people must create effective demand calling forth investment and development of appropriate technology, domestic resource use and production" (Landsberg, 1987:229).

An interdisciplinary IUEP deployed in universities will provide the education in the form of theoretical and practical knowledge required in order for such changes to occur.

6.6 Regional Cooperation - an Economic and Environmental Strategy

It could be argued that a gradual movement towards domesticized and self-sustaining economic structures by the `South' would not serve to bring about a drastic reduction of global inequalities. The rift between `North' and `South' is too great to be able to bring about international equalities in social welfare, even with the development of international institutions to plan and co-ordinate economic policies and development on a global basis (Rees, 1989:392).

One needs only to observe the claim of the advanced countries that their own growth and well-being will ultimately benefit developing countries by the increasing of profits from their exports to the developed countries. This is only partially true, however:

> "The advanced countries have prospered for decades and centuries, and the developing countries are still struggling. There have been mechanisms and rules by which capital accumulation and benefits of development were not shared "equitably" between the industrial rich and the resource-exporting poor" (Abdel-Rahman, 1980:350-351).

Bearing this in mind, it might seem that the only way in which to bridge the rift between `South' and `North' is for Southern Africa to lessen its dependence on and exploitation by the `North'. Regional cooperation and stability are essential first steps required to achieve the maximum self-reliance possible. How to achieve this is going to be problematical, and certainly a great deal of further research. However, some suggestions will be discussed with a view to facilitating this strategy:

1) South Africa must embark on concerted social, economic and environmental reform policies that would bring about much needed changes in our society. This would facilitate strong regional support for South Africa by the Southern African countries. South Africa will not be seen as a sub-imperialist power exploitating the Southern African region.

2) South Africa should be adopted as a tenth member of the South African Development Coordination Conference (SADCC), with regional programmes and strategies being negotiated between all member

states. An environmental and resource management strategy should be implemented together with economic and developmental initiatives. By not isolating South Africa, the political pressure by the nine states together with the changes which are occurring in South Africa, will enhance a more rapid transformation in that country.

3) Out of the present SADCC should be created a more unified, coordinated supranational body that would adopt as its basic guideline philosophy, the interlinking of developmental and environmental concerns in a regional set of strategies. Such a body could be called the <u>Southern African Economic and Environmental Community (SAEEC)</u>. The establishment of the body would be feasible in light of the reality that the different member nations could have certain strengths in different areas related to the economy, infrastructure, natural resources and human resources. This would heighten the need for intra-regional cooperation and coordination.

This supranational body would coordinate a self-sufficient economy for the Southern African region, primarily with a view to bringing about inequality reduction and mutual benefit between countries in terms of economic and social welfare and environmental well-being, upliftment and conservation.

4) This whole movement towards Southern African regional development and ways of achieving this would need to be conducted and advised by an intra-regional body of critically informed people who have particular acumens pertaining to certain aspects of development and the economy. All would essentially need to be united in their concern for and consideration of environmental issues and problems. In this sense, the **semi-hegemony** in South Africa and the other Southern African universities could cooperate in the creation and imparting of wide ranging knowledge and expertise. In this way, the semi-hegemony could contribute meaningfully to the development of a stable, self-reliant Southern African region.

6.6.1 South Africa's Present and Future role in the Southern African Milieu

South Africa, being the strongest economic and military power in Southern Africa, has dominated the Southern African states economically. The Southern African Development Coordinating Conference (SADCC) was established primarily to draw the nine states of Southern Africa (Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe) away from economic dependence on South Africa (Meyns, 1984:196)

At the SADCC summit of these states in Lusaka in 1980, a declaration was promulgated and signed. It stated that,

> "Southern Africa is dependent on the Republic of South Africa as a focus of transport and communications, as an exporter of goods and services and as an importer of goods and cheap labour....The nine states....were, in varying degrees, deliberately incorporated - by metropolitan powers, colonial rulers and large corporations - into the colonial and sub-colonial structures centring...on the Republic of South Africa. The development of national economies..., let alone the welfare of the people of Southern Africa, played no part in the economic integration strategy...Southern Africa is fragmented, grossly exploited...Future development must aim at a reduction of economic dependence not only on the Republic of South Africa, but also on any single external state or groups of states" (Amin, 1987:9).

However, South Africa finds itself in the same predicament as the rest of Southern Africa, in that its economy has been influenced strongly by multinational and monopoly corporations. South Africa provides an abundant supply of relatively cheap labour and raw materials. This has served to strengthen its development and economic potential (Chitala, 1987), but only insofar as it involves integration into the world capitalist system.

Chitala (1987) has argued that South Africa, far from being opposed to the various social forces in the world capitalist system, is in fact an "...independent developed capitalist state which has a definite role in the network of imperialist relations" (Chitala, 1987:19).

It has to be remembered however, that South Africa's economic power and military muscle remains the domain of a minority hegemony. The vast majority of the country's people remain largely opposed to the naked exploitation and inequalities inherent in the socio-economic status quo. With (i) more than 60% of the South African blacks living below the subsistence level; (ii) with South Africa having amongst the highest measures of social and economic inequality in the world; (iii) with severe land shortages for blacks; (iv) with rampant malnutrition, poor diet and health prospects for blacks, and so on (Sunday Times, 29 January 1989:11); it comes as no surprise that the counter-hegemonic realm has sought to strive for such goals as equality, social and economic welfare and justice, and an end to other virulent aspects of the capitalist economy.

With the inevitable dissolution of the existing hegemonic status quo, a new hegemonic order will arise, which will be determined by the relative nature and strength of input by the hegemony, semi-hegemony and the counter-hegemony. South Africa is moving ever closer towards this eventual outcome. The Southern African region needs to take this into account. Futuristic scenarios and impingent planning need attention. The SADCC needs to move toward viewing South Africa as the economic, political and strategic base for a future SADCC, thus lessening its contradictory seeking of foreign donors and capital - a direct enigma to intra-regional cohesion (Mandaza, 1987:210-211;214).

By officially inviting South Africa into its fold once it has undergone adequate transformation, the links with the North will be reduced. With its existing economic and resource strength and potential, South Africa together with the rest of the region could move ever closer to cutting close links with the world capitalist order and the super powers. As such it would be

> "...in the interests of long-term regional economic cooperation in the subregion if the SADCC could currently include in its perspectives, plans and projects, the probability that in the not too distant future, South Africa will not only be part of it but the heart of it" (Mandaza, 1987:222-223).

6.6.2 Towards an Alternative Development

The SADCC has realized for some time that an alternative development strategy is required in the Southern African context in order to reduce its dependency on the world economic system. This development strategy would have to be "...need-oriented, endogenous, self-reliant, ecologically-minded.." (King Moshoeshoe II, 1985:10-11), with frugality, cooperation and collective self-reliance (in the form of concrete programmes and projects) being the key concepts. (Meyns, 1984)

Environmental education in its holistic sense, becomes particularly applicable in this developmental scenario. This alternative development strategy has environmental implications and requires environmentally attuned policies and practices. A major priority is to first of all stamp out blatant inequality and eliminate poverty. Environmental concerns and resultant environmental education and practices are essential if development in the region is to achieve its aims of eliminating the disparity between developed and less developed areas, achieving equality in living standards and conditions and creating a steady, needs-meeting economy. In real practical terms, environmental awareness and resultant actions could include amongst others, attempts to resolve pressing issues at the land/people interface, such as:

i) Research and data storage related to pressing problems in the rural and less developed areas; farming development; appropriate technology; resource base potential for land use planning; land capability studies, and so on.

ii) Environmental and social impact assessments into projects related to land-use planning.

iii) Intra-regional consultation and programmes to deal with the problems of deforestation and soil erosion on a massive scale.

iv) Agricultural training and management for small-scale farming.

v) Population control - family planning, demographic control techniques and incentives, education.

vi) Land reform - analysis and research into systems of land tenure and the gradual introduction of institutional changes to maximize land use efficiency and conservation.

vii) Infrastructure and services development in rural areas (domestic water provision, health clinics; educational facilities; provision of non-farming, needs-meeting production activities to offset land pressures and unemployment; agricultural extension services).

viii) The conservation of resources through national and international legislation and cooperative programmes at the regional level (Erskine, 1988:186-188).

These few examples are a fraction of the environmentally related strategies required in one important aspect of development, ie.land-usage and planning. It becomes essential that the interface between the society, the economy and the environment should not become blurred. It would be the responsibility of a newly established Southern African Economic and Environmental Community (SAEEC) established out of the present SADCC to ensure this.

6.6.3 The Basic Priorities and Guidelines of the SAEEC

An important priority for this new body would be to draw away from the `ad hoc' planning of economic strategies reminiscent of the SADCC, to a sustained, long-term approach that would ensure a collective, self-reliant economic and social base (Ndlela, 1987). This body needs to be organizationally stronger and should not have to rely purely on the goodwill and voluntary action on the part of the member states as is indicative of the SADCC. This is not to say that the SAEEC should not arrive at decisions on policy-making by consensus. Nor should it become bureaucratic, inefficient, expensive, divisive and isolated from the broader masses of society (Tostensen, 1982:10).

What is in essence required is detailed planning involving specific strategies and coordination for development. The following broadly based strategies would need urgent priority:

1) The evolving of internal cohesive social structures by the enhancement of political, economic and environmental ethics and structures through coordination and learning from each others national development plans (Ndlela, 1987:46-47).

2) The move from competitive industrial and other economic activities to complementarity so that Southern African countries can supply one another's needs, thus expanding intra-regional trade and increasing social well-being (Maasdorp, 1988:76-77), reducing the need for migrant labour and drastically reducing the region's role as a major exporter of raw materials and importer of finished products (Sekhonyana, 1985:19).

3) A movement towards structural transformations at the national and intra-regional level, involving changes in social relations via socio-economic and environmental transformations. Examples of such changes would be (i) a redistribution of resources and wealth, (ii) a reduction of severe class, group and international inequalities and (iii) a limited economic growth ethic. Social and political transformations leading to social democracy and participation by the broader mass of society in guiding decision making at every level of administration is essential. Only then can a needs-oriented, endogenous, self-reliant, ecologically minded development strategy be fully conceived (Nerfin, 1985:24; Erskine, 1988).

The SAEEC, in order to fully integrate holistic environmental concerns with economic, political, social and development concerns in the above-mentioned development strategies, would need to adopt an **Integrated Southern African Environmental Policy.** Such a programme would ensure this integration and as such could be adopted as the set of cardinal policy guidelines for the SAEEC. Such a policy will need to be informed and aided by environmentally conscientized inter-disciplinary and vocational teams from the different countries making up the SAEEC.

6.6.4 The Role of the Semi-Hegemony at the Regional Level and its Importance for the SAEEC

The semi-hegemonic realm will become all important in terms of providing knowledgeable academics, politicians and professionals in a multiplicity of fields to serve in or advise the SAEEC in its various fields of concern. It is of the utmost importance that a holistic environmental education permeate through the semi-hegemony, in order that it can play its role fully in an environmentally informed, transformative national and intra-regional development. The semi-hegemonic realm throughout the Southern African region should not continue to work separately in their own countries.

The semi-hegemony has to be united on an intra-regional level in order that the whole Southern African region can benefit from its input. All the universities from the region should fall under the auspices of an **Association of Southern African Universities (ASAU)** which would be an affiliate of the Association of African Universities. As such, in accordance with the philosophy of this association, ASAU members would attempt to:

1) `Africanize' university education especially in respect of discipline curricula, and in conjunction with manpower development requirements;

2) Undertake research into social, economic, environmental and developmental problems affecting their communities and Southern Africa in general;

3) Provide intellectual leadership for the production and dissemination and application of knowledge pertaining to social and economic development and change;

4) Promote regional unity, cooperation and international understanding through its role in tertiary education (Hinchcliffe, 1987:36; Thompson, 1977:283).

In adopting this philosophy, ASAU would be able to institute a regional IUEP policy of its own. By doing this, ASAU could contribute knowledge and expertise to the SAEEC, especially in the implementation of the Integrated Southern African Environmental Policy.

6.7 A Concluding Comment

Change is occurring in South Africa but not in the direction desired. Cosmetic, status quo reforms in respect of the environmental and socio-economic realms need to be countered with tangible far-reaching transformations. The model therefore provides guidelines for a course of action that could be implemented. It should not be assumed however that these guidelines for strategies are going to occur immediately and in some ordered sequence. But in the final analysis, moves towards more than superficial transformations in the environmental and socio-economic status quo are going to have to occur. The normative model provided can therefore be seen as a small step in the right direction.

Amidst increasing turbulence in South African society, the semi-hegemony cannot afford to be complacent. South Africa seems to have entered a phase in its history where "...the old is dying and the new cannot be born; and in this interegnum a great variety of morbid symptoms appear" (Gramsci, in Bundy, 1987:73). The lines have been drawn between the hegemony and the counter-hegemony. It remains the task of the semi-hegemony to act in its pivotal role, and bring about the birth of a new tomorrow by mediating between these two counter forces, to arrive at a new, restructured socio-economic, political and environmental status quo. A critical, integrative environmental paradigm needs to be incorporated into the semi-hegemonic realm so that the product of this birth is not incomplete. This thesis presents a normative model for moving beyond the present.

An adventurous and at times a seemingly far-reaching picture has been sketched relating to the explanations, results and analysis of, and solutions pertaining to, the problem of the missing link in education. Yet in the context of the great changes occurring in society, a preparation of society for the world of the future is ultimately more realistic than serving the needs of the present-day world (Thompson, 1977:294). Hopefully, what has been endeavoured in this thesis will become more than just an act of faith.

APPENDIX 1   QUESTIONNAIRE DEFINITIONS AND QUESTIONNAIRE SAMPLE

<u>DEFINITIONS</u>

Below are a number of definitions that <u>must be read</u> before the questionnaire is filled in. In order to be able to answer the <u>short</u> questionnaire without ambiguities and misinterpretations, the reader should be familiar with the concepts outlined. The reader should also bear in mind throughout that the term <u>ENVIRONMENT</u> is treated HOLISTICALLY, that is, in the <u>physical</u> (natural and built), <u>social</u> and <u>cultural</u> senses.

1) <u>Definition of Environmental Education</u>

Environmental education could be perceived as an

> "...<u>integrated process</u> dealing with man's interrelationship with his natural and man-made surroundings including the relationship of population growth, pollution, resource allocation and depletion, conservation technology and rural and urban planning to the <u>total</u> human environment. Environmental education is related to a study of the factors influencing ecosystems, mental and physical growth, living and working conditions, decaying cities and population pressures...Environmental education is intended to promote among citizens an awareness and understanding of the environment, our relationship to it, and the concern and <u>responsible action</u> necessary to assure our survival and improve the quality of life". (Martin and Turner, 1972,p.ix).

As such, environmental education in its broadest sense, is a

> "...process aimed at producing citizenry that is knowledgeable concerning the total environment and the role of man, able to <u>participate</u> in activities for maintaining and improving the quality of the environment while meeting human needs..." (Saveland, 1976: pg 201).

Moreover, environmental education also entails "...practice in <u>decision-making</u> and self-formulating of a code of behaviour about issues concerning environmental quality..." (Cerovsky, 1971) and resource usage and management.

From a societal perspective environmental education would have as one of its aims, the synthesis of close, mutual interactions between people and the environment; and the changing of values, morals and ethics that guide societies' present-day interactions and relationships with the environment. The result would be a shift towards `symbiotic connectivity ' between the society, the economy, culture and the environment in its totality (Scott,1988; Sayer, 1984).

2) Definition of Environmentally Explicit

Content that is directly relevant to the social/physical environment; or can be readily translated into environmentally relevant material in the environmental educative framework, be it positive or negative in connotation.

Examples (all of which are examples from the University of Natal) would be:

Faculty/discipl.	Course	Content
1) Education	Professional Stud-ies in education II	Environmental studies.
2) Social Science (Geography)	Environmental Imp-act Assessment.	The purpose of EIA; Methods of impact analysis. The prediction and assessment of impacts on the air,water,noise, biological, cultural and socio-economic environments.
3) Social Science (Nursing)	Nursing:Midwifery and Community	Environmental health care.
4) Law	Environmental law	The purpose, nature and scope of environmental law. The sources and principles of E law and comparative analysis.

Enforcement. Capita
selecta: a) Nature
conservation; b)
Soil conservation;
c) pollution control
; land-use and town
planning; urban
environment, etc.

3) Definition of Environmentally Implicit

Content that is indirectly relevant to the environment; or can be reinterpreted within an environmental educative framework, be it positive or negative in connotation.

Examples would be:

Faculty/discipline	Course	Content
1) Arts (Economic History)	Economic History	Concepts of economic growth and development. The industrial revolution.
2) Agriculture (Agricultural economics)	Agricultural economics 380 (Agric.development.	Agricultural development and land tenure in South Africa.Food and nutrition, dualism, technology,education, education and land reforms as factors in agricultural development.
3) Commerce	Economics I	Behaviour of consumers and producers. Macro-economics.
4) Engineering (Electrical/ electronic)	Professional practice	Legal obligations and implications in Engineering; The Machinery and Occupational Safety Act,No. 6 of 1983. Engineering Economics; project evaluation and cost estimation.

4) Definition of Environmentally Important

Content that has a direct bearing on and implications for the environment, be it negative or positive in connotation.

Examples would be:

Faculty/discipline	Course	Content
1) Science (Microbiology)	Microbiology - Plant Pathology 2 (g) (III)	General Plant pathology: Selected plant diseases due to adver- adverse environmental factors; The economic and sociological importance of plant diseases.
2) Commerce (Economics)	Economics Course III	Public finance and environmental econom- ics: theory and policy. Development planning and project appraisal.
3) Engineering (Civil Enginee- ring)	Public Health engineering	Introduction to envir- onmental degradation by pollution; basic biochemistry and microbiology; principles of waste management; liquid and solid waste disposal.

5) Definition of Environmental Potential

Content that has an indirect or hidden bearing on the environment. With reinterpretation and contextualization, such information could become environmentally important, be it negative or positive in connotation.

Examples would be:

Faculty/discipline	Course	Content
1) Education (UED; HDE)	Sociology of Education.	School and Society - socialization.
2) Medicine	Community Health II	Occupational Health and public health
3) Social Science (Social Anthropology)	Social Anthropology IB	The processes and consequences of urbanization.

QUESTIONNAIRE

Below are listed the courses and content preliminarily identified as having environmentally
applicable/potentially applicable information:

COURSE	YR	CONTENT	EXP	IMP	NB	POT

1) Are there any <u>DELETIONS</u> of the above-mentioned courses or content, which you would propose?

COURSE	YR	CONTENT	REMARKS

2) Are there any possible <u>ADDITIONS</u> to the courses or content already outlined, which you would propose?

COURSE	YR	CONTENT	REMARKS

3) For what reason/s do you think knowledge about the environment is being taught in your department? (Tick the fitting reason/s).

i) a) To perceive the environment as a set of resources for socio-economic and industrial development and growth?
b) To create specialist knowledge and techniques in order to improve the material well-being of the country's people.

_____

ii) a) To create the means by which scientific, technological and political expertise can provide the key to solve problems related to economic growth, public health and safety, and optimal, efficient use of resources.

_____

iii) a) To engender a concern about environmental
degradation and over-exploitation and (b) to appreciate the lack of effective environmental resource management policies to cater for societies' needs in terms of economic and social development and (c) to seek ways of ameliorating these concerns.

_____

iv) a) To seek to improve environmental legislation and enforcement of environmental policies.
b) To make suitable economic adjustments that are environmentally attuned.
c) To create and participate in effective environmental management and monitoring concerns at all levels of administration; as well as in the public/private sectors for the environment.

_____

v) a) To critically examine the implications of materialism and mass production and consumption as perpetrator of present-day environmental problems.
b) To instill an awareness that environmental problems are not compartmentalized and separate from each other; and that solutions lie not in short term solutions, but in long term solutions, brought about by the changing of values, morals and ethics.
c) To arrive at an understanding that the environment should be conserved and utilized not for the purposes and needs of society itself; but for its own sake - not as a commodity, but as an equal partner with its own requirements
and its own controlling abilities over itself and over society.

_____

vi) a) To contribute towards the creation of people-environmental relationships and attitudes that link society and the total environment symbiotically or mutually.
b) To attempt to modify a culture that divorces society from the environment, by changing societal values through education.
c) To initiate moves towards knowledge and ideas that could create this symbiosis, for example, in the fields of needs-meeting production and resource allocation and management; equitable welfare distribution; new environmental and planning policies; community and workplace health, safety and non-alienating environments; demographic policies and education; democratic participatory and decision making techniques and policies, and so on.

_____

4) To what other departments does or could your department align itself in terms of providing (i) interchange of environmental ideas and content, and (ii) provide environmentally educative courses for students outside your department? Space is provided on the next page for your response.

DEPARTMENT	FAIR (F)/ GOOD (G)/ STRONG (S) ALIGNMENT	REMARKS

5) Do you foresee your department having an important part to play in a broad inter-disciplinary environmental education of the future? (Tick where applicable).

Little Importance	Some Importance	Important	Very Important

Remarks:

NAME:_____

DEPARTMENT:_____

UNIVERSITY:_____

Thank-you.

APPENDIX 2   INTRODUCTORY LETTER - QUESTIONNAIRE

GARY GALANOS
DEPARTMENT OF GEOGRAPHICAL AND
ENVIRONMENTAL SCIENCES
UNIVERSITY OF NATAL
KING GEORGE V AVE
DURBAN
4001
  / /8

Dear

RE: THE CONDUCTING OF A QUESTIONNAIRE FOR RESEARCH PURPOSES:

I am at present conducting research toward a Master of Arts thesis in the Department of Geographical
and Environmental Sciences at the University of Natal, Durban. The topic title of the planned thesis
reads as follows: "Environmentalism in Education: a forgotten link".

The broad underlying aim of this research is to gauge the extent to which the environmental paradigm
has been incorporated into the realm of education, specifically at the university level.

One of my hypothetical assumptions is that political, economic and social changes need to be
accompanied by substantial changes in environmental conceptions and practices in order for real,
holistic, beneficial changes to occur in society.

By assessing and analyzing the extent to which environmental interests have been introduced into
higher institutions of education, suggestions can be made and ways devised for the strategic
incorporation of the environmental paradigm into this educational domain. By doing this, the long-
term survival of the country and its people can be enhanced.

Your participation in filling the attached questionnaire would greatly assist me in my research. A self-
addressed envelope has been enclosed. Could it please be returned at your nearest convenience. Your
replies will be kept confidential.

I can be contacted at the above-mentioned department by phoning (031)815911, extension 1278 or
2416.

Thank-you for your anticipated cooperation.

Yours faithfully,

GARY GALANOS.

APPENDIX 3   QUESTIONNAIRE RESULTS - DATABASE 3+ FORMAT

UNIVERSITY: ZULU   DEPARTMENT: NURSING SCIENCE

COURSE	YR	EXPIMP	NBPOT
1 NURSING EDUCATION (ANE 115)	1	IMP	NB
2 COMMUNITY HEALTH NURS.AHN 115/125	1	IMP	POT
3 COMMUNITY HEALTH NURS.AHN 215/225	2	IMP	NB
4 COMMUNITY HEALTH NURS.AHN 315/325	3	EI	NBP
5 NURSING EDUCATION III (ANE 315)	3	IMP	POT
6 GENERAL NURSING SCI./ART AGN 125	1	IMP	POT
7 COMM.HEALTH NURS.SCI.I APP 115/25	1	EI	NB
8 COMM.HEALTH NURS.SC.II APP 215/25	2	IMP	NBP
9 COMM.HEALTH NUR.SC.III.APP 315/25	3	IMP	NB
10	0		
11	0		
12	0		

Q31A .F.	Q31B .F.	
Q32A .F.		
Q33A .F.	Q33B .F.	Q33C .F.
Q34A .F.	Q34B .F.	Q34C .F.
Q35A .F.	Q35B .F.	Q35C .F.
Q36A .T.	Q36B .T.	Q36C .T.

Q4	DEPARTMENT	RATING
1	GEOGRAPHY	2
2	SOCIOLOGY	2
3		0
4		0
5		0
6		0
7		0
8		0
9		0
10		0

Q5   3

Key:

a) Exp-Imp - Whether the content in the applicable course has explicit or implicit content. Both explicit and implicit content is keyed in as `EI'.

b) NB-Pot - Whether the content in the applicable course is important or potentially important. If both

are pertinent, then this is indicated as `NBP'.

c) <u>Q31A</u> - Question 3, Section 1, sub-section (a) (as in the questionnaire).
T - True if respondent ticks a section positively.
F - False if section has not been chosen.

d) <u>Q4</u> - Rating 1 - Fair.
        2 - Good.
        3 - Strong.

e) <u>Q5</u> - Rating 1 - Little importance.
    Rating 2 - Some importance.
    Rating 3 - Important.
    Rating 4 - Very Important.

APPENDIX 4   DATASHEET ANALYSIS I - DATABASE 3+ FORMAT

UNIVERSITY: UND   DEPARTMENT: ARCHITECTURE

	COURSE	LEC	YEAR%	TOT.%	COMP
1	BUILDING SCIENCE I (DAAR1SCY)	30	7.95	1.77	.T.
2	HISTORY OF ARCHIT.IA(DAAR1HAI)	20	5.30	1.18	.T.
3	HISTORY OF ARCHIT.IB(DAAR1HA2)	20	5.30	1.18	.T.
4	HISTORY OF ARCHIT.IIA(DAAR2HA1)	26	6.25	1.53	.T.
5	HISTORY OF ARCHIT.IIB(DAAR2HA2)	26	6.25	1.53	.T.
6	HISTORY OF ARCHI.111A(DAAR3HA1)	26	6.82	1.53	.T.
7	BUILDING SERVICES II(DAAR3BSY)	17	4.46	1.00	.T.
8	BUILDING CHEM.(ARCH.)(DSCH3BC2)	10	2.62	0.59	.T.
9	PROFESSIONAL PRACTICE(DAAR4PPY)	3	0.88	0.17	.T.
10	BUILDING SCIENCE II (DAAR2SCY)	26	6.25	1.53	.T.
11	BUILDING SERVICES I (DAAR2BSY)	14	3.36	0.82	.T.
12	SITE SURVEY (DNLS1AR1)	9	2.16	0.53	.T.

UNIVERSITY: UND   DEPARTMENT: ARCHITECTURE,CONT.

	COURSE	LEC	YEAR%	TOT.%	COMP
1	HISTORY OF ARCH.IIIB(DAAR3BCY)	26	6.82	1.53	.T.
2	ACOUSTICS (DNEC3ACY)	8	2.09	0.47	.T.
3	THEORY OF ARCHITEC.IV(DAAR4TAY)	52	15.38	3.06	.T.
4	HISTORY,URBAN SETTLEM.(DAAR4USI)	26	7.69	1.53	.T.
5	THEORY OF ARCHITECT.V(DAAR5AD1)	26	14.28	1.53	.T.
6	ARCHITECTURAL DESIGN V(DAAR5AD1)	40	21.97	2.36	.T.
7	HOUSING IN DEVELOPMENT(DAAR4HD2)	13	3.84	0.76	.F.
8	ECOLOG. RESOURCE MGMT(DAAR4ER1)	26	7.69	1.53	.F.
9	ARCHITEC.CONSERVATION(DAAR4AC2)	26	7.69	1.53	.F.
10	LANDSCAPE ARCHITECTURE(DAAR4LA1)	16	4.73	0.94	.F.
11	URBAN DESIGN (DAAR4UD2)	26	7.69	1.53	.F.

Key:

a) Lec - Number of lectures (or tutorials/practicals).

b) Year% - The proportional percentage that the relevant content comprises of the total course content for a particular year of study.

c) Tot% - The proportional percentage that the relevant course content comprises of the total course content for all the degree/discipline years of study.

d) Comp. - Compulsory? (True or False)

APPENDIX 5   NON-RESPONDENT LISTING OF DEPARTMENTS, COURSES AND COURSE
CONTENT NATURE - DATABASE 3 + FORMAT

UNIVERSITY: FHARE   DEPARTMENT: SURVEYING

COURSE	YR	EXPIMP	NBPOT
1 SURVEYING I	1	EI	POT
2 ENGINEERING SURVEYING	2	EXP	POT
3 CARTOGRAPHY	3	IMP	NBP
4 PHOTOGAMMETRY AND REMOTE SENSING	3	IMP	POT
5 CADASTRAL SURVEYING	3	IMP	NB
6 SURVEYING IV	4	EXP	POT
7 URBAN DEVELOPMENT,TOWNSHIP PLANNING	4	EXP	NB
8 PROFESSIONAL PRACTICE	4	EI	NBP
9	0		
10	0		
11	0		
12	0		

UNIVERSITY: FHARE   DEPARTMENT: NURSING

COURSE	YR	EXPIMP	NBPOT
1 NURSING SCIENCE AND ART 1	1	EXP	NB
2 NURSING SCIENCE AND ART II	2	IMP	POT
3 NURSING SCIENCE AND ART IV	4	IMP	POT
4 MICROBIO.,PARASITOLOGY,PHARMACOLOGY	3	EI	NBP
5 COMMUNITY HEALTH NURSING I	1	EI	NB
6 COMMUNITY HEALTH NURSING II	2	IMP	NB
7 COMMUNITY HEALTH NURSING III	3	IMP	NB
8 PSYCHIATRIC NURSING I	4	IMP	POT
9 PSYCHIATRIC NURSING II	5	IMP	POT
10 HEALTH EDUCATION I	4	IMP	NB
11 SOCIOLOGY AND SOCIAL CARE (SOCIO.I)	1	EI	NBP
12 HUMAN SCIENCE I (PSYCHOLOGY I)	2	IMP	POT

UNIVERSITY: FHARE   DEPARTMENT: NURSING,CONT.

COURSE	YR	EXPIMP	NBPOT
1 ELEMENTARY CHEMISTRY,BIOCHEM.I	1	IMP	POT
2 ETHOS OF NURSING I	1	IMP	POT
3 NURSING ADMINISTRATION I	1	IMP	POT
4 NURSING ADMINISTRATION II	2	IMP	POT
5 NURSING ADMINISTRATION III	3	IMP	NB
6 NURSING EDUCATION II	2	IMP	NB
7 NURSING EDUCATION III	3	IMP	NB
8 PUBLIC ADMINISTRATION I	1	IMP	POT
9 PUBLIC ADMINISTRATION II	2	IMP	NB

APPENDIX 6   DATASHEET ANALYSIS II - DATABASE 3+ FORMAT

UNIVERSITY: UDW   DEPT/DEGREE: CHEMICAL ENGINEERING

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
0	2	0	4	0	74	4.09	2.49	1.60	3.26	0.83

UNIVERSITY: UDW   DEPT/DEGREE: CIVIL ENGINEERING

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
0	1	4	5	0	183	10.58	7.57	3.01	4.27	6.31

UNIVERSITY: UDW   DEPT/DEGREE: ELECTRICAL ENGINEER.

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
0	0	1	3	0	68	3.51	2.94	0.57	2.94	0.57

UNIVERSITY: UDW   DEPT/DEGREE: MECHANICAL ENGINEER.

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
0	0	3	3	0	89	5.34	3.42	1.92	4.02	1.32

UNIVERSITY: UDW   DEPT/DEGREE: ANTHROPOLOGY

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
1	1	1	0	0	97	31.08	0.00	31.08	0.00	31.08

UNIVERSITY: UDW   DEPT/DEGREE: CRIMINOLOGY

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
1	1	1	0	0	108	34.61	0.00	34.61	0.00	34.61

UNIVERSITY: UDW   DEPT/DEGREE: PHILOSOPHY

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
1	1	1	0	0	72	23.07	0.00	23.07	0.00	23.07

UNIVERITY: UDW   DEPT/DEGREE: POLITICAL SCIENCE

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
1	1	1	0	0	138	44.23	0.00	44.23	0.00	44.23

UNIVERSITY: UDW   DEPT/DEGREE: PHYSICAL EDUCATION

NO.OF COURSES

YR1	YR2	YR3	YR4	YR5	LEC.NO	CUM%LEC	CUM%EX	CU%IM	CU%NB	CUM%PO
1	1	0	0	0	47	15.06	11.21	3.85	11.21	3.85

```
-------------------------------------------------------------
UNIVERSITY: UDW                    DEPT/DEGREE: PSYCHOLOGY


NO.OF COURSES
YR1  YR2  YR3  YR4  YR5  LEC.NO  CUM%LEC  CUM%EX  CU%IM  CU%NB  CUM%PO
1    1    1    0    0    133     42.62    5.44    37.18  5.44   37.18
-------------------------------------------------------------
```

Key:

a) YR - The year of study and the number of courses with environmentally applicable content. If a degree spans a period of more than five years, then the number of courses for the successive years are placed in the YR5 column.

b) Lec.No. - The total number of lectures with environmental connotations (or practicals/tutorials) for all the courses for the total number of study years. If the number of lectures ran into four figures, the limit was set at 999.

c) Cumulative % Lec. - The total number of lectures, converted to a cumulative percentage of the total number lectures for the discipline/degree years of study.

d) Cum % Exp, Imp, NB, Pot. - Cumulative percentages of all the environmentally related course content in a discipline or degree, which are explicit, implicit, important and potentially important.

APPENDIX 7   LISTING OF DEPARTMENTS (RESPONDENTS AND NON-RESPONDENTS)
IN THE FOUR EDUCATIVE CATEGORIES

FORT HARE*

Social Science/Humanities

1) Philosophy
2) Systematic theology
3) Industrial Psychology
4) Development studies
5) Archeology
6) Agricultural economics
7) Anthropology
8) Private Law
9) Historical/comparative
   education
10) Geography
11) Constitutional law
12) Accountancy
13) Empirical Orthopedagogy
14) Economics
15) Business economics
16) Biblical studies
17) Communication
18) Xhosa and Sotho
19) Political science
20) Public administration
21) Social Work
22) Sociology
23) Psychology
24) Old Testament/Hebrew
25) New Testament/Practical
    theology
26) Ecclesiastical history
27) Fundamental Pedagogics
28) Didactics/science of
    teaching.

Physical/Natural Sciences

1) Soil science
2) Crop science
3) Animal science
4) Pasture science
5) Horticultural science
6) Plant Protection
7) Zoology
8) Botany
9) Geology
10) Physics
11) Microbiology

Engineering/Planning Sci.

1) Agricultural extension
   and rural development
2) Agricultural engineer-
   ing.
3) Land-use planning
4) Surveying.

Medical/Health Sciences.

1) Human Movement studies
2) Nursing

* – Highlighted departments –
   respondents to the
   questionnaire.

ZULULAND UNIVERSITY

Social Sciences/Humanities

1) Dogmatics/church history
2) Geography

Physical/Natural Sciences

1) Geology
2) Hydrology

3) History of education/
   comparative education
4) Public finance
5) Business Economics
7) Zulu law
8) Social work
9) Criminal/procedural law
10) Anthropology
11) Communication science
12) Criminology
13) Development studies
14) Philosophy
15) Psychology
16) Sociology
17) Constitutional law
18) Private law
19) New testament
20) Old testament
21) Biblical studies
22) Accounting
23) Economics
24) Industrial Psychology
25) Political science
26) Public Administration
27) Educational Psychology
28) Philosophy of education
29) Educational planning
    and administration
30) I.P.S.V.T.(Law)
31) I.P.S.V.T (Public admin)

3) Physics
4) Botany
5) Zoology
6) Chemistry

Engineering/Planning Sci.
Not applicable

Medical/Health Sciences
1) Nursing science
2) Human Movement studies
3) Home Economics

UNIVERSITY OF DURBAN-WESTVILLE

Social Sciences/Humanities

1) Sociology
2) Geography
3) Mercantile law
4) Science of religion
5) Social Work
6) Private law
7) Psychology of education
8) Economics
9) Psychology
10) Foundations of
    education (philosophy)
11) Business economics
12) General didactics
13) Applied didactics

Physical/Natural Sciences

1) Microbiology
2) Zoology
3) Botany
4) Geology
5) Physics

14) Criminology
15) Philosophy
16) Political science
17) Public administration
18) Industrial psychology
19) New testament/Old
    testament/biblical
    studies
20) Systematic theology/
    practical theology
21) Public law

Engineering/Planning Sci.

1) Chemical Engineering
2) Civil Engineering
3) Electrical engineering
4) Mechanical engineering

Medical/Health Sciences

1) Speech and hearing therapy
2) Dentistry
3) Pharmacy
4) Human Movement studies
5) Occupational therapy
6) Physiotherapy
7) Optometry
8) Home Economics

UNIVERSITY OF NATAL (DURBAN)

Social Sciences/Humanities

1) Political science
2) Economics
3) Social Anthropology
4) Business administration
5) Geography
6) Economic history
7) Psychology
8) Philosophy
9) Private law
10) Procedural law
11) Law
12) Sociology
13) Centre for social and
    development studies
14) Social work
15) Contemporary Cultural
    studies
16) Education
17) Educational Psychology
18) Public Law
19) Business Law

Physical/Natural Sciences

1) Biology
2) Geology

Engineering/Planning Sci.

1) Surveying and mapping
2) Town and regional
   planning

Medical/Health Sciences

1) Medical microbiology
2) Nursing
3) Community Health

3) Building Management
4) Chemical engineering
5) Civil engineering
6) Mechanical engineering
7) Architecture
8) Electrical engineering
9) Electronic engineering
10) Quantity surveying

4) Paediatrics
5) Medically applied
   psychology

UNIVERSITY OF NATAL (PIETERMARITZBURG)

Social Sciences/Humanities

1) Political studies
2) Psychology
3) Philosophy
4) Education
5) Agricultural economics
6) Geography
7) Religious and theol-
   ogical studies
8) Sociology
9) Educational psychology
10) Business administration
11) Law
12) Economics

Physical/Natural Sciences

1) Mathematics
2) Zoology and entomology
3) Geology
4) Botany
5) Crop science
6) Soil Sci./agrometeorology
7) Grassland science
8) Horticultural science
9) Microbiology/plant
   pathology
10) Animal science

Engineering/Planning Sci.

1) Agricultural engin-
   eering.

Medical/Health Sciences

1) Home Economics/dietetics

UNIVERSITY OF THE WESTERN CAPE

Social Sciences/Humanities

1) Anthropology
2) Adult education
3) Business economics
4) Comparative education
5) Industrial psychology
6) Social Development
7) Didactics
8) New Testament
9) Public Administration
10) Accounting
11) Biblical studies
12) Economics
13) Geographical and
    environmental studies
14) History
15) Political science
16) Psychology

Physical/Natural Sciences

1) Geology
2) Botany
3) Physics
4) Zoology
5) Biochemistry
6) Microbiology/plant
   pathology

17) Sociology
18) Educational Psychology
19) Philosophy and
    history of education
20) Child Guidance and
    remedial teaching
21) Social Work
22) Institute for
    Counselling.
23) Old Testament
24) Systematic theology
25) Diaconiology
26) Missiology
27) Public/adjective law
28) Mercantile law
29) Private, comparative
    public international
    law.

Engineering/Planning Sci.

Not applicable

Medical/Health Sciences

1) Pharmaceutics
2) Pharmacology
3) Community Dentistry
4) Oral Medicine\Periodontics
5) Human Ecology
6) Occupational Therapy
7) Physiotherapy
8) Nursing
9) Oral Surgery
10) Roentgenology
11) Conservative dentistry
12) Medical Microbiology

PRETORIA UNIVERSITY

Social Sciences/Humanities

1) Sociology
2) Economics
3) Indigenous/native law
4) Social Work
5) Public law
6) Historical/comparative
   education
7) Geography
8) Fundamental Pedagogics
9) Dogmatics/ethics (B)
10) Old Testament (A)
11) Personnel Management
12) Didactical Pedagogics
13) Orthopedagogics
14) School Guidance
15) Religious science/

Physical/Natural Sciences

1) Zoology
2) Plant production
3) Pedology
4) Animal science
5) Microbiology
6) Botany
7) Geology
8) Physics
9) Physiology
10) Entomology
11) Biochemistry
12) Horticulture

missiology (A)
16) Agricultural Economics
17) Dogmatics/ethics (A)
18) New Testament (B)
19) Business economics
20) Philosophy
21) Biblical studies
22) Archeology
23) Fine Arts
24) Criminology
25) Public Administration
26) Psychology
27) Political science/
    International politics
28) Anthropology
29) Commercial and labour
    law
30) Private law
31) History and philosophy
    of law
32) Psycho- and socio-
    pedagogics
33) New Testament (A)
34) Religious Studies,
    Missiology (B)
35) Old testament (B)

Engineering/Planning Sci.

1) Chemical engineering
2) Metallurgical
   Engineering
3) Agricultural engineering
4) Industrial/works
   engineering
5) Electrical engineering
6) Mechanical engineering
7) Surveying
8) Town and regional
   planning
9) Civil Engineering
10) Architecture
11) Agricultural extension
12) Electronic engineering
13) Mining engineering
14) Building Management
15) Quantity surveying

Medical/Health Sciences

1) Radiology
2) Human Movement studies
3) Pharmacology (Veterinary s)
4) Food Science
5) Contagious diseases
   (Veterinary sciences)
6) Parasitology (Veterin.sci.)
7) Zootechnology (Veterin.sc.)
8) Medicine (Veterinary sci.)
9) Community Health (Veter.sc)
10) Occupational therapy
11) Home Economics/dietetics
12) Periodontics
13) Nursing
14) Medical microbiology
15) Physiotherapy
16) Surgery (Veterinary sci.)
17) Community dentistry
18) Physiology (medicine)
19) Microbiology (medicine)
20) Internal medicine
21) Psychiatry
22) Community Health
23) Radiography
24) Pharmacy
25) Oral biology and

pathology
26) Audiology, speech therapy
27) Physiology (Veterinary sc)
28) Poultry diseases
29) Human Movement studies
    (education)
30) Genetics (Veterinary sci.)

APPENDIX 8   DISCIPLINES AND DEGREES IN THE FOUR EDUCATIVE CATEGORIES
WITH THE NUMBER OF COURSES AND LECTURES APPLICABLE

FORT HARE (Social Sciences)

Discipline/Degree	No.Courses	No.Lectures
1) Anthropology	3	131
2) Archeology	2	55
3) Development studies	3	208
4) Biblical Studies	3	91
5) Communication studies	3	114
6) Philosophy	3	115
7) Political Science	3	121
8) Public Administration	3	186
9) Psychology	3	63
10) Social Work	3	215
11) Sociology	3	208
12) Xhosa and Sotho	3	152
13) Geography	3	312
14) Law (B.A.Law)	4	168
15) Law (B.Procurationis)	4	168
16) Law (LLB)	5	331
17) Law (Diploma Juris)	4	168
18) Old Testament studies	3	97
19) New Testament,Practical theol.	3	76
20) Systematic Theology	4	302
21) Ecclesiast.history,missiology	3	108
22) Accountancy	1	20
23) Business economics	8	286
24) Economics	8	664
25) Industrial Psychology	4	184
26) Public Admin. (B.Admin)	7	471
27) Fundamental pedagogics	5	77
28) Historical,comparative educ.	8	114
29) Empirical and orthopedagogics	5	70
30) Didactics/science of teaching	6	107
31) Agricultural economics	8	168

Physical and Natural Sciences

Discipline/Degree	No.Courses	No.Lectures
1) Biology (Zoology)	1	67
2) Botany	2	137
3) Geology	3	127
4) Microbiology	2	76
5) Physics (Terminal)	2	31
6) Surveying (B.Sc)	8	395
7) Zoology	3	232
8) Physics	2	13
9) Animal science (B.Agric.)	10	286
10) Crop Science (B.Agric.)	8	208
11) Horticultural Sci.(B.Agr.)	7	165
12) Pasture Science	8	295
13) Plant Protection	3	102
14) Soil Science	8	219

Engineering and Planning Sciences

1) Agricultural Engineering	6	181
2) Agricultural Extension	3	50
3) Agricult.Ext.(Dipl.Agr.Ext.)	3	27
4) Landuse Planning	3	137

Medical and Health Sciences

1) Nursing (B.Curationis)	13	896
2) Nursing (B.Cur.Admin and Community nursing)	10	630
3) Nursing (B.Cur.education and community nursing)	9	564
4) Human Movement Studies	4	113

ZULULAND UNIVERSITY (Social Sciences/Humanities)

Discipline/Degree	No.Courses	No.Lectures
1) Anthropology	4	110
2) Communication Science	5	82
3) Criminology	4	53
4) Development studies	5	164
5) Geography	6	390
6) Philosophy	7	264
7) Psychology	3	82
8) Social Work	4	168
9) Sociology	4	179
10) Accounting	2	32
11) Business Economics	4	89
12) Economics	2	73
13) Industrial Psychology	5	115
14) Political science	6	110
15) Public Administration	4	99
16) Law (B.Juris)	7	215
17) Law (B.Proc.)	7	215
18) Law (LLB)	14	476
19) Dogmatics and Ethics	3	120
20) New Testament	3	68
21) Old Testament	2	32
22) Biblical studies	3	51
23) Education (B.Paed.)	6	206
24) Physical Education (B.Paed.)	5	153
25) U.E.D.(Education)	6	130
26) Secondary School Teachers Dip.	4	66
27) B.Ed.(Admission course)	1	9
28) B.Ed.	6	62
29) Dipl.Juris.(I.P.S.V.T)	1	65
30) Dipl.Legum (I.P.S.V.T)	2	108
31) Dipl.Local Govt.(I.P.S.V.T)	7	732
32) Dipl.Public Admin.(I.P.S.V.T)	10	914
33) Dipl.Public Finance(I.P.S.V.T)	4	253

34) Dipl.Data Processing (IPSVT)	2	83
35) Dipl.Co-Operative Mgmt(IPSVT)	3	133
36) Dip.Advanced Public Admin	4	503

Physical and Natural Sciences

1) Geology	5	94
2) Hydrology	2	131
3) Physics	3	8
4) Botany	4	142
5) Zoology	6	138
6) Physical science	3	38

Medical and Health Sciences

1) Nursing (B.Nursing Education and Admin I,II)	8	145
2) Nursing (B.Nursing Education (and Admin.III)	16	413
3) Diploma Nursing Education	6	125
4) Diploma Community Health Nursing	8	204
5) Nursing (B.Curationis)	11	325
6) Nursing (Dipl.Nursing Admin.)	6	128
7) B.Home Economics	19	529

UNIVERSITY OF DURBAN-WESTVILLE (Social Sciences)

Discipline/Degree	No.Courses	No.Lectures
1) B.Paedagogics (Education)	3	90
2) B.Paed.(Primary Ed.)	4	93
3) B.Ed.	10	87
4) Higher Dipl.of Education	1	51
5) Dipl.in Special Ed.(remedial)	1	10
6) Dipl.in Special Ed.(Mental H)	4	114
7) Public Administration	4	109
8) Industrial Psychology	3	117
9) Economics	6	330
10) Business Economics	3	116
11) Biblical studies	2	87
12) B.Theology	10	378
13) B.Divinity	9	332
14) Certificate of Theology	9	332
15) Anthropology	3	97
16) Criminology	3	108
17) Philosophy	3	72
18) Political Science	3	138
19) Science of Religion	2	61
20) Physical education	2	47
21) Psychology	3	133
22) Social Work	4	224
23) Sociology	3	103
24) Geography	3	266

25) B.Iuris (Law)	4	79
26) B.Proc.(Law)	5	99
27) LLB (Law)	8	195

Physical and Natural Sciences

1) Botany	3	89
2) Geology	5	281
3) Microbiology	2	50
4) Zoology	3	211
5) Biology (Zoology)	1	35
6) Physics	4	76

Engineering and Planning Sciences

1) Chemical Engineering	6	74
2) Civil Engineering	10	183
3) Electrical Engineering	4	68
4) Mechanical Engineering	6	89

Medical and Health Sciences

1) Physical Education	2	47
2) B.Pharmacy	4	72
3) B.Physiotherapy	4	145
4) B.Optometry	5	146
5) B.Speech, Hearing therapy	6	212
6) B.Occupational Therapy	11	347
7) B.Dental Therapy	4	145
8) B.Oral Therapy	3	68
9) B.Home Economics	14	436

UNIVERSITY OF NATAL (DURBAN) (Social Sciences)

Discipline/Degree	No.Courses	No.Lectures
1) Post-grad.Dipl.Industrial Relations	3	69
2) B.Commerce	13	393
3) Anthropology	6	173
4) Comparative African Govt.	1	17
5) Centre for Social and Development Studies (Applied Studies)	1	45
6) CSDS (Applied Studies)	1	45
7) CSDS (Post-grad Diploma in Applied Social Sciences)	1	56
8) CSDS (Honours in Applied Social Sciences)	4	58
9) Geography	14	289
10) Psychology	10	175
11) Social Work	7	153
12) Sociology	7	182
13) Law (B.Procurationis)	9	83

14) Law (LLB - 3yr)	18	235
15) Law (LLB - 2yr)	14	196
16) Post-Grad Dipl.Maritime Law	1	5
17) Contemporary Cultural studies	1	156
18) Economic History	2	93
19) Economics	6	168
20) Philosophy	4	86
21) Political Science	5	51
22) B.Prim.Ed	11	284
23) Higher Dipl.Education	4	59
24) B.Education	8	242
25) B.Ed.(School counselling)	5	131
26) B.Ed.(Ed.Psychology)	5	128

Physical and Natural Sciences

1) Biology (Biology 1T)	1	33
2) Biology (B.Sc.)	6	390
3) Geology	9	142

Engineering and Planning Sciences

1) Agricultural Engineering	9	183
2) B.Sc.Eng.Chemical Engineering	3	20
3) B.Sc.Eng.Civil Engineering	17	280
4) Electrical Engineering	2	13
5) Electronic Engineering	2	13
6) B.Sc.Eng.Mechanical Eng.	4	72
7) B.Sc.Eng.Land Surveying	20	297
8) Architecture (B.Arch.)	23	512
9) B.Sc.Building Management	14	297
10) Quantity Surveying	13	184
11) Town and Regional Planning	12	286
12) M.Building Economics (Quantity Surveying)	2	56

Medical and Health Sciences

1) Nursing (B.Curationis)	5	157
2) Nursing (B.Cur.Education)	4	67
3) Nursing (B.Cur.Admin.)	2	43
4) Advanced University Diploma in Nursing Education	3	58
5) Advanced University Diploma in Nursing Administration	1	17
6) General Nursing (M.Soc.Sc)	2	33
7) M.Soc.Sc.(Community Health nursing)	4	119
8) Medicine (M.B.ChB)	9	714

UNIVERSITY OF NATAL (PIETERMARITZBURG)(Social Sciences/Humanities)

Discipline/Degree	No.Courses	No.Lectures

1) Agricultural Economics (B.Sc.Agric.)	13	267
2) B.Comm.Business finance	5	139
3) B.Comm.Law	6	140
4) B.Comm.Purchasing, materials management	4	100
5) B.Comm.Economics	5	138
6) B.Comm.Marketing	9	205
7) B.Comm.Personnel Management	14	223
8) B.Comm.General field	4	112
9) Economics	3	89
10) Political Studies	3	260
11) Psychology	3	108
12) Sociology	3	115
13) Geography	3	275
14) Law (LLB - 2yr)	14	233
15) Law (LLB - 3yr)	14	233
16) Philosophy	2	54
17) Religious studies	7	323
18) H.D.E.	11	212
19) B.Ed.	11	319
20) B.Ed (School Counselling)	7	154
21) B.Ed.(Educational Psychology)	7	126

Physical and Natural Sciences

1) B.Sc.Agr.Agric.production (all options)	7	277
2) B.Sc.Agr.Agric.production (Animal science/crop science)	9	412
3) B.Sc.Agr.Agric.production (Animal sci./grassland sci.)	9	421
4) B.Sc.Agr.Agric.production (Crop Sci./Grassland sci.)	10	427
5) B.Sc.Agr.Agric,production (An.sc./Crop sc./Grassl.sc.)	9	404
6) B.Sc.Agr.Agrometeorology	15	378
7) B.Sc.Agr.Animal science	11	319
8) B.Sc.Agr.Crop science	19	465
9) B.Sc.Agr.Grassland Sci.	15	440
10) B.Sc.Agr.Grassland Sci. (Grassland sc./animal sc.)	16	464
11) B.Sc.Agr.Grassland Sci. (Ecology)	16	694
12) B.Sc.Agr.Horticulture (standard)	15	381
13) B.Sc.Agr.Horticulture Management	17	420
14) B.Sc.Agr.Horticulture (Botany)	13	441
15) B.Sc.Agr.Soil science	18	560
16) B.Sc.Agr.Microbiology	8	296
17) B.Sc.Agr.Plant Pathology	9	317
18) B.Sc.Agr.Entomology	16	639
19) Botany	4	195

20) Chemistry	1	25
21) Geology	3	95
22) Mathematics	1	20
23) Hydrology (B.Sc.)	2	72
24) Meteorology (B.Sc.)	2	27
25) Microbiology (B.Sc.)	6	200
26) Soil Science (B.Sc.)	5	143
27) Entomology	3	112
28) Zoology	5	329
29) Biology (Zoology)	1	60

Engineering and Planning Sciences

1) B.Agric.Management	16	355

Medical and Health Sciences

1) B.Sc.Dietetics and Home Economics	10	294

UNIVERSITY OF THE WESTERN CAPE (Social Sciences/Humanities)

Discipline/Degree	No.Courses	No.Lectures
1) Law (LLB - 2yr)	8	127
2) Law (LLB - 3yr)	8	127
3) Law (B.Proc.)	12	385
4) Law (B.Iuris)	8	325
5) Law (Diploma Iuris)	7	317
6) B.Theology	8	222
7) B.Theology (Honours)	14	209
8) Social Work (B.A.)	22	766
9) Diploma Special Teaching (Remedial teaching)	5	118
10) Diploma Special Teaching (Child Guidance)	6	159
11) Education (HDE;STD;LSTD)	7	135
12) Education (B.Ed.)	20	478
13) Education (HDE Postgrad.)	3	143
14) Special Dipl.(Mental Handicap)	2	48
15) Special Dipl.(Child Guidance)	1	53
16) Anthropology	6	246
17) Biblical Studies	6	156
18) Economics	15	203
19) Geography	6	384
20) History	6	76
21) Industrial Psychology	8	206
22) Philosophy	6	338
23) Political science	8	195
24) Psychology	5	182
25) Public Administration	10	188
26) Sociology	10	264
27) B.Administration	16	957
28) B.Comm (General)	11	594

29) B.Economics	17	772

Physical and Natural Sciences

1) Biochemistry (Biology)	2	70
2) Botany	6	266
3) Geology	4	155
4) Microbiology	4	144
5) Physics	4	96
6) Plant Pathology	4	288
7) Zoology	5	100

Medical and Health Sciences

1) Dentistry (B.Ch.D)	17	346
2) Dentistry (Dipl.Oral Health)	3	114
3) B.Sc.Dietetics	13	448
4) B.Pharmacy	10	335
5) B.Sc.Occupational Therapy	14	678
6) B.Sc.Physiotherapy	10	831
7) Nursing (B.Cur.)	12	615
8) Dipl.Nursing Admin./ Community Nursing	9	290
9) Human Movement Studies	6	354
10) Human Ecology (B.A.)	28	723

PRETORIA UNIVERSITY (Social Sciences/Humanities)

Discipline/Degree	No.Courses	No.Lectures
1) Theology (Admission)(Sec.A)	4	86
2) B.Divinitatis (A)	12	412
3) B.A.(Theology)(B)	8	153
4) B.Divinitatis (B)	10	520
5) Postgrad Dipl.Theology	2	88
6) H.D.E.(Undergrad.) General	13	161
7) H.D.E.(Non-grad) Home Economics	19	414
8) H.D.E.(Non-grad) Physical Ed.	12	219
9) H.D.E.(Postgrad)	12	121
10) Dipl.in tertiary education	1	19
11) B.Prim.Ed.(Pre-Primary)	13	295
12) B.Prim.Ed.(Junior Primary)	10	162
13) B.Prim.Ed.(Senior Primary)	12	198
14) B.Education.)(General)	10	52
15) B.Ed.(School Counselling)	8	76
16) B.Ed.(Orthopedagogics)	10	75
17) B.Ed.(Orthodidactics)	10	82
18) B.Ed.(Physical education)	8	72
19) B.Ed.(Subject didactics)	14	149
20) B.Ed.(Teaching administration)	7	30
21) B.Ed.(Special Education)	10	84
22) B.Ed.(Curriculum studies)	10	99
23) B.Ed.(Technical)	10	95
24) B.Ed.(Vocational Guidance)	10	91

25) B.Ed.(Psig.) Orthopedagogics	10	75
26) B.Ed.(Psig.) Orthodidactics	10	111
27) B.Sc.Agr.Agricult.Economics (Economics)	23	374
28) B.Legum Civilium (BLC)	17	400
29) Law (LLB)	11	277
30) B.Iuris (Law)	5	140
31) B.Procurationis	19	418
32) Dipl.Iuris (Law)	3	83
33) B.Comm.(Economics)	30	827
34) B.Comm.(Business Economics)	30	719
35) B.Comm.(Market Management)	14	260
36) B.Comm.(Personnel Management)	21	574
37) B.Comm.(Law)	23	504
38) B.Admin.(Public Admin.)	35	988
39) B.Admin.(Internat.relations)	26	802
40) Archeology	5	67
41) Religious studies	4	88
42) Fine Arts	4	112
43) Economics	7	133
44) Geography	6	312
45) Criminology	4	104
46) Public Administration	4	159
47) Psychology	4	63
48) Sociology	5	104
49) Political Science	8	181
50) Anthropology (Ethnology)	7	135
51) Philosophy	6	103

Physical and Natural Sciences

1) B.Sc.Agr.Biochemistry	8	202
2) B.Sc.Agr.Entomology	20	539
3) B.Sc.Agr.Pedology	18	397
4) B.Sc.Agr.Agricult.Economics (Agriculture)	23	455
5) B.Sc.Agr.Microbiology	17	439
6) B.Sc.Agr.Plant pathology	16	444
7) B.Sc.Agr.Plant production	25	540
8) B.Sc.Agr.Plant production (Weed control)	25	556
9) B.Sc.Agr.Horticulture	27	488
10) B.Sc.Agr.Animal Science	15	349
11) B.Sc.Agr.Plant Production (Weidingskunde)	23	500
12) Zoology	6	139
13) Entomology	5	294
14) Physics	7	152
15) Physiology	2	35
16) Geology (B.Sc.+ B.Eng.)	13	319
17) Microbiology, plant pathology	11	398
18) Botany	10	290

Engineering and Planning Sciences

1) B.Architecture	26	896
2) B.Landscape Architecture	23	622
3) B.Sc.Building Management	12	235
4) B.Sc.Quantity Surveying	10	154
5) B.Eng.Works/industrial Eng.	19	365
6) B.Eng.Chemical Engineering	10	149
7) B.Eng.Electrical Engineering	11	257
8) B.Eng.Electronic Engineering	6	146
9) B.Eng.Agricultural Engineering	16	403
19) B.Eng.Mechanical Engineering	18	336
20) B.Eng.Metallurgical Eng.	20	399
21) B.Eng.Mining Engineering	18	378
22) B.Eng.Civil Engineering	21	762
23) B.Sc.Surveying	12	276
24) B.Town and Regional Planning (Full-time).	39	999
25) B.Town and Regional Planning (Part-time).	36	999

Medical and Health Sciences

1) B.Sc.Agr. Food Science	15	298
2) B.Dietetics	15	369
3) B.V.Sc.(Veterinary Science)	23	999
4) Dipl.in Animal Nursing	2	52
5) Human Movement Studies (B.A)	7	185
6) Speech and Hearing therapy	6	127
7) B.Dentistry (B.Ch.D)	18	707
8) Dipl.in Oral Hygiene	6	97
9) B.Medicine,Surgery(M.B.chB)	17	492
10) B.Medical science	7	273
11) B.Nursing (B.Cur.)	18	544
12) B.Cur.(Education/Community nursing)	8	329
13) B.Cur.(Admin./Community nur.)	11	483
14) B.Cur.(Post basics)	2	79
15) B.Occupational Therapy (B.Arb)	10	402
16) B.Radiology	7	245
17) B.Physiotherapy	8	336
18) B.Pharmaciae	8	308
19) Dipl.in Nursing Admin.	4	180
20) Dipl.in Nursing Admin. (Community nursing)	6	285
21) Dipl. Nursing Education	3	141
22) Dipl. Nursing Education (Community Nursing)	5	246
23) B.Home Economics (Clothing)	17	431
24) B.Home Economics (Food Mgmt)	8	177
25) B.Home Economics (General)	22	546

APPENDIX 9   INTER-UNIVERSITY COMPARISON OF THE ASSOCIATION BETWEEN
INTERDISCIPLINARY POTENTIAL RATINGS AND ENVIRONMENTAL IDEOLOGICAL
LEANING

	1	2	3	4
TECHNO	FHR (4) ZUL (1) UDW (0) UND (2) UNP (0) UWC (3) PRE (4)	FHR (7) ZUL (7) UDW (2) UND (7) UNP (2) UWC (3) PRE (13)	FHR (4) ZUL (0) UDW (6) UND (6) UNP (4) UWC (4) PRE (15)	FHR (2) ZUL (3) UDW (6) UND (5) UNP (3) UWC (3) PRE (16)
ACCOMO	FHR (0) ZUL (0) UDW (0) UND (1) UNP (1) UWC (1) PRE (1)	FHR (6) ZUL (5) UDW (1) UND (3) UNP (3) UWC (2) PRE (8)	FHR (1) ZUL (0) UDW (6) UND (3) UNP (2) UWC (4) PRE (12)	FHR (1) ZUL (1) UDW (5) UND (5) UNP (3) UWC (4) PRE (15)
ECOCEN	FHR (2) ZUL (0) UDW (0) UND (0) UNP (1) UWC (2) PRE (2)	FHR (9) ZUL (6) UDW (1) UND (1) UNP (1) UWC (3) PRE (9)	FHR (2) ZUL (1) UDW (8) UND (5) UNP (6) UWC (4) PRE (13)	FHR (2) ZUL (1) UDW (6) UND (5) UNP (3) UWC (3) PRE (15)

APPENDIX 10 CUMULATIVE TABLES OF ENVIRONMENTAL CONTENT PERCENTAGES
FOR DISCIPLINES AND DEGREES IN THE FOUR EDUCATIVE CATEGORIES

Appendix 10A - Cumulative Table of Environmental Content Percentages for Disciplines and Courses (Social Sciences)

Univ	Disc2	Tot%	Crse2
Zulu	25	5	28
UNP	30	4	20
UND	33	5	17
ForH	34	8	37
UWC	40	4	28
UDW	25	6	25
Pret	27	2	29
Tot.	214	34	184
Mean	31	5	26

Key:

Disc2 - cumulative mean percentage of environmental content per discipline or degree, both explicit and implicit and important and potential.

Tot% - proportional percentage contribution of a course's content to a discipline or degree's total environmental content.

Crse2 - cumulative mean percentage of environmental content per course across all disciplines.

Appendix 10b Cumulative Results - Environmental Content Percentages for Disciplines and Percentages (Physical and Natural Sciences

Univ	Disc2	Tot%	Crse2
Zulu	26	7	18
UNP	31	3	23
UND	34	6	30
ForH	47	10	30
UWC	54	13	34
UDW	36	12	38
Pret	25	2	23
Tot.	253	53	196
Mean	36	8	28

Appendix 10c - Cumulative Table of Environmental Content Percentages for Disciplines and Courses (Engineering and Planning Sciences)

Univ	Disc2	Tot%	Crse2
FHar	39	13	25
UND	13	1	6
UDW	6	9	5
Pret	21	1	15
UNP	18*.	1	24#
Tot.	97	25	75
Mean	19	5	15

* - Durban university courses excluded.
# - Durban university courses included.

Appendix 10d <u>Cumulative Results - Environmental Content Percentages for Disciplines and Courses</u>
<u>(Medical and Health Sciences)</u>

Univ	Disc2	Tot%	Crse2
Zulu	19	2	22
UNP	24	2	26
UND	15	4	7
Fhar	31	3	42
UWC	34	3	38
UDW	13	2	9
Pret	19	2	33
Tot.	155	18	177
Mean	22	3	25

APPENDIX 11   CROSS-TABULATIONS - INTER-UNIVERSITY COMPARISONS

Appendix 11a Explicitness and Implicitness by the Importance and Potentiality of Environmental
Educative Content - an Inter-University Comparison

	NB	POT
EXP	FHR (67) ZUL (24) UDW (27) UND (62) UNP (52) UWC (68) PRE (189)	FHR (35) ZUL (15) UDW (25) UND (29) UNP (30) UWC (34) PRE (145)
IMP	FHR (70) ZUL (54) UDW (30) UND (49) UNP (23) UWC (115) PRE (165)	FHR (135) ZUL (115) UDW (117) UND (143) UNP (77) UWC (151) PRE (332)

Appendix 11b Inter-University Comparison of the Associatioon between Ideology and the Explicitness
and Implicitness of Environmental Educative Content

	EXPLICIT	IMPLICIT
TECHNO.	FHR (54) ZUL (19) UWC (22) UDW (21) UND (64) UNP (39) PRE (208)	FHR (50) ZUL (29) UWC (67) UDW (46) UND (107) UNP (23) PRE (137)
ACCOMO.	FHR (19) ZUL (6) UWC (24) UDW (23) UND (29) UNP (41) PRE (194)	FHR (34) ZUL (22) UWC (60) UDW (34) UND (38) UNP (30) PRE (221)
ECOCEN.	FHR (32) ZUL (11) UWC (18) UDW (20) UND (34) UNP (39) PRE (187)	FHR (52) ZUL (38) UWC (71) UDW (48) UND (58) UNP (41) PRE (223)

Appendix 11c <u>Inter-University Comparison of the Association of Environmental Ideology and the Importance and Potentiality of Environmental Content</u>

	IMPORTANT	POTENTIAL
TECHNO.	FHR (63) ZUL (19) UWC (44) UDW (24) UND (78) UNP (40) PRE (232)	FHR (47) ZUL (41) UWC (50) UDW (46) UND (107) UNP (24) PRE (289)
ACCOMO.	FHR (22) ZUL (14) UWC (46) UDW (24) UND (48) UNP (44) PRE (193)	FHR (33) ZUL (17) UWC (41) UDW (36) UND (42) UNP (30) PRE (214)
ECOCEN.	FHR (43) ZUL (33) UWC (46) UDW (21) UND (37) UNP (40) PRE (196)	FHR (47) ZUL (25) UWC (48) UDW (49) UND (51) UNP (46) PRE (237)

Appendix 11d Inter-University Comparison of Association between the Explicitness and Implicitness of Environmental Education and the Importance of Role in Environmental Education

	LITTLE NB	SOME NB	IMPORTANT	VERY NB
EXPLICIT	FHR (10). ZUL (2) UND (3) UNP (0) UWC (4) UDW (0) PRE (2)	FHR (19) ZUL (3) UND (5) UNP (5) UWC (19) UDW (0) PRE (13)	FHR (15) ZUL (6) UND (33) UNP (8) UWC (13) UDW (19) PRE (53)	FHR (18) ZUL (10) UND (55) UNP (22) UWC (19) UDW (21) PRE (78)
IMPLICIT	FHR (33) ZUL (12) UND (6) UNP (14) UWC (4) UDW (6) PRE (17)	FHR (33) ZUL (32) UND (27) UNP (17) UWC (18) UDW (13) PRE (71)	FHR (5) ZUL (8) UND (29) UNP (23) UWC (18) UDW (4) ¤PRE (140)	FHR (19) ZUL (8) UND (39) UNP (3) UWC (14) UDW (32) PRE (129)

Appendix 11e Inter-University Comparison of Association between the Important and Potential Nature of Environmental Education and the Importance of the Environmental Educative Role

	LITTLE NB	SOME NB	IMPORTANT	VERY NB
IMPORT.	FHR (16) ZUL (0) UND (3) UNP (1) UWC (9) UDW (0) PRE (11)	FHR (14) ZUL (5) UND (4) UNP (5) UWC (13) UDW (0) PRE (9)	FHR (17) ZUL (10) UND (35) UNP (11) UWC (20) UDW (17) PRE (57)	FHR (17) ZUL (5) UND (56) UNP (25) UWC (16) UDW (24) PRE (76)
POTENT.	FHR (40) ZUL (19) UND (13) UNP (17) UWC (10) UDW (7) PRE (29)	FHR (28) ZUL (28) UND (22) UNP (17) UWC (10) UDW (13) PRE (62)	FHR (9) ZUL (10) UND (39) UNP (22) UWC (22) UDW (9) PRE (142)	FHR (20) ZUL (7) UND (29) UNP (4) UWC (11) UDW (27) PRE (145)

REFERENCES

1) Abdel-Rahman,I.H.(1980): The International Order, in Dorner,P.and El-Shafie,M.A.(eds), Resources and Development - Natural Resource Policies and Economic Development in an Interdependent World, London: Croom Helm.

2) Adamson,W.L.(1980): Hegemony and Revolution - A Study of Antonio Gramsci's Political and Cultural Theory, Berkeley: University of California Press.

3) Alston,R.M.and Freeman,D.M.(1975): The Natural Resources Decision-maker as Political and Economic Man: Toward a Synthesis, Journal of Environmental Management, 3, 167-183.

4) Amin,S.(1987): Introduction, in Amin,S., Chitala,D. and Mandaza,I.(eds), SADCC - Prospects for Disengagement and Development in Southern Africa, New Jersey: United Nations University.

5) Anderson,B.(1983): Imagined Communities - Reflections on the Origin and Spread of Nationalism, London: Verso.

6) Atkinson,N.(1981): Curriculum as Decision-making, in Hunter,A.P., Ashley,M.J. and Millar,C.J.(eds): Education, Curriculum and Development, Cape Town: Dept.of Education, Univerity of Cape Town.

7) Babu,A.M.(1981): African Socialism or Socialist Africa?, London: Zed Press.

8) Bailey,K.D.(1978): Methods of Social Research, New York: Free Press.

9) Baker,R.(1974): Towards a Conceptual Approach in Environmental Studies, Environmental Studies, 3, 46-50.

10) Beetham,D.(1974): Max Weber and the Theory of Modern Politics, London: Allen and Unwin.

11) Behr,A.L.(1984): New Perspectives in South African Education - 2nd ed., Durban: Butterworths.

12) Behr,A.L.(1987): South African Universities Today: Perceptions for a Changing South Africa, South African Journal of Higher Education, 1, 3-9.

13) Bennett,J.(1987): Unthinking Faith and Enlightenment - Nature and the State in a Post-Hegelian Era, New York: New York University Press.

14) Ben-Peretz,M.(1978): Environmental Education is too Important to be Left in the Hands of Teachers Alone, in Bakshi,T.S.and Naveh,Z.(eds.):Environmental Education - Principles, Methods, and Applications, New York: Plenum Press.

15) Ben-Yosef,I.A.(1987): Continuing Education in Critical Times with Special Reference to Martin Buber, South African Journal of Higher Education, 1, 11-15.

16) Blalock,H.M.(1981): Social Statistics, Auckland: Mc Graw Hill.

17) Blowers,A.(1973): Planning residential areas, in Open University: Planning and the City, Milton Keynes: Open University Press.

18) Boggs,C.(1976): Gramsci's Marxism, London: Pluto Press.

19) Bottomore,T.et.al (ed.)(1983): A Dictionary of Marxist Thought, Oxford: Basil Blackwell.

20) Boulle,L.J.(1988): Affirmative Action and Educational Opportunity, <u>Critical Choices for South African Society</u>, Cape Town: Institute for the study of Public Policy.

21) Bowie,N.E.and Simon,R.L.(1977): <u>The Individual and the Political Order - An Introduction to Social and Political Philosophy</u>, New Jersey: Prentice-Hall,Inc.

22) Boyd,J.M.(1984): The Role of Religion in Education, <u>The Environmentalist</u>, 4, 40-44.

23) Braham,M.(ed.)(1982): <u>Aspects of Education</u>, New York: John Wiley.

24) Braham,M.(1988): The Ecology of Education, in Briceño,S. and Pitt,D.C.(eds), <u>New Ideas in Environmental Education</u>, London: Croom Helm.

25) Briceño,S.and Pitt,D.C.(1988): New Roles for International Action, in Briceño,S. and Pitt.D.(eds), <u>New Ideas in Environmental Education</u>, London: Croom Helm.

26) Brookfield, H.(1975): <u>Interdependent Development</u>, London: Methuen.

27) Brown, L.(1985): <u>Justice, Morality and Education: A New Focus on Ethics in Education</u>, Hampshire: Macmillan.

28) Brown,L.(1987): <u>Conservation and Practical Morality - Challenges to Education and Reform</u>, Hampshire: Macmillan.

29) Brown,P.(1985): Universals and Particulars in the Position of Women, in Cambridge Women's Study Group (1985): <u>Women in Society - Interdisciplinary Essays</u>, London, Virago.

30) Brubacher,J.S.(1977): <u>On the Philosophy of Education</u>, San Francisco: Jossey-Bass.

31) Brunsson.N.(1982): The Irrationality of Action and Action Rationality: Decisions, Ideologies and Organizational Actions, <u>Journal of Management Studies</u>, 19, 29-44.

32) Buci-Glucksmann,C.(1980): <u>Gramsci and the State</u>, London: Lawrence and Wishart.

33) Buckland,P. (1982): Technicism and De Lange: Reflections of the Process of the HSRC Investigation, <u>Perspectives in Education</u>, Special Issue - The HSRC Education Report, May 1982, 35-51.

34) Buckland,P.(1982): The Education Crisis in South Africa: Restructuring the Policy Discourse, <u>Social Dynamics</u>, 8, 14-28.

35) Budlender,G.(1977): The Conservative Bias of South African Universities, in Van der Merwe,H.W. and Welsh,D.(ed.)(1977): <u>The Future of the University in South Africa</u>, Cape Town: David Philip.

36) Bundy,C.(1987): History, Revolution and South Africa, <u>Transformation</u>, 4, 60-75.

37) Carson,S.McB.(ed.) (1978): <u>Environmental Education: Principles and Practice</u>, London: Edward Arnold.

38) Cassim,F.(1988): Growth, Crisis and Change in the South African Economy, in Suckling,J. and White,L.(eds), <u>After Apartheid - Renewal of the South African Economy</u>, York: Centre for Southern African Studies.

39) Chandrasekhar,S.(1976): Population, Poverty and Pollution, in Mohtadi,M.F.(ed.) - <u>Man and his Environment,Vol.2. Proceedings of the Second International Banff Conference on Man and His</u>

Environment, Oxford: Pergamon Press.

40) Chiras,D.D.(1985): Environmental Science - A Framework for Decision-Making, Benjamin/Cummings, Menlo Park, California.

41) Chisholm,L.(1982): Training for Capital: De Lange Reports, Perspectives in Education, Special Issue (The HSRC Education Report), May 1982, 3-20.

42) Chisholm,L.and Christie,P.(1984): Restructuring in Education, in South African Research Service (ed.), South African Review, Vol.1, Johannesburg: Ravan Press.

43) Chitala,D.(1987): The Political Economy of SADCC and Imperialism's Response, in Amin,S.,Chitala,D.and Mandaza,I.(eds), SADCC - Prospects for Disengagement and Development in Southern Africa, New Jersey: United Nations University.

44) Cobbe,J.(1988): Economic Policy Issues in the Education Sector, in Suckling,J. and White,L.(eds), After Apartheid - Renewal of the South African Economy, York: Centre for Southern African Studies.

45) Coggin,P.A.(1979): Education for the Future: The Case for Radical Change, Oxford: Pergamon Press.

46) Coker,P.(1978): Higher Education, in McB Carson,S.(ed.):Environmental Education - Principles and Practice, London: Edward Arnold.

47) Collier,K.G.(1983): Ideological Influences in Higher Education, in Boyd-Barrett,O.et.al (eds), Approaches to Post-School Management, London: Harper and Row.

48) Congress of the People (1955): Freedom Charter (The People's Charter).

49) Corbridge,S.(1986): Capitalist World Development - A Critique of Radical Development Geography, Houndmills: Macmillan.

50) Council for the Environment (1989): Integrated Environmental Management in South Africa, Pretoria: Joan Lotter.

51) Davies,J.(1984): Capital, State and Educational Reform in South Africa, in Kallaway,P.(ed.), Apartheid and Education - The Education of Black South Africans, Johannesburg: Ravan.

52) Davos,C.A.(1977): Towards an Integrated Environmental Assessment within a social context, Journal of Environmental Management, 5, 297-305.

53) De Bell,G.(1971): Education and Ecology, in Barr,J.(ed.): The Environmental Handbook - Action Guide for the UK, London: Pan Books.

54) Department of Education and Science (1981): Environmental Education - A Review, London: HMSO.

55) Department of Environmental Affairs (1989): White Paper on Environmental Education, Pretoria: Department of Environmental Affairs.

56) Derrick Sewell,W.R.and O'Riordin,T.(1976): The Culture of Participation in Environmental Decision-making, Natural Resources Journal, 16, 1-21.

57) Deutsch,K.W.(1977): Ecosocial Systems and Ecopolitics - A Reader on Human and Social Implications of Environmental Management in Developing Countries, Paris: Unesco.

58) Diepeveen,W.M.(1984): Teaching for Environmental Conservation - a Guide for Teachers in all Phases of Education, Pretoria: Committee for Environmental Education of the Council for the Environment, Department of the Environment.

59) Diesing,P.(1982): Science and Ideology in the Policy Sciences, New York: Aldine.

60) Dlamini,C.(1988): Deepening the United Front, Broadening the Anti-Apartheid Alliance (interview with C.Dlamini), South African Labour Bulletin, 13, 42-49.

61) Dominicé,P.(1978): How Open Should Universities Be? in Stephens,M.D. and Roderick,G.W.(eds), Higher Education Alternatives, London: Longman.

62) Du Plessis,P.G.(1987): University Training in the Dynamic South African Environment with Special Reference to the Presentation of Business Economics, South African Journal of Higher Education, 1, 29-37.

63) Earthlife (1989): Earthlife Newsletter, August 1989, Scottsville, Pietermaritzburg.

64) Earthlife (1989): Earthlife News, October 1989, Scottsville, Pietermaritzburg.

65) Eberhard, A.A. and Williams, A.T.(eds.)(1988): Renewable Energy Resources and Technology Development in Southern Africa, Cape Town: Elan Press.

66) Erskine,J.M.(1988): Ecology and Land Usage, in Leistner,E. and Esterhuysen,P.(eds), South Africa in Southern Africa: Economic Interaction, Pretoria: Africa Institute of South Africa.

67) Eyles,J.and Evans,M.(1987): Popular Consciousness, Moral Ideology and Locality, Environment and Planning D: Society and Space, 5, 39-71.

68) Federov,E. and Novik,I.(1977): Man, Science and Technology, in Deutsch,K.W.(ed.), Ecosocial Systems and Ecopolitics - A Reader on Human and Social Implications of Environmental Management in Developing Countries, Paris: Unesco.

69) Femia, J.(1988): Gramsci's Political Thought - Hegemony, Consciousness and the Revolutionary Process, Oxford, Clarendon Press.

70) File,J.(1986): The Politics of Excellence: University Education in the South African Context, Social Dynamics, 12, 26-42.

71) Forgacs,D.(ed.)(1988): A Gramsci Reader - Selected Writings, 1916 - 1935, London: Lawrence and Wishart.

72) Frank, A.G.(1987): Global Crises and Transformation, in Peet,R.(ed.), International Capitalism and Industrial Restructuring - A Critical Analysis, London: Allen and Unwin.

73) Frankel, B.(1987): The Post-Industrial Utopians, Cambridge: Polity Press.

74) Frankel, J.(1979): International Relations in a Changing World, Oxford: Oxford University Press.

75) Fuggle, R.F.(1980): Regulating Environmental Change in South Africa - Shaping our Environment Symposium - CSIR, 1979, The Civil Engineer in South Africa, 1, 77-83.

76) Fuggle,R.F.and Rabie,M.A.(eds.)(1983): Environmental Concerns in South Africa, Capetown, Juta.

77) Fuggle,R.F.(1988): Conservation Ethics: Should Wildlife Society Members be Required to Subscribe to a Code of Conduct? Proceedings: National Conference, September, 1988, Durban: Wildlife Society of Southern Africa.

78) Geber,B.A.and Newman,S.P.(1980): Soweto's Children: The Development of Attitudes, London: Academic Press.

79) Giachetti,R.(1972): Antonio Gramsci: The Subjective Revolution, in Howard,D. and Klare,K.E.(1972): The Unknown Dimension - European Marxism Since Lenin, New York, Basic Books.

80) Giarini,O.and Louberge,H.(1978): The Diminishing Returns of Technology - An Essay on the Crisis in Economic Growth, Pergamon Press, Oxford.

81) Giddens,A.(1972): Politics and Sociology in the Thought of Max Weber, London: Macmillan.

82) Giddens,A.(1981): Capitalism and Modern Social Theory - An Analysis of the Writings of Marx, Durkheim and Max Weber, Cambridge: Cambridge University Press.

83) Gilbert,G.N.(1981): Modelling Society - An Introduction to Loglinear Analysis for Social Researchers, London: George Allen and Unwin.

84) Goldberg,M.(1981): Formulating Worker Consciousness, Social Dynamics, 7, 32-41.

85) Golding,M.(1984): Black Consciousness and Trade Unions, South African Labour Bulletin, 10, 29-36.

86) Gorman,R.A.(ed.)(1985): Biographical Dictionary of Neo-Marxism, London: Mansell.

87) Green,R.M.(1985): Intergenerational Distributive Justice and Environmental Responsibility, in Velasquez,M. and Rostankowski,C.(eds.): Ethics - Theory and Practice, Englewood Cliffs: Prentice-Hall.

88) Gregory,D.(1978): Ideology, Science and Geography, London: Hutchinson.

89) Gregory,M.B.(1979): Economic Analysis of Environmental Issues, in Lenihan,J. and Fletcher, W.W.(eds), Economics of the Environment, Environment and Man, Vol.10, Glasgow: Blackie.

90) Haggett,P.(1979): Geography - A Modern Synthesis, New York: Harper and Row.

91) Hall,R.H.(1963): The Concept of Bureaucracy: An Empirical Assessment, American Journal of Sociology, 69, 32-40.

92) Hall,S.,Lumley,B.,McLennan,G.(1983): Politics and Ideology: Gramsci, in Schwarz,B. et.al.(eds.) (Centre for Contemporary Cultural Studies), On Ideology, London: Hutchinson.

93) Hammond,R.and McCullagh,P.S.(1983): Quantitative Techniques in Geography: An Introduction, Oxford: Clarendon Press.

94) Harvey,D.(1969): Explanation in Geography, London: Edward Arnold.

95) Harvey,D.(1984): The Limits to Capital, Oxford: Basil Blackwell.

96) Harvey,D.(1973): Social Justice and the City, London: Edward Arnold.

97) Held,D.(1980): Introduction to Critical Theory - Horkheimer to Habermas, London: Hutchinson.

98) Hinchcliffe,K.(1987): Higher Education in Sub-Saharan Africa, London: Croom Helm.

99) Hofmeyer,J. and Moulder,J.(1988): Towards Scenarios for South African Education: Trying to Find the Rules of the Game, South African Journal of Higher Education, 2, 9-13.

100) Holroyd,P.and Loveridge,D.J.(1978): Industry and Higher Education Alternatives, in Stephens,M.D. and Roderick,G.W.(eds), Higher Education Alternatives, London: Longman.

101) Hooker,C.(1976): Cultural Form, Social Institution, Physical System: Remarks Toward a Systematic Theory, in Mohtadi,M.F.(ed.). Man and his Environment, Vol.2. Proceedings of the Second International Banff Conference on Man and his Environment, Oxford: Pergamon press.

102) Huckle,J.(1983): Environmental Education, in Huckle,J.(ed.), Geographical Education - Reflection and Action, London: Oxford University Press.

103) Jain,R.K.,Urban,L.V. and Stacey,G.S.(1981): Environmental Impact Analysis - A New Dimension in Decision- making (2nd Edition), New York: Nostrand Reinhold.

104) Johnston,R.J.(1983): Philosophy and Human Geography, London: Edward Arnold.

105) Joll,J.(1979): Gramsci, Glasgow: Fontana/Collins.

106) Jungk,R.(1979): Politics and Technology, in Coates,K.(ed.), Socialism and the Environment, Nottingham: Spokesman.

107) Kallaway,P.(1984): An Introduction to the Study of Education for Blacks in South Africa, in Kallaway,P.(ed.), Apartheid and Education - The Education of Black South Africans, Johannesburg: Ravan.

108) Kgware,W.M.(1977): The Role of Black Universities in South Africa in Van der Merwe,H.W. and Welsh,D.(ed.): The Future of the University in South Africa, Cape Town: David Philip.

109) Kirkby,M.J. and Morgan,R.P.C.(1980): Soil Erosion, Chichester: John Wiley.

110) Knamiller,G.(1983): Environmental Education for Relevance in Developing countries, The Environmentalist, 3, 173-179.

111) Kolakowski,L.(1978): Main Currents of Marxism - Its Origin, Growth, and Dissolution. Vol.III - The Breakdown, Oxford, Clarendon Press.

112) Kolakowski,L.(1975): Neutrality and Academic Values, in Montefiore,A.(ed.), Neutrality and Impartiality - The University and Political Commitment, London: Cambridge University Press.

113) Landsberg,M.(1987): Export-led Industrialization in the Third World: Manufacturing Imperialism, in Peet,R.(ed.) International Capitalism and Industrial Restructuring - A Critical Analysis, London: Allen and Unwin.

114) Lash,S. and Urry,J.(1987): The End of Organized Capitalism, Oxford: Basil Blackwell.

115) Lee,N. and Wood,C.(1978): Environmental Impact Assessment of Projects in EEC countries, Journal of Environmental Management, 6, 57-71.

116) Lee,J.A.(1985): The Environment, Public Health and Human Ecology - Considerations of Economic Development, Baltimore: John Hopkins University Press.

117) Leff,H.L.(1978): Experience, Environment and Human Potentials, New York: Oxford University Press.

118) Maasdorp,G.(1988): The Southern African Co-ordination Conference, in Leistner,E. and Esterhuysen,P.(eds), South Africa in Southern Africa:Economic Interaction, Pretoria: Africa Institute of South Africa.

119) Mabogunje,A.L.(1980): The Development Process - A Spatial Perspective, London: Hutchinson.

120) Macun,I.and Myers,J.(1987): Health and Safety Organization: A Cape Perspective on Trends in State - Management Labour Relations, in Moss,G.and Obery,I.(eds.), South African Review 4, Johannesburg: Ravan Press.

121) Macun,I.(1988): Trade Union Organization and Health and Safety, South African Labour Bulletin, 13, 109-120.

122) Mandaza,I.(1987): Perspectives on Economic Cooperation with Autonomous Development in Southern Africa, in Amin,S.,Chitala,D.and Mandaza,I.(eds), SADCC - Prospects for Disengagement and Development in Southern Africa, New Jersey: United Nations University.

123) Manzer,R.(1984): Public Policy-Making as Practical Reasoning, Canadian Journal of Political Science, 17, 577-594.

124) Martin,G.C. and Turner,E.(eds.)(1972): Environmental Studies, Leicester, Blond educational.

125) Meadows,D.et,al.(1974): The Limits to Growth, London, Pan Books.

126) Mészáros,I.(1986): Philosophy, Ideology and Social Science - Essays in Negation and Affirmation, Brighton, Wheatsheaf.

127) Meyns,P.(1984): The Southern African Development Coordination Conference (SADCC) and Regional Cooperation in Southern Africa, in Mazzeo,D.(ed.), African Regional Organizations, Cambridge: Cambridge University Press.

128) Migliaro,L.R.and Misuraca,P.(1982): The Theory of Modern Bureaucracy, in Showstack Sassoon (ed.), Approaches to Gramsci, London: Writers and Readers.

129) Moll,T.(1988): `The Limits of the Possible': Macro-economic Policy and Income Redistribution in Latin America and South Africa, in Suckling,J. and White,L.(eds), After Apartheid - Renewal of the South African Economy, York: Centre for Southern African Studies.

130) Molobi,E.(1987): The University as White Elephant (Professors and the People), Frontline, 6, 27-28.

131) Morgan,R.P.(1979): Soil Erosion, London: Longman.

132) Moshoeshoe,II King.(1985): Alternative Strategies for Development - A Clarion Call! Foundation for Education with Production (ed.) Another Development for SADCC - Alternative Development Strategies for the SADCC Countries, Serowe: Printers Brigade.

133) Moss,R.P.(1988): The Integration of Teaching on Environmental Problems, in UNESCO and the International Association of Universities (1986), Universities and Environmental Education, Paris:

UNESCO.

134) Muller,J.(1987): People's Education and the National Education Crisis Committee, in Moss,G. and Obery,I.(eds.) South African Review 4, Johannesburg, Ravan Press.

135) Murray,P. and Wickham,J.(1985): Women Workers and Bureaucratic Control in Irish Electronic Factories, in Newby,H., Bujra,J., Littlewood,P., Rees,G. and Rees,T.L. (eds), Restructuring Capital - Recession and Reorganization in Industrial Society, Houndmills: Macmillan.

136) McCarthy,J.J.and Smit,D.P.(1981): The Political Economy of Urban land Use and Land Use Planning: Review of the Theory with Conclusions for South Africa, Social Dynamics, 7, 8-31.

137) McCarthy,J.J. and Smit,D.P.(1984): South African City: Theory in Analysis and Planning, Capetown, Juta.

138) MacIntyre, A.(1976): Marcuse, Glasgow: Fontana/Collins.

139) McNeil,K.(1978): Understanding Organizational Power: Building on the Weberian Legacy, Administrative Science Quarterly, 23, 65-90.

140) Nadel,M.V.(1975): The Hidden Dimension of Public Policy: Private, Governments and the Policy-making Process, The Journal of Politics,37, 2-34.

141) Nattrass,J.(1988): The South African Economy (Update Edition), Cape Town: Oxford University Press.

142) Ndlela,D.B.(1987): The Manufacturing Sector in the Eastern and Southern African Subregion, with Emphasis on SADCC, in Amin,S.,Chitala,D.and Mandaza,I.(eds), SADCC - Prospects for Disengagement and Development in Southern Africa, New Jersey, United Nations University.

143) Nerfin,M.(1985): The Essence of Another Development, Foundation for Education with Production (ed), Another Development for SADCC - Alternative Development Strategies for the SADCC Countries, Serowe, Printers Brigade.

144) Newman,P.(1981): The Dilemma of the Environmental Educator: Are We Really needed? Some answers and examples in the affirmative, Environmental Education and Information, 1984, 1, 109-122.

145) Nkomo,M.O.(1984): Student Culture and Activism in Black South African Universities - The Roots of Resistance, Conneticut: Greenwood Press.

146) Odum,H.T.(1978): Challenge of Environmental Education, in Bakshi,T.S.and Naveh,Z.(ed.) - Environmental Education - Principles, Methods and Applications, New York: Plenum Press.

147) Okut-Uma,R.and Wereko-Brobby,C.(1985): Environmental Education: The African Dimension, The Environmentalist, 5, 137-142.

148) O'Riordan,T.(1981): Environmentalism (2nd edition), London: Pion Limited.

149) O'Riordan,T.(1989): Contemporary Environmentalism, in Gregory,D.and Walford,R.(eds.): Horizons in Human Geography, Hampshire: Macmillan.

150) O'Sullivan,P.E.(1986): Environmental Science and Environmental Philosophy -Part 1:Environmental Science and Environmentalism, International Journal of Environmental Studies, 28, 97-107.

151) Peavy,H.S., Rowe,D.R. and Tchobanoglous,G.(1985): Environmental Engineering, New York: McGraw-Hill.

152) Pepper,D.(1985): Determinism, Idealism and the Politics of Environmentalism - A Viewpoint, International Journal of Environmental Studies, 26, 11-19.

153) Peters,B.G.(1981): The Problem of Bureaucratic Government, The Journal of Politics, 43, 56-82.

154) Redclift,M.(1984): Development and the Environmental Crisis - Red or Green Alternatives, London, Methuen.

155) Redclift,M.R.(1985): Marxism and the Environment: A View from the Periphery, Rees,G., Bujra,J.et.al (eds.), Political Action and Social Identity - Class, Locality and Ideology, Houndmills, Macmillan.

156) Rees,J.(1989): Natural Resources, Economy and Society, in Gregory,D. and Walford,R.(eds), Horizons in Human Geography, Houndmills: Macmillan.

157) Rees,J.(1985): Natural Resources - Allocation, Economics and Policy, London: Methuen.

158) Roberts,A.(1979): The Self-Managing Environment, London: Allison and Busey.

159) Robinson,P.(1981): Perspectives on the Sociology of Education, London: Routledge and Kegan Paul.

160) Rothenberg,D.(1987): A Platform of Deep Ecology, The Environmentalist, 7, 185-190.

161) Rudolph,L.I.and Rudolph,S.H.(1979): Authority and Power in Bureaucratic and Patrimonial Administration of Weber on Bureaucracy, World Politics, 31, 195-227.

162) Russell,D.D.(1983): Adult Education for Development, in Hunter,A.P., Ashley,M.J. and Miller,C.J.(eds), Education, Curriculum and Development, Capetown: Dept. of Education, University of Cape Town.

163) SACHED (Christie,P.)(1986): The Right to Learn: The Struggle for Education in South Africa, Johannesburg: Ravan Press.

164) Sandbach,F.(1980): Environment, Ideology and Policy, Oxford: Basil Blackwell.

165) Saveland,R.N.(1976) (ed.): Handbook of Environmmental Education with International Case Studies, London: John Wiley.

166) Sayer,A.(1984): Method in Social Science. A Realist Approach, London: Hutchinson.

167) Schwass,R.(1986): The University and the Concept of Environmental Education, in UNESCO and the International Association of Universities, Universities and Environmental Education, Paris: UNESCO.

168) Scott, D.(1986): Time, Structuration and the Potential for South African Historical Geography, South African Geographical Journal, 68, 45-66.

169) Scott,D.(1988): Environmental Ethics: The Philosophical Foundations of Contemporary Attitudes Towards the Environment, Paper - presented at Natal Parks Board, Umfolozi Game Reserve, Aug.2-3, 1988.

170) Scott,D.and Diab,R.D.(1989): Inanda Dam: A Case-study of the Social Impacts of Infrastructural Development in the South African Context, International Journal of Environmental Studies, 34, 43-55.

171) Sekhonyana,E.R.(1985): Another Development for SADCC, in Foundation for Education with Production (ed), Another Development for SADCC - Alternative Development Strategies for the SADCC Countries, Serowe, Printers Brigade.

172) Shapiro,J.(1981): Education in a Capitalist Society: How Ideology Functions, Perspectives in Education, 5, 99-117.

173) Shipman,M.D.(1975): The Sociology of the School, London: Longman.

174) Short,J.R.(1982): An Introduction to Political Geography, London: Routledge and Kegan Paul.

175) Short,J.R.(1985): Human Geography and Marxism, in Baranski,Z.G.and Short,J.R.(eds.), Developing Contemporary Marxism, London: Macmillan.

176) Showstack Sassoon,A.(1980): Gramsci's Politics, London: Croom Helm.

177) Siegel,S.(1956): Nonparametric Statistics for the Behavioral Sciences, Auckland: McGraw-Hill.

178) Skillern,T.(1985): Discourse Fever. Post-Marxist Modes of Production, in Edgley,R. and Osborne,R.(eds.), Radical Philosophy Reader, London: Verso.

179) Smith,H.L.(1979): Distributive Justice and American Health Care, in Finnin,W.M. and Smith,G.A.(eds.), The Morality of Scarcity - Limited Resources and Social Policy, Baton Rouge: Louisiana State University Press.

180) Smith,H.W.(1975): Strategies of Social Research - The Methodological Imagination, Englewood Cliffs: Prentice-Hall.

181) Spangler,M.B.(1985): Heuristic Opinion and Preference Evaluation Research for Assessing Technological Options - A User's View, in Covello,V.T.et.al.(eds.): Environmental Impact Assessment, Technology Assessment, and Risk Analysis, Berlin: Springer-Verlag.

182) SPSS/PC Manual (1984): Ch.18. Loglinear Analysis: Procedure Hiloglinear, SSPS/PC Manual, New York: McGraw-Hill.

183) Sykes,J.B.(1976): The Concise Oxford Dictionary, 6th edition, Oxford: Oxford University Press.

184) Taylor,R.H.and Richards,C.M.(1986): An Introduction to Curriculum Studies, Berkshire: NFER-Nelson.

185) Therborn,G.(1980): The Ideology of Power and the Power of Ideology, London: Verso Editions.

186) Thompson,L.(1977): Some Problems of Southern African Universities, in Van Der Merwe,H.W. and Welsh,D.(eds): The Future of the University in Southern Africa, Cape Town: David Philip.

187) Tostensen,A.(1982): Dependence and Collective Self-Reliance in Southern Africa - The Case of the Southern African Development Coordination Conference (SADCC), Research Report No.62, Uppsala: Scandanavian Institute of African Studies.

188) Totemeyer, G.K.H.(1987): The University and Africa: The University and its Role in Underdeveloped society, South African Journal of Higher Education, 1, 53-59.

189) University of Natal Planning Committee (1989): The Role in Society of the University of Natal - 1989 Onwards, Durban: University of Natal.

190) Tyler Miller,G.(1979): Living in the Environment, 2nd.ed., Belmont: Wadsworth.

191) Van der Ploeg,S.(1976): Ecology and Economics: Synthesis or Antithesis? in Nijkamp,P.(ed.), Environmental Economics, Vol.1 - Theories, Leiden: Martinus Nijhoff Social Sciences Division.

192) Webster,E.(1985): Competing Paradigms: Towards a Critical Sociology in Southern Africa, Social Dynamics, 11, 44-48.

193) Weisskopf, T.E.(1978): Imperialism and the Economic Development of the Third World, in Edwards,R.C.,Reich,M.and Weisskopf,T.E.(eds.), The Capitalist System, Englewood Cliffs: Prentice-Hall.

194) Wigston,D.L.(1977): Problems of Subject Integration in Environmental Science in Hughes-Evans,D.(ed.), Environmental Education - Key Issues of the Future, Oxford: Pergamon Press.

195) Wulfson,T.(1987): Can Environmentalism Make Political, Economic Inspired Planning Theory More Substantial? Isizwe, Journal of the Students Geographical Society, University of Natal, Durban, 9, 28-37.

196) Zeigler,H.and Peak,W.(1974): The Political Functions of the Educational System, in Cave,W.M.and Chesler,M.A.(eds.): Sociology of Education: An Anthology of Issues and Problems, New York: Macmillan.

197) Newspapers:

a) Bruggemans,C. The Rex Column, Business Times (Sunday Times) - 10/5/87.

b) Mercury Reporter. A School that is also a Way of Life Natal Mercury - 4/7/87.

c) Prof.Moodley,K. Teachers Could Fight for Change, Natal Mercury - 18/6/87.

d) New Nation Reporter. ANC's Constitutional Guidelines, New Nation - 18-24/8/89, 6-7.

e) Pottinger,B. Poverty - Wanted: A Solution to Defusing the Time-Bomb ticking away in SA..., Sunday Times - 29/1/89, 11.

f) Conyngham,J.and Mc Gibbon,C. Don't Kill the Country, Sunday Tribune - 1/10/89, 20-21.

g) Koch,E. The ANC puts its policy on ecology, Weekly Mail, 1-7/12/89, 10.

198) University Calendars:

a) University of Natal (Durban and Pietermaritzburg).

b) University of Durban-Westville.

c) University of Fort Hare.

d) University of Zululand.

e) University of the Western Cape.

f) University of Pretoria.