TOWARDS AN ENVIRONMENTAL EDUCATION PROGRAMME FOR THE TRAINING OF PRIMARY SCHOOL TEACHERS

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ABSTRACT

This study involved the design, implementation and evaluation of an Environmental Education programme intended for teacher training. The programme was implemented over a twelve week period with a group of nineteen final year students at the Johannesburg College of Education. The programme has two main aims:

1) the development of environmental literacy in students;
2) the equipping of students to develop environmental literacy in their pupils.

The evaluation of the programme involved the collecting of weekly diaries kept by students and the analysis of these by means of a phenomenologically based method. The aim of this analysis was to allow for the derivation of a set of principles which would represent a contribution in the research field and also be useful in the further refinement of the programme.

The principles which emerged from the analysis were grouped within two categories, namely, the process by which environmental literacy develops, and methodologies which promote that process. The use of learner-centred, active and experiential learning situations were found to be of great importance in the development of environmental literacy. Other important principles which emerged are, for example, the 'insecurity-event-fulfillment' cycle; values education, particularly when this involves the concept of 'shock'; the existence of authentic and sincere relationships among all members of the group, including the educator; the focus on personally relevant information and the use of exercises which encourage close attention to a place and hence the development of a personal involvement with it.

New insights were gained inter alia into the development of personal and professional confidence and into aspects of in-service teacher training. An important contribution of the study is the application of the phenomenological method of analysis, since it allows an understanding of subjective experience, as far as can be ascertained, not yet achieved in Environmental Education.

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CHAPTER 1 : INTRODUCTION AND PHILOSOPHICAL PERSPECTIVE

The motivation for this study arose from a personal awareness of the natural environment, the pressures on it and the resultant loss of environmental quality. However, teaching and research experience in this area showed that the solution to the problem of environmental degradation lies, not in a focus on the natural environment per se, although a knowledge of this is obviously vital, but on people; their perceptions, attitudes, values and behaviour in relation to their environment.

Gomm (1978, p63) says that he is "particularly concerned that environmental education should give proper attention to the fact that 'environmental problems' are the outcome of social processes,...a consequence of political and economic decision making". Environmental literacy is seen as an important part of the solution to such problems, and Environmental Education is believed to be an appropriate approach to the development of environmental literacy. By providing effective Environmental Education for teachers, the multiplier effect can be enormous.

The literature shows that good Environmental Education is imperative if environmental degradation is to be dealt with effectively. (Burton, 1975; Carson, 1978; Hurry, 1982 and Terry, 1971). Hurry (1982), in a study of four Bachelor of Primary Education courses in the Transvaal, showed that Environmental Education was poorly represented or was not catered for at all. In other words, at the teacher training level, Environmental Education was virtually non-existent.

In addition to the above shortcomings, Hurry's (1982) work shows that Environmental Education at the tertiary level tends to be content-based, does not deal with values conflicts or the ethical and moral components of issues, and does not incorporate a methodological component which is consonant with the requirements of an Environmental Education approach to teaching. There thus appears to be a need to expand work being done in the area of teacher training, particularly in South Africa, and for this reason this study attempts to develop Environmental Education principles suitable for the training of primary school teachers.

1.1 AIMS OF THIS STUDY

Since teacher training in Environmental Education has been identified as an important research area, this study aims to make a contribution by:

1) developing an Environmental Education programme for the training of primary school teachers;
2) evaluating the programme; and
3) deriving a set of principles which can be employed in the refinement of the programme and also be used by other environmental educators.

It should be noted that the programme referred to above has a set of aims which are presented in Chapter 4. The aims of this study and the programme aims are not the same and should not be confused.

1.2 PHILOSOPHICAL PERSPECTIVE

The philosophical point of departure of this study results from a feeling of unease about the results of an uncritical acceptance of the dominant, western, technocentric worldview. Human progress has been characterised by an increasing use of technology to control and exploit nature and people. "It shows two lines of development: people's changing relations to each other, to society, and their changing relations to the natural environment" (Huckle, 1985, p4). It must be noted, however, that technology itself is neither good nor bad: it is a product of human endeavour and is a human construct of reality. It is legitimate and valuable within a context of wise control.

The growth of science and technology are rooted in philosophical developments of the seventeenth century: new ways of thinking that produced a revolutionary change in the economic and social history of the world. It was realised that society had the ability to solve its own problems, and that people could rely on technological developments to bring about a better and more comfortable world.

> "In the search for scientific truth, man came across knowledge that he could use for the domination of nature" (Fromm, 1968, p2).

The Baconian creed, that scientific and technological knowledge afford power and control over nature resulted, particularly in the twentieth century, in a 'technicist' mind-set. Technicism can be defined as:

> "a method of legitimation reflecting a particular kind of world view comprising unconsciously taken for granted assumptions" (Stanley, 1978, p9).

These assumptions have led to a situation which, according to Schumacher (1973), is characterised by three simultaneous crises. First is the human revolt against inhuman patterns and practices; secondly, the living environment which supports human life shows signs of partial breakdown; and, thirdly, inroads are being made into the world's non-renewable resources. The latter two relate to what is commonly referred to as the 'environmental crisis', and there is little reason to doubt that they are real and serious.

Fromm (1968) and Barbour (1980) point out other characteristics of the 'crisis'. "In the one-sided emphasis on technique and material consumption, man lost touch with himself, with life" (Fromm, 1968, p2). "When the technological mentality is dominant, people are viewed and treated like objects" (Barbour, 1980, p43). Authentic relationships between people, where r⊤le-playing is unnecessary and where unconditional acceptance of others exists, are lost when people are objectified. A blind faith in modern technology as the solution to the problems of existence is perceived as being antithetical to humanistic values. The result of technicism is, therefore, an uncritical acceptance of an environmentally destructive and dehumanising life situation. This 'uncritical acceptance' is at the nub of the philosophical conflict between 'technicists' and 'humanists'.

The concern of many humanists is to break the hold of technicism. This concern focuses on western society's seemingly deli-

berate state of mental unawareness. It is largely the humanists rooted in an existentialist tradition who have pointed out the dangers of a runaway technology:

> "Existentialism has traditionally been a form of reaction against the submergence of the individual in a system; philosophical, religious, political, technological. It is still, in part, a philosophy of revolt" (Bowers, 1965, p223).

Greene (1973) speaks of 'wide-awakeness' as a counter condition to the blind acceptance of the status quo. Bowers (1965) refers to this modern day syndrome as 'alienation', which is "when we live without knowing why, and when we try to avoid present realities by living for the future or in the past" (ibid, p225).

Alienation results in a failure to discover what the individual values and believes in. Conformity is the logical solution to this lack of authenticity, and with conformity comes an inability to question what is wrong, or in fact even to know with any degree of certainty what is right. For the existentialist, an important step towards creating an awareness of the problems of modern western life is to place the problem of alienation and the challenge and responsibility of using one's freedom at the centre of educational experiences. In other words,

> "The goal is to help individuals achieve their chosen ends, and know how to act on them. It is not whether an individual belongs to a group or not, but whether his actions and ends are his own, authentically chosen and acted upon" (Ozmon and Craver, 1976, p178).

The concept of authentic choice mentioned above is significant because, in choosing, individuals assert themselves; make themselves subjects in the world rather than objects; actors rather than objects being acted upon. This relates to the concept of locus of control: individuals as objects are powerless, individuals as subjects know that they are significant elements in the world and will be committed to acting authentically, in line with the values that they have chosen for themselves.

This authenticity is important for the environmental educator because:

> "the purpose of education, as seen from the existentialist point of view, is to enable the individual to understand his own culture so thoroughly he is no longer swayed unconsciously by its premises" (Bowers, 1965, p226).

The above does not imply a situation of anarchy and individualistic absolutism. With freedom to choose comes an expectation of responsibility. In this sense, existentialism can be seen as one of the most humane of philosophies. People are granted respect simply by virtue of their existence. They do not have to earn respect, and all people are accorded the same recognition. In other words each individual has the responsibility, in choosing, to consider others in his or her deliberations.

For the environmental educator the elements of culture that are crucial are those relating to environmental degradation. What the individual needs are the skills to act as subject to improve the quality of life rather than accept modern technological mores unquestioningly.

The above philosophical perspective informs two major aspects of this study. The programme itself is intended to allow students to develop self-realisation and an awareness of themselves in relation to the world. Secondly, the method by which the programme is evaluated is philosophically consonant with the programme and is sensitive to the nature of the study.

A further perspective which influences the study emerges from the fact that the study and the programme being developed, implemented and evaluated by it are part of the South African reality. By virtue of the fact that it is placed within the context of a racially delineated education structure, the study may be accused of implicitly supporting such a structure.

That such racially based education structures exist at all is deplored and the above-mentioned racial context is not intended to signal a blind acceptance of the status quo. What will emerge

in the post-Apartheid South Africa is difficult to predict, but it is expected that students who have been exposed to the methodological and philosophical stance adopted in this study should be able to question the status quo, or stand aside from it, and thus be able to apply their understanding of Environmental Education in a non-racial society.

This chapter has introduced the need for this study and the perspective adopted by the researcher. Chapter 2 deals with Environmental Education by exploring definitions and discussing various implications of these definitions for the study. It then presents principles and guidelines which are applicable to the designing of Environmental Education programmes for teacher training.

CHAPTER2: ENVIRONMENTAL EDUCATION AND TEACHER TRAINING: DEFINITIONS AND GUIDING PRINCIPLES

2.1 DEFINITIONS

Environmental Education is a relative newcomer in Education and Conservation circles and despite a number of attempts by various authors and international meetings, it has not yet been adequately defined (Irwin, 1981). Definitions that exist come mainly from the United States of America and Europe. Some definitions tend to be supported by conservationists, who emphasise the wise use of natural resources for the benefit of humankind. Others are supported by educationists, who tend to view the environment as an extension of the classroom, that is, the environment is there for the benefit of the educational process (ibid).

A considerable variety of interpretations of the word 'environment' exists. Irwin (1981) shows how early emphasis on the natural component of the environment has changed under the influence of authors such as Carson (1977, 1978, 1980), Martin (1973, 1975) and Wheeler (1975) so that the word now implies the "total complex of inter-relationships making up the physical, biological and social surroundings" (Irwin, 1981, p7). It is clear that the environment must be understood to include both its human and natural components as an inextricable whole. In cases where environmental educators pay lip-service to the human environment it is in fact conservation education (as in nature conservation) that is being practised.

Opinion about the nature of Environmental Education can be understood in terms of the continuum of world views held by different individuals or societies. On the conservative side one tends to find an emphasis on the natural elements of the environment, and a focus on the 'Spaceship Earth' metaphor. This viewpoint sees nature and its conservation as the prime purpose of Environmental Education and man as a negative force in the world.

An opposing view, which tends to be held by socialists and which is frequently encountered in a 'Third World' context (Chiappo, 1980 and O'Riordan, 1981) is based on the belief "that the whole

'capitalist' way of life is not conducive to environmental quality" (Withrington, 1977, p39). An important aspect of such Environmental Education programmes is the concept of public participation and the need for change in society. In this sense, Environmental Education is seen as a means of achieving a politically literate citizenry.

There is, in fact, such a wide range of definitions of Environmental Education that it is difficult and probably unwise to attempt to produce one all-encompassing definition. There are, however, two definitions which have come to be accepted fairly widely. The first is contained in the United States Environmental Policy Act of 1977 which reads as follows:

> "Environmental Education is an integrated process which deals 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 urban and rural planning to the total human environment. Environmental Education is a study of the factors influencing ecosystems, mental and physical health, living and working conditions, decaying cities and population pressures. Environmental Education is intended to promote amongst citizens the awareness and understanding of the environment, our relationship to it and the concern and responsible action necessary to assure our survival and to improve our quality of life" (cited in Hurry, 1982, pp 38-9).

The most commonly used and most widely accepted definition of Environmental Education is that of the International Union for the Conservation of Nature and Natural Resources (IUCN). It reads as follows:

> "Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of

behaviour about issues concerning environmental quality" (IUCN, 1971).

Harvey's (1976) conceptualisation of Environmental Education, here referred to as 'people-environment relationship education', although it does not enjoy wide circulation, is seen as a very useful contribution. It reads as follows:

> "People-environment relationship education is the process of developing an environmentally literate, competent, and dedicated citizenry which actively strives to resolve values conflicts in the people-environment relationship, in a manner which is ecologically and humanistically sound, in order to reach the superordinate goal of a homeostasis between quality of life and quality of environment" (op cit, p68).

Each of the above definitions views Environmental Education as a process. In other words, Environmental Education should make a life-long contribution to people's educational development. While this is not disputed, a problem associated with this emphasis on process is that it provides insufficient assistance to the prospective teacher in translating training into the classroom situation. It does not provide a methodology. Thus it is felt that, for teacher training, Environmental Education must also be presented as an approach. That is, Environmental Education is not a distinct school subject, but an approach to teaching any subject.

The IUCN definition (op cit) refers to the recognition of values and the clarification of concepts. This implies the use of values education in the 'process', and is a widely supported belief. Harvey (1976) takes this aspect a step further when he suggests that the resolution of values conflicts should not be left as a subjective process of values clarification but be brought out of the classroom into the 'people-environment relationship'.

Harvey, in his use of the words 'actively strives' calls for an active role to be played in the resolution of values conflicts. This aspect is, surprisingly, almost entirely lacking from the IUCN definition. Where the latter definition is strong on the personal aspects of awareness, understanding and appreciation,

and practice in decision-making, it makes little attempt to encourage a participatory ethic except for encouraging the "self-formulation of a code of behaviour" (IUCN, op cit). Harvey (1976), on the other hand, makes provision for action strategies for resolving conflicts in the people-environment relationship.

This theme, which is taken up by other Environmental Education theorists (Hungerford and Peyton, 1976; Sia, Hungerford, and Tomera, 1986; and UNESCO-UNEP, 1976) is regarded as an important part of Environmental Education.

Another important concept raised in the above definitions is inter-relatedness. This is a basic and central concept in Ecology, where man is seen to be part of the entire web of life on Earth. The IUCN definition goes beyond this essentially biological level, however, because it includes man's culture. This is strong justification for studying the built environment in a way that includes such themes as the perception of space, the aesthetic qualities of various parts of the built environment, and the processes of city management.

Harvey's definition (1976, p68) approaches the essence of Environmental Education in the phrases "in a manner which is ecologically and humanistically sound" and "homeostasis between quality of life and quality of environment". These two phrases maintain a fine balance among all the aspects of life on Earth without requiring a return to the pre-technological era or a denial of the benefits of what technology has brought. Accordingly there is an implied acknowledgement of humankind's privileged position in the world and a charge to maintain the quality of all life.

As the above discussion of selected definitions reveals, Environmental Education goes beyond educating <u>about</u> the environment, as in Environmental Studies, or even <u>for</u> the environment, but focuses on the individual and the development of the individual towards becoming a better human being or 'Earth citizen'. The IUCN's (1971) "self-formulation of a code of behaviour" implies the development of an environmental ethic which should result in positive action in response to environmental issues. This is, ultimately, the major focus of Environmental Education.

It is clear from the above that an understanding of attitudes and values and the ways in which they develop and can be incorporated into Environmental Education are of great importance. Equally important is an understanding of the links between attitudes, values and behaviour, as is an ability to influence these links.

While the above definitions and related discussion raise significant issues, the practical means of achieving the desired goals of Environmental Education are not dealt with. Hurry (1982) provides a valuable synthesis of principles drawn from Environmental Education, Education generally and from the area of teacher training, which are useful in bringing together the issues dealt with above and related methodological principles. Hurry's (1982) work makes a major contribution to this study as it forms a basis for the development of the programme described in Chapter 4.

2.2 A MODEL FOR TEACHER TRAINING IN ENVIRONMENTAL EDUCATION

Much that is relevant to teacher training in Environmental Education in South Africa is contained in the work of Hurry (1982). Of particular significance is his two-part model of teacher training. This model is a synthesis of a wide range of principles and can be used as a framework for structuring an Environmental Education programme for teacher training.

The model consists of eighteen key elements which are divided into two groups, namely the 'learning-and-responding' process in which environmental literacy is developed in student teachers and the 'teacher-training' process in which student teachers are shown how to teach Environmental Education. The eight elements of the learning-and-responding process are as follows:

"1. Environmental Literacy should be a basic aim of the programme;

2. There should be a co-ordinator for Environmental Education (Eeco-teacher);
3. Learners should be exposed to holistic teaching;

4. The programme should provide basic information on the total human environment, with special emphasis on bio-physical elements;

5. Learners should be trained in fieldwork and/or practical work techniques;

6. The programme should deal with values education;

7. The programme should develop problem-solving abilities in the learners;

8. The programme should involve the learners in local issues as an exercise in problem-solving" (ibid, p94).

The next ten key elements, which Hurry (1982) suggests belong to the teacher-training process, are:

"1. Training with regard to holistic subject teaching, including training with regard to integrated studies (theme teaching);

2. Training in the planning and management of field-work and/or practical work, particularly with regard to the local environment, which includes the development and testing of materials;

3. Training in the management of the learning milieu, with special reference to:

motivation
discussions
intra-group processes

4. Training in the setting of objectives and, most important, in achieving these objectives;

5. Training with regard to values education;

6. Training with regard to problem/conflict solving;

7. Teaching experience specifically related to Environmental Education;

8. The training programme developed against the background needs and aspirations of the community in which the teacher will be teaching;

9. The familiarisation of student teachers with curriculum design and adaptation;

10. The continuous evaluation of the programme and updating when necessary in terms of the needs of the community at large" (ibid, p124-5).

It should be noted that Hurry places environmental literacy as the first of eighteen elements. This is significant as it suggests that the development of environmental literacy is of great consequence.

A number of issues raised by Hurry's model are discussed below:

First, it is noted that Hurry acknowledges the importance of the "total human environment" in Environmental Education (ibid, p94) and that the context provided by his work does not differ materially from Gomm's (1978, p63) statement that he is:

> "particularly concerned that environmental education should give proper attention to the fact that 'environmental problems' are the outcome of social processes ... a consequence of political and economic decision making".

Nevertheless, the statement reveals a view which, it is felt, should have wider currency. Without this breadth of vision in Environmental Education, 'solutions' will remain partial or superficial. The deeper contexts of the processes being dealt with are unlikely to be exposed, and a critical awareness of socio-political issues will probably not develop.

Another issue, which is regarded as being of some importance in a model for teacher training, is the development of professional

confidence and autonomy in student teachers in order to ensure the transfer of training into the school situation. While some of the points listed above address this issue implicitly, Hurry's model does not deal specifically with it.

Denscombe (1982) suggests that classroom control and privacy represent a hidden pedagogy which overrides whatever influence training may have. Huling and Hall (1982) identify a number of institutional forces which tend to resist change and maintain the status quo. Ballantyne (1987) reports a similar phenomenon, in that factors such as the nature of the teacher-pupil interaction, availability of equipment, dependence on textbooks and the existence of examinations, particularly in the matriculation year, all have a strong influence on probationary teachers. The tendency under these pressures is towards teacher-centred education practices.

A strategy aimed at overcoming the problems associated with the transfer of training into practice needs to be implemented on a much wider scale than that of a single Environmental Education programme (Ballantyne, 1987). Nevertheless, such a strategy should form an explicit part, however limited, of a model such as Hurry's. In this way, a person using such work to design an Environmental Education programme for teacher training will be assisted in the development of student confidence and thus enable them to resist some of the pressures referred to above.

The issue of teaching experience is raised by point seven of Hurry's (1982) teacher-training process. While it is acknowledged that many curriculum innovations require initial vigorous support before they become generally accepted, provision for teaching experience specifically related to Environmental Education should not have to be made. Just as is the case with basic skills such as numeracy, literacy and graphicacy, so too should Environmental Education be regarded as a basic component of the curriculum.

Points nine and ten of Hurry's (1982) teacher-training process relate directly to this study, since it is a form of curriculum development. These two points are supported by an approach to curriculum development commonly referred to as process-based

research (McCormick and James, 1983; Parlett, 1975; Stenhouse, 1975, 1983). This approach is based on the principle that prescriptive or a priori syllabus or curriculum design is not acceptable and that an on-going evaluation of any curriculum innovation must take place so that improvements can be fed back into the development process. The implications of this approach for this study are that the programme cannot be seen as the final product and also that the study is (or ought to be) merely the first of a number of iterations of the present research procedure, hence the title **"Towards an Environmental Education Programme..."**

Finally, as the following statement suggests:

> "The approach to Environmental Education is via all college subjects, with particular emphasis on the so-called 'content' subjects such as History, Geography and Biology" (Hurry, p90),

the intention is for Hurry's model to be applied generally in a teacher training college. However, in emphasising particular subjects, Hurry limits the scope of Environmental Education. It is not only the 'environmental' components of the so-called 'content' subjects that can contribute to Environmental Education. All subjects, in their own right, are important. Student teachers must be shown that to implement an Environmental Education approach in their classrooms does not require a section of the syllabus which deals directly or specifically with the 'environment'. Rather, any lesson, topic or theme can be made to go beyond what is obvious in the syllabus, particularly in terms of its content, into the areas of values, attitudes, the affect, morals or ethics.

Clacherty (1986) illustrates this point by showing that English as an Arts discipline can be used to create a depth of environmental awareness without manipulating the discipline by making, for example, a poetry lesson 'environmental'. The Arts must stand on their own and be allowed to remain true to their own form and content. As a result, the educational experience will be more holistic and effective.

While the above argument applies fully to College of Education curricula, Hurry's belief that a more formal input in Environmental Education is necessary is acknowledged. Such an input will allow for the presentation of material which is unique to Environmental Education, such as its philosophy, scope, definitions and educational principles. Although it should not be required, a formal input will supplement students' experiences in other parts of the curriculum:

> "it may be necessary to introduce a special course in Environmental Education to supplement the work done by all college departments in developing Environmental Literacy in the student teachers" (ibid, p91).

2.3 FURTHER GUIDING PRINCIPLES

Hurry's model is seen as the major contribution to this study in the development of a programme for teacher training in Environmental Education. Although Hurry's work is a synthesis of much that is relevant in this research field, two further contributions are included here, since their influence on the development of an Environmental Education programme is believed to be of significant value.

2.3.1 THE ARCHETYPAL EXPERIENCE

Raimondo's (1985) work makes a noteworthy contribution to Environmental Education. In his analysis of the Wilderness Leadership School, Raimondo investigates perceptions of a guided wilderness trail. One of the aspects put forward as being significant in the creation of a successful wilderness experience, which would then be significant in the development of environmental literacy, is the inclusion of 'archetypal' situations. These are experiences such as "sitting around a camp fire, being alone in a wilderness area, crossing a dangerous river, or facing wild animals" (ibid, p74) as well as, for example, climbing a mountain; swimming in a (cold) mountain stream and hiking in a 'wilderness' setting.

Such experiences should be built into those parts of Environmental Education programmes which take students into natural or 'wilderness' areas. These sorts of experiences are seen as one of the most effective ways of stimulating the development of environmental literacy and much time can be devoted to them during such excursions.

2.3.2 THE PROBLEM-SOLVING APPROACH

The problem-solving approach, finds its more recent philosophical roots in the pragmatism of Dewey. Dewey (1910) sees the 'scientific method' and the process of scientific thinking as central to his method of education. He was interested primarily in real-life problems and in dealing with 'problematic situations' of a real, not an artificial nature. Individuals, in order to solve a problem, need to apprehend the elements of the problem through their senses. Such apprehensions need to be ordered through a process of hypothesis testing. The Deweyan teacher poses or defines problems, he transforms indeterminate situations into problematic ones.

Since the scientific method is central to Dewey's concept of learning, the world of the learner is a world of objective meanings, the experience of which allows the learner to reconstruct his understandings of that world. The problem-solving approach is a major tenet of modern Environmental Education, since it enables learners to engage their minds with an environmental issue. As such the approach is seen as an 'active learning' method. Such an approach is, therefore, valuable for an Environmental Education teacher training programme, as students, apart from their own experience of the approach, can thereby learn to engage the minds of their pupils actively through the posing of 'problematic situations'.

2.4 CONCLUSION

This chapter introduced Environmental Education through a discussion of its major definitions. It then dealt with a model for teacher training in Environmental Education. This model, contributed to the field by Hurry (1982), and two other guiding principles, namely, the use of archetypal experiences (Raimondo, 1985) and the problem-solving approach to learning (Dewey, 1910) are useful for the development of an Environmental Education programme for the training of primary school teachers.

A major theme which is discernible in Hurry's (1982) work and which, as he points out, is present in much of the Environmental Education literature, is the importance of environmental literacy. Hurry makes it clear that the development of environmental literacy is paramount in the design of Environmental Education programmes. His 'learning-and-responding' process is specifically intended to bring about the development of environmental literacy in student teachers. Moreover, as was noted earlier, its first element states that:

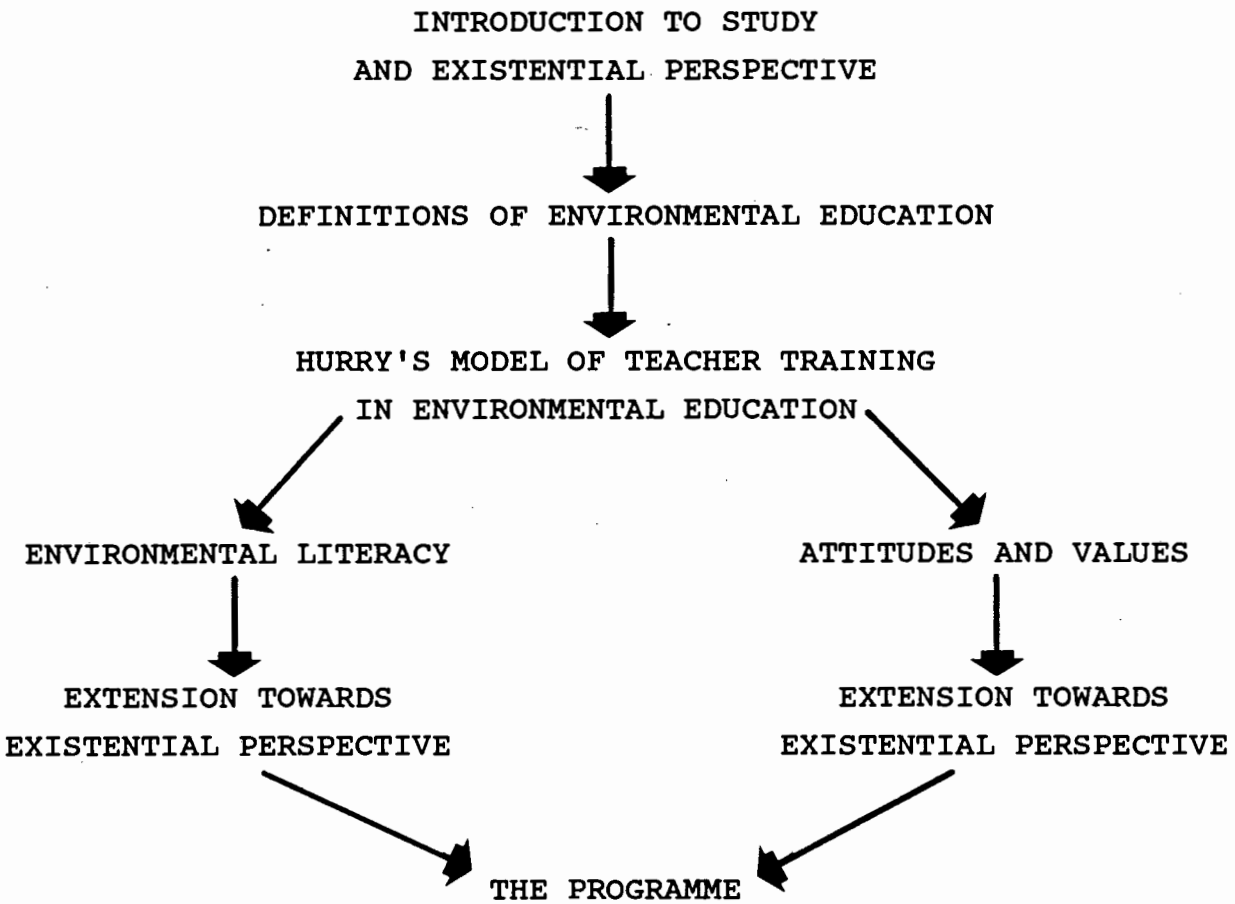
> "1. Environmental Literacy should be a basic aim of the programme" (ibid, p 94).

From this and the discussion of definitions it is clear that the concept 'environmental literacy' is central in Environmental Education. The other central concept area identified in this chapter is that of attitudes and values and their links with behaviour. The next chapter deals with these two concept areas and extends each of them towards the existential perspective discussed previously.

CHAPTER 3: CORE CONCEPTS: ENVIRONMENTAL LITERACY, VALUES, ATTITUDES AND VALUES EDUCATION

In the previous chapter two concept areas which are central to Environmental Education were isolated. These are environmental literacy, which should be a basic aim of all Environmental Education programmes and, implicit in the achievement of environmental literacy, the development of positive environmental attitudes, values and behaviour. This chapter deals with these concept areas in turn, and extends each of them towards the existential perspective introduced in the first chapter. They are distinct, albeit interrelated to a certain extent, and in this study can be seen to converge towards or culminate in the development of a single Environmental Education programme for the training of primary school teachers. Figure 1 provides a visual representation of the above.

FIGURE 1:



3.1 ENVIRONMENTAL LITERACY

As has been demonstrated, Hurry (1982) suggests that environmental literacy is a central concept in Environmental Education. Harvey (1976) sees environmental literacy as the first of a set of three expected outcomes of Environmental Education. These outcomes are sequential; the ultimate goal of Environmental Education is to achieve the third outcome. Harvey defines the three outcomes as follows (ibid, p67):

1) "Environmentally literate person--one who possesses basic skills, understandings, and feelings for the man-environment relationship.

2) Environmentally competent person--one who is environmentally literate, and in addition, has the ability to apply, analyze, synthesize, and evaluate knowledge; has the skills necessary for implementation; and has values consistent with the man-environment relationship superordinate goal.

3) Environmentally dedicated person--one who is environmentally literate and environmentally competent in the affective domain, and in addition, is characterized by a values system in which one acts consistently in a manner compatible with a homeostasis between quality of life and quality of environment. The environmentally dedicated person is inferred to be able to operate at the highest levels of the psychomotor and cognitive domain as well as the affective".

The above use of the term 'environmental literacy' is fairly limited, and has, since 1976, been redefined by a number of authors, as outlined by Hurry (1982). Thus the term has come to be used in a much wider sense as is obvious from the following:

"A person who is Environmentally Literate:

- is aware of the natural and man-made environment of which he is part, and ... sees his places of work, residence and recreation as part of the fabric of his own ecosystem. He sees himself as a living part of, and

interacting with, his ecosystem;

- is aware of the natural resources upon which he is directly or indirectly dependent, and that he has some understanding of finite and renewable resources;

- has a conviction of his individual responsibility for the health of the land, where health is the capacity of the land for self-renewal;

- has been stimulated into positive environmental action in his daily life. He is committed to caring for his environment and its resources, in no matter how small a manner;

- is concerned with developing or maintaining a quality of life which is not only acceptable to the majority, but which is also in harmony with the capabilities of the environment" (Hurry, 1982, p44).

The above extended definition is a valuable contribution to understanding what it is environmental educators are attempting to produce in their students. The rest of this section extends the concept of environmental literacy towards the philosophical perspective introduced in Chapter 1. It is represented on the left hand side of Figure 1 as "Extension Towards Existential Perspective".

Paulo Freire (1972a, 1972b) discusses the concept of literacy and extends the meaning of the term beyond Hurry's use of it in environmental literacy. For Freire, literacy does not involve the acquisition only of the mechanical skills and techniques of reading and writing. His approach to literacy starts at the point of skills, but the learning process is designed to lead the person to a much wider understanding of his life situation and hence to a desire and ability to transform it. Literacy is a life-long journey for which there is no final destination. It is a "means by which we comprehend, unravel and transform the reality in which we find ourselves" (Mackie, 1980, p2).

Freire believes that it is through the process of conscientisation that a person achieves literacy. Conscientisation is not just the creation of awareness (consciousness). It involves both the achievement of a critical understanding of one's world and an ability and commitment to act on it rather than to be acted upon by it. Through conscientisation:

> "individuals acquire a deeper awareness of the social and cultural order which shapes their lives and also perceive their own capacity to transform it" (Open University Press, 1977, p83).

Gleeson (1974) describes a conscientised person as one who will be able to act critically towards himself and society, while Giroux (1981, p135) defines the true nature of conscientisation as:

> "learning through reflection and action to overcome the social, economic and political contradictions of an oppressive reality".

While Freire worked mostly in a Third World context, his ideas have been applied to a First World situation. His response to a visit to the United States of America is most significant:

> "This is one of the most alienated of all countries. People know they are exploited and dominated, but they feel incapable of breaking down the dehumanized wall" (cited in Giroux, 1981, p136).

Giroux (ibid) asserts that the alienation, exploitation and domination referred to by Freire are an inescapable fact, but that they do not form part of the subjective perceptions of the American people: it is the very existence of the problem that has still to be recognised by most Americans. This lack of awareness is perhaps the most serious societal problem yet to face the Western World.

The significance of this to the environmental educator is the allegation that the values and assumptions dominant in society

are accepted uncritically. It is important, therefore, to attempt to counter this alienation from self, others and the world. For the existential educator an initial step is to encourage a caring and accepting relationship between educator and student, for this lies at the heart of an existential pedagogy. Freire (1972a, p62-3), in discussing the concept of dialogue in education, says:

> "Dialogue cannot exist without humility. How can I enter into a dialogue if I always project ignorance onto others and never perceive my own?". Freire goes on to say: "Founding itself upon love, humility and faith, dialogue becomes a horizontal relationship of which mutual trust between the participants is the logical consequence" (p64).

Since the causes and effects of environmental problems are pervasive and inter-relate to such a high degree with political, economic, and other socially based factors, the passive acceptance of existing values systems stands as a serious challenge to environmental educators. The development of mutual respect and trust between educator and learner and the existence of authenticity in them as individuals and in their educational relationship are thus believed to be of much significance for Environmental Education.

The concept of wide-awakeness is similar to Freire's concept of literacy, but Greene's (1978) further explication is useful to the environmental educator. The concept is consonant with the wider definition of environmental literacy introduced above, and its development process is similar to Freire's concept of conscientisation. In this study, the concept is subsumed within the concept of environmental literacy and is included only in order to assist in the development of environmental literacy theoretically and methodologically.

Greene (1978) refers to wide-awakeness as a process in which people actively involve themselves in understanding their world. She uses the phrase 'to be awake is to be alive' as a starting point for describing wide-awakeness:

> "By the term 'wide-awakeness' we want to denote a plane of

consciousness of highest tension originating in an attitude of full attention to life and its requirements. Only the performing and especially the working self is fully interested in life and, hence, wide-awake. Passive attention is the opposite to full awareness" (Schutz, 1967, p213).

Greene's concern "is to enable diverse persons to break through the cotton wool of daily life and to live more consciously" (1978, p185). It is necessary for individuals to be able to stand apart from the 'givens' and normal assumptions of life, to emerge from their submergence, and become conscious. Only through the development of such consciousness will people be able to "break with the structures of what is presented as 'normal'" (Greene, 1978, p105). Consciousness is more than just an awareness:

"Consciousness thrusts toward the world, not away from it; it thrusts towards the situations in which the individual lives her or his life" (Greene, 1978, p14). Also,

"consciousness...involves the capacity to pose questions to the world, to reflect on what is presented in experience, to imagine and to try to realise possibilities of change...[T]o be conscious, to be in the world, is to be able to conceive things as being otherwise than they are" (Greene, cited in Bakker, 1985, p133).

For the existentialist, the term 'world' has a specific and important meaning denoting, not the entire world as geographically defined, but the stage upon which individuals act out their lives and with which they interact on a daily basis, hence the use of the phrase 'lived-world'.

To "take that world for granted as predefined or objectively <u>there</u> is to be uncritical, submissive and submerged" (ibid, p17).

Fully conscious living is necessary because, as conscious beings, we make our own meanings through our relation with the world. However, we do not make meanings in the Deweyan sense, since

Dewey's approach to learning does not imply a change to the world of the learner. Greene (1978, p99), while acknowledging the value of Dewey's contributions in the area of experiential learning, says:

> "With our Deweyan past, our familiarity with participant knowing, with learning as 'the reconstruction of experience', we are sometimes tempted to treat the (existential) concept of praxis as an elaborated form of Deweyan knowing. But this tends to make us overlook the fact that critical reflection, in Dewey's context, is intended to clarify and effect connections in experience, to make possible a widening perception of meanings, to promote growth."

Greene goes on to discuss the concept of praxis as involving both critical reflection and action upon a situation:

> "Of equal moment is the fact that praxis involves a transformation of that situation to the end of overcoming oppressiveness and domination" (ibid, p100).

Wide-awakeness is thus an extremely important concept for environmental educators since it is a means of combating the technicism referred to in Section 1.2. In achieving wide-awakeness, the individual is able to be critically aware of the processes of environmental degradation, and hence, is capable of meaningful action; meaningful, since it addresses the root of the problem.

While Greene does not attempt to lay out a 'recipe' for wide-awakeness, she does suggest that an attentiveness to one's history, the set of experiences and events which constitute one's background consciousnesses, may enable one to be critically aware of much that is taken for granted.

The above hints at, but does not provide a methodology, a 'how to teach for wide-awakeness'. For the purposes of this study it is worth attempting to derive such a methodology from the literature dealing with wide-awakeness, since this will be directly applicable to the development of environmental literacy. Having set out to outline a methodology, however, it is first necessary

to take note of the cautions expressed by Bakker (1985).

Bakker (1985, p178) says that "'recipe methods' with their assumed applicability in any context with all groups of people can have little value for the propagation of (wide-awakeness)". One cannot teach wide-awakeness as if it were yet another school subject. One can teach only from a perspective of wide-awakeness, and in that way, independent of the topic being taught, the students will be challenged to become critically conscious of themselves and their world.

Similarly, environmental educators cannot impose environmental literacy. They must at least be personally committed to environmental quality, and from that position of authenticity, encourage the development of environmental literacy in their students.

In spite of the above cautions, an approach to teaching for wide-awakeness within a context of the study of literature has been outlined by Greene (Bakker, 1985, pp205-9). This approach, although it is derived from work dealing with wide-awakeness, should be placed within the context of the development of environmental literacy.

The approach consists of four steps, namely, making connections, disclosure, reconstruction, and generation. In the present context the term 'environment' is used as synonymous with 'world', existentially defined.

Making connections means:

> "establishing a sense of connectedness between whatever part of the (environment) is to be studied and the experience of the student" so that "the student will not be exposed to other people's explanations that cannot be tested because of their remoteness from the student's experience" (Bowers, 1974, p115).

In other words, the environment is encountered through the individual's experience. If people are to be able to explore assumptions concerning environmental issues and processes which

are normally taken for granted, they must first clarify their experience of the environment, and thereby gain a subjective appreciation of it.

In this way the environment and the individual's experience will form connections with each other. These connections will either challenge or parallel the individual's experiences, allowing a refinement and reconstitution of understanding. Making connections is vitally important in Environmental Education, since, ultimately, solutions to environmental problems will derive from appropriate values systems (Milbrath, 1984). Without a personal 'connection' with the environment, the development of environmental literacy will be hindered.

Disclosure is a two-way process in which the individual and the environment 'make connections' with each other in a relationship of meaning-making. The environment must be 'disclosed' by the individual. That is, it must be examined critically: generally accepted assumptions about it must be stripped away. Equally, people must also be 'disclosed' since meaning is constituted through their interactions with the environment. The extent to which people are able to constitute meaning from the environment is limited by their capacity to 'disclose' their existing understanding of the environment.

At this stage of Greene's approach, 'meaning' is entirely subjective. The individual is required to understand the environment in subjectively real terms. Conversely, the individual is required to refrain from imposing assumptions of meaning onto the environment, and for the moment, simply to "perceive and create" (Bakker, 1985, p207).

Greene's approach applies to Environmental Education here in that, where 'making connections' has allowed a degree of personal involvement with the environment, which is a first, vital step towards commitment, disclosure implies the development of this sense of relationship. Disclosure encourages a conceptual exploration of the environment in a way which attempts to prevent the development of preconceived notions about environmental issues and processes. Hence the basis is laid for a balanced understan-

ding of and an holistic approach to environmental problem solving.

Having laid the above foundation, the individual is now able to reconstruct existing understandings of the environment. Having explored the 'unknown territory', the individual now begins to redraw his or her maps, but not within the 'taken for granted assumptions'. This stage represents a formalisation of the previous one, in that, having become meaningful at a subjective level, the environment and the individual's experiences of it now begin to replace these purely subjective understandings with new meaning, based on an interaction between subjective and objective reality.

The final stage, generation, steps outside of the dialogue between the individual and the environment. It flows from the previous stages, but is the process whereby critical consciousness is created, where the individual becomes aware of the dichotomy between what is 'taken for granted' in the environment and a full consciousness of reality. Obviously the individual will not be able to achieve a total knowledge of what is 'reality' and what comprises the assumptions that society holds about that reality, nevertheless, Greene suggests that the individual can begin to "break with the structures of what is presented as 'normal',...to develop perspective on social reality (Greene, 1978, p105).

The importance of this stage lies particularly in the fact that it directs the individual away from the predominantly subjective aspects of the previous stages. 'Generation' enables the individual to face the objective reality of the world and to understand it, while still examining that reality critically and not drawing any unconsidered assumptions about it. The intention is:

> "to enable the individual to understand his own culture so thoroughly he is no longer swayed unconsciously by its premises" (Bowers, 1965, p226).

As has been stated above, wide-awakeness and environmental literacy are similar. Thus, the approach to wide-awakeness just out-

lined is worthy of consideration and inclusion in any Environmental Education programme as a general approach. People exposed to such an approach should develop the capacity to stand back from the information, opinions, vested interests and entrenched values pertaining to an environmental problem or issue and seek its underlying factors. This capacity for critical awareness in all people is vitally important if the continued survival of planet Earth's inhabitants and a satisfactory quality of that survival are to be ensured.

It is clear that the teacher involved in teaching for wide-awakeness must also have a personal commitment to being wide-awake. Thus it is important to investigate the status and personality of the teacher in an existential pedagogy.

3.1.1 ENVIRONMENTAL LITERACY AND THE TEACHER

Bakker (1985) states that a personal involvement of the teacher precedes method. According to Greene (1978), the capacity in a teacher to break through the normally accepted conceptions of reality and to create new conceptions is of great significance. This capacity supports the kind of teaching:

> "that moves persons to reflection and to going beyond. Only, however, if educators can remain in touch with their own histories, their own background consciousnesses, can they engage with others who are making their own efforts to transcend" (p 103).

In a sense, then, Bakker was right when he said "take care of the why and the how will look after itself" (1985, p174). The teacher must be an authentic, wide-awake person, or at least aware of his or her obligation towards wide-awakeness, striving honestly to stand apart from the assumptions of daily life. If this is so, the teacher will be in a position to challenge students to a similar 'way of being'.

> "Whether teacher or student, then, the individual is asked to remain in contact with his perceptions, his history. He

> is asked deliberately to strive to constitute their meanings as he carries out his cognitive projects, as he makes his effort to know. To accomplish this end, he must achieve a state of 'wide-awakeness...a plane of highest tension originating in an attitude of full attention to life and its requirements'" (Greene, 1973, p162).

The above should have a clear influence on the educator and on the relationship that exists between educator and student, for where authenticity forms the basis of an educational relationship, the result will be an affirmation of self worth and personal growth and a sincere desire to 'go beyond' in understanding the environment.

In the context of this study, it is possible to replace the term 'wide-awakeness' with the term 'environmental literacy'. Indeed, wide-awakeness is included here only in that it serves the purpose of illuminating the concept of 'environmental literacy'. The challenge to teachers, then, is towards the development of environmental literacy in themselves and to incorporating it, as outlined above, into the educational process.

As can be seen, Hurry's definition of environmental literacy as extended by Freire and the concept of wide-awakeness are valuable additions to existing conceptions of Environmental Education. The intention is not to replace Hurry's definition but to give it an added perspective. This is the existential perspective evident above. From this point in the study, the term 'environmental literacy' is used in this wider sense.

Following on from the discussion of environmental literacy and its related concept, wide-awakeness, is a discussion of the second concept area that emerged from the previous chapter, namely attitudes, values and behaviour. As was mentioned earlier, the two concept areas are equally important in the development of an Environmental Education programme and, while related, are distinct from each other.

3.2 ATTITUDES AND VALUES

While environmental literacy is an important focus for Environmental Education, it is also important to know how to achieve it. It is clear that for environmental knowledge and skills to be of benefit to the environment and to society, these must be matched by appropriate attitudes, values and, ultimately, behaviour. However, while the imparting of knowledge is a relatively simple issue, the area of values education is a complex and controversial one. In order to be able to understand values education it is first necessary to deal with attitudes, values and behaviour. (See Figure 1).

For Environmental Education the link between attitudes, values and behaviour is important: without appropriate action, no amount of positive attitude change is going to be of much environmental benefit. The question thus arises: how can the environmental educator deal with values and attitudes in such a way as to bring about significant and lasting change (which would benefit the environment and hence our quality of life) and also ensure that such values are observable in overt behaviour? How can environmental literacy be achieved?

Values and attitudes are distinct but closely related concepts. Where values occupy a central and significant position, attitudes are usually seen as more peripheral (Reich and Adcock, 1976). Values are seen as enduring beliefs upon which people would normally choose to base their actions, whereas attitudes, which are usually determined by values, are situation specific. While it is accepted (ibid) that there is a relatively high degree of consistency between attitudes and values, the link between these and behaviour is much more tenuous.

A difficulty for the environmental educator wishing to incorporate values education into his teaching is that one cannot teach attitudes and values in the way one might teach factual information (Talyzina, 1984). One can teach about values without effecting any significant change in learners. However, it is possible to teach students to look at their own attitudes and values and explore these in a way which allows them to undergo

positive change.

According to the cognitive dissonance theory of attitude change (Festinger, 1957, 1962), by providing people with appropriate knowledge (cognitions) and experiences they will make adjustments to their own value systems. Depending on their personalities and the nature of their experiences they may also achieve a level of commitment which will cause them to act positively when the situation requires it.

It is clear, however, (Deaux and Wrightsman, 1984; Fishbein, 1967c and Gerard, 1965) that beliefs, attitudes, behavioural intentions and behaviour, while related, must be regarded as independent phenomena. While one might expect behaviour to match attitudes, research has consistently failed to demonstrate a direct link between the two (Reich and Adcock, 1976). For example people may know that they ought not to litter, but faced with the absence of a suitable receptacle, may still do so. They may even experience a twinge of conscience about the act, but still do it. On the other hand, people who are committed to not littering, may be guilty of different, and potentially more serious, acts of environmental abuse such as squandering water resources on gardens during times of severe drought. It appears that there is a lack of consistency between such people's attitudes and behaviour, or that an attitude which applies in one context, does not apply in another.

Many attempts have been made to explain why this is so, for example, blaming research failures on the measuring instruments or the definition of attitude. Fishbein (1967c, p477) points out that:

> "what little evidence there is to support any relationship between attitude and behavior comes from studies showing that a person tends to bring his attitude into line with his behavior rather than from studies demonstrating that behavior is a function of attitude."

There is evidence to suggest that a person's attitude toward any object can be seen as a function of his beliefs about the object

(Fishbein, 1967c and Rosenberg, 1967), yet it cannot be said that a person's behaviour can be predicted from his beliefs or even his behavioural intentions.

> "Indeed,...behavior toward an object may be completely determined by situational or individual difference variables, rather than any variable associated with the stimulus object per se. In other words,...behavior toward a given object is a function of many variables, of which attitude toward the object is only one" (Fishbein, 1967c, p491).

Another explanation of the poor predictability of behaviour from attitude is that attitudes do not constitute an harmonious whole within an individual, but act in competition (Deaux and Wrightsman, 1984). Certain attitudes might prevail in one context, while different attitudes might be dominant in another, resulting in situationally different behaviours. For example, a person might drop sweet papers at a rugby match and be seen picking them up at a conservation conference.

The implication of the above for this study is that one cannot assume that changing a person's attitudes will result in changed behaviour. This is not to say that changed attitudes will not result in changed behaviour, simply that they may not. In order to tighten the connection between attitudes and behaviour it is necessary to be aware of the intervening variables and to attempt to overcome these where possible.

For example, a teacher may know about (cognitive), believe in the importance of (affective) and wish to implement (conative) Environmental Education yet not attempt to do so. This may be the result of situational constraints such as a rigid time-table, a school which equates noise with lack of discipline, or even the inability of the teacher, perhaps in the face of a normally rowdy class, to cope with the perceived demands of such a teaching approach.

It is part of a teacher trainer's task to overcome these constraints by, for example, providing suitable curriculum material or by ensuring the sort of pre-service training that shows that

progressive ideas can and do work in a restrictive educational milieu. In addition it may be possible to so motivate the student teacher that the constraints are perceived as less significant in the light of the ensuing enthusiasm.

A further implication of the above discussion for this study is the observation that a person tends to bring his attitude into line with his behaviour rather than vice versa. (Fishbein, 1976c). Once again, one cannot expect a person's behaviour necessarily to reflect his attitudes, but what does seem true is that through action (behaviour), one can expect that a person's attitudes may change in response. This is in line with the 'experiential education' of Weidner (1973) and the concept of 'learning by doing' of Dewey (1910, 1938). It is also equivalent to the phenomenological-existentialist views of educational philosophers such as Greene (1973, 1978). Greene supports the views of twentieth century philosophers who have

> "associated knowing with a type of participant action or with deliberate engagement in problematic situations" (ibid, p121). Also, "some (philosophers) stress the role of praxis, or the transformation of an existing reality; few conceive knowing as passive or merely contemplative" (ibid, p121).

Thus, in attempting to develop environmental literacy in student teachers, they must be involved in undertaking environmentally based activities. These activities must be such that if they were done spontaneously, they would have stemmed from an appropriate environmental ethic. In other words, if 'doing' influences attitudes, environmental educators must ensure that it is the right kind of 'doing'.

Equally important, according to the 'social modelling' concept suggested by Abelson (1972), is the validation of appropriate behaviour by means of a model. In other words, the environmental educator's behaviour must be consistent with environmentally appropriate values and attitudes. Then the learner's behaviour is more likely to be consistent with his own attitudes and values (assuming that these are also environmentally appropriate) than if the correctness of such behaviour had not first been validated

by the model.

An understanding of attitudes and values, how they are formed, how they are changed, and how they relate to behaviour, is thus vital to Environmental Education. Not only is an understanding of the concepts important, so too is a knowledge of how to implement this understanding in an educational context. This leads to values education as a means of bringing about positive change in values and attitudes and hence, hopefully, in behaviour.

3.2.1 VALUES EDUCATION

Values education is an important part of Environmental Education, since no environmental issue can be value free (Hurry, 1982; Maye, 1984). According to Maye (1984) there are various approaches to values education and he outlines a number of these, from values inculcation on the one hand, to action learning on the other. These represent the ends of a continuum, from no direct examination by the student of his own values, to the student's becoming involved in issues, clarifying his values in relation to them, and taking action on the basis of the values and solutions developed, respectively.

Some of these approaches are listed here:

1) Watson (1977) uses a values clarification approach for the teaching about values in the man/environment relationship.

2) Banks and Clegg (1977) use a problem solving approach based on the importance of reasoning skills, values being generated through an hypothesis testing approach.

3) Stapp (1974) has designed an action-oriented model based on the contention that it is through active behaviour that the individual learns best.

4) Oliver and Shaver (in Weil and Joyce, 1978) have devised the Jurisprudential Model, based on jurisprudential (or legalistic) thinking in a context of open dialogue.

5) Stenhouse (1983) uses problematically presented evidence in the context of a discussion led by a neutral chairman to allow the development of autonomous, responsible judgement.

Each of these has its merits and weaknesses, and, while it is not the intention here to discuss these relative merits, it is obvious that the environmental educator has a wide range to choose from in developing a values education approach in his work. The work of Raths, Harmin and Simon (1966, 1978) is regarded by most environmental educationists as the most important approach to values education, so much so that for most the term 'values education' is uniquely associated with these authors.

3.2.2 VALUES CLARIFICATION

Values clarification is a general term which includes a number of approaches, all of them being intended to "enable the student to recognise his or her own values and to make values choices in a non-judgemental and non-threatening situation" (Maye, 1984, p38). The best known contribution, of Raths, et al (1966; 1978), has received widespread support in Environmental Education probably because it is seen as a practical approach to developing an environmental ethic:

> "[I]t's practical, it works, and it gets right at the heart of the environmental educator's dilemma--teaching for voluntary or self-regulatory behaviors which are in equipoise with the environment" (Hanselman, 1979, p4).

The process of valuing, according to Raths et al consists of three components:

"Choosing: 1) freely
2) from alternatives
3) after thoughtful consideration of the consequences of each alternative

Prizing: 4) cherishing, being happy with the choice
5) willing to affirm the choice publicly

Acting: 6) doing something with the choice

7) repeatedly, in some pattern of life" (Raths et al, 1966, p30).

If all seven of the above steps are present in a learning experience what emerges represents a value (Raths et al, 1978). An important aspect of the values clarification process is its emphasis on active learning. This is because the individual is faced with a number of possibilities from which he must choose and then must act upon that choice. As such, the process is in line with the Deweyan concepts discussed earlier.

While the valuing process has much to recommend it in that it avoids preaching and moralising, accepts students' contributions, encourages them to consider the various alternatives and is attractively simple, Boyd and Bogdan (1984) say that in their experience, teachers often question its value after using a few of the values clarification strategies. A number of reasons for this response can be identified.

There is a fundamental relativism inherent in the process (Fraenkel, 1977). Values clarification is intended to allow students to clarify their own personal values, but it does not provide any assistance in situations where such values are clearly 'socially deviant'. The problem here is that:

> "the clear ideals of a Martin Luther King cannot be distinguished from the 'something' that might be 'clarified' and 'purposefully and proudly' pursued by the Ku Klux Klan" (Boyd and Bogdan, 1984, p292).

Another problem is that many of the values clarification activities, because they require a public confession, tend to emphasize conformity rather than a personal exploration of values. Associated with this is the concept of "postdecisional dissonance" (Festinger, 1957), which is the tendency, after having made a decision among alternatives, for the individual to distance himself from those possibilities he did not choose and to move towards the one he did choose. In this way, values clarification can reinforce the 'mean' value at the expense of a more divergent one. If the result of this is the loss of a society's critical

thinkers, then the process can only be to that society's long term detriment.

A further issue is that values clarification tends to focus on the process or technique, rather than on the individual. Obviously the process is intended for the individual's benefit. The problem is that because of the emphasis on the technique, values clarification will tend to limit personal growth in this area to the occasions when the teacher implements the process. To the existentialist, values clarification is a life-long process focused within the individual, rather than on the educationist.

By setting up a process implemented by an 'expert' is to make it external, and hence unavailable, to the individual. This is the reason for Bakker's (1985) cautions relating to the setting up of an approach to wide-awakeness. A 'recipe' approach requires implementation by the educationist, who can then rely on the technique. The existential educator relies rather on a personal interaction between the educator and the student.

Thus, since for Greene (1973; 1978) the ultimate is a wide-awake person, it is not possible for the teacher who has no involvement, no commitments, who may, therefore, not be a wide-awake person to undertake values education. The teacher needs to be:

> "at the side of his students, making efforts to constitute meanings - caring intensely about the kind of thinking going on and the choices being made. As aware of his students' incompleteness as he must be of his own, the teacher can only strain to encounter his students without objectifying; he can only act to help them, as autonomous beings, to choose" (Greene, 1973, p275).

From this it can be seen that, for the existential educator, the very concept of values education is superfluous, since wide-awakeness as it has been described above forms an integral part of an existential pedagogy.

To be practical, it may be better for a 'disengaged' teacher to use good techniques than not at all. In the process the teacher

may be stimulated to start reflecting on his or her authenticity as a person, which is a step towards wide-awakeness. Nevertheless, an implicit aim of this study is to develop the person, not the technique. This does not imply that 'techniques' or teaching methods are unimportant. Rather, the achievement of a degree of wide-awakeness, or in the context of this study, environmental literacy, in the teacher, is of higher priority than the perfection of technique alone.

3.2.3 AN EXISTENTIAL APPROACH TO VALUES EDUCATION

All that appears above about the development of critical consciousness, informed attending or wide-awakeness is generally relevant to an existential approach to values education. However, some comments more specifically related to such an approach can be made. (The present discussion is represented on the right hand side of Figure 1 as "Extension towards Existential perspective").

Greene (1973, p214) points out that:

> "moral choices are free choices, made by individuals who are aware of options, who think more than one possible action exists at a particular moment of stress and unease".

This statement contains some important considerations for the environmental educator interested in values education. There must be the element of free choice among options, which is true of most approaches to values education, including values clarification, but more importantly, the individual must think or believe that there is more than one course of action open to him.

This range of possible actions forces the individual to confront them, become aware of their possibilities, and finally, to choose. Choice is the focus of 'stress and unease' because, no matter what form of outside advice or precedent exists, no matter how universal or objective may be the range of moral options open to the individual, finally, the decision is a personal one. Choice is focal to the area of values, as it is central to existential thinking, for all meaning exists through will and

'intentionality': "no good or evil (can) exist without will" (Greene, 1973, p254).

This quote supports the view that values are not fixed entities or universal: they are what the individual makes them to be; they are in constant flux; are rooted in the individual's temporality, and have meaning only in that context. Thus there is no purpose in relying on a system of normative values. The individual must choose, must develop a personally authentic value system.

Such a perspective, although personal, is not self-centred, since it must take account of the external, objective world of meaning. It should be noted that, for the existential educator, meaning is created through the interaction between individuals and the environment. Thus an existential pedagogy needs to confront the external world of meaning:

> "Not only must (the teacher) imagine himself within his concrete historical situation as it presents itself to <u>his</u> subjectivity; he must confront the problematic of all systems and universal charts, the limitations of 'calculative' inquiry, and the insufficiency of abstract norms" (ibid, p254).

As far as classroom teaching is concerned, the teacher

> "cannot <u>tell</u> another person how to live; nor can he demand that his students exercise their will and become, in their own way, volunteers. But he can set up classroom situations that make it difficult to maintain 'peace of mind'...(H)e may focus on crisis situations; he may engage students in concrete questioning and confrontation; he may urge them to take stands. The task will not be easy for such a teacher, any more than it will be for his students because they are forever condemned to the freedom that requires them to create themselves over and over without a sense of comforting constraint or a priori norm" (Greene, 1973, pp 281-2).

The focus on personal choice and individually determined values systems suggests that the same charge of relativism laid against

values clarification earlier seems possible here. Bakker (1985, p163-4) refutes this charge, saying that the kind of awareness that arises from an ability to:

> "avoid merely 'gazing' at the world, and instead to 'attend' with a critical reflection that leads to action...demands a level of consciousness and wide-awakeness that insures not only against submergence in the taken for granted assumptions of an objectified world, but also against an inevitable relativism consequent upon critical reflection becoming an end in itself".

The approach to wide-awakeness outlined in Section 3.1 makes clear the point that an understanding of the world comes from a dialogue between it and the individual: the world communicates meaning to the individual who in turn constitutes this into a personal understanding of the world. The fact that this understanding of the world emerges from a perspective of critical awareness, so that the individual "is no longer swayed unconsciously by its premises" (Bowers, 1965, p226), suggests that an existential pedagogy is rooted firmly in reality.

With regard to an existential approach to values education, a key concept is Greene's phrase quoted above (1973, p281), referring to the creation of classroom situations which "make it difficult to maintain peace of mind". This is more than just challenging a person to consider the unconsidered, to question the assumed, for it reaches into the person's own existence and attempts to create a 'crisis of existence', what Schutz (in Greene, 1978) describes as an "experience of shock". Such an experience will cause a shift in the person's consciousness to a point where the normal assumptions of life cannot be accepted, where the person has to break into unmapped territory and draw the maps for him or herself.

At such a point of experience it is vital for the teacher to allow the student to reflect on the situation of 'unease'. There must be a problematising of the situation, an effort to comprehend linkages. Having reflected, examined and comprehended, the student can emerge from a world of assumptions and, by making new

meanings, become a 'subject-in-the-world'.

What has been presented here is a form of methodology: the experience of shock; reflection; and intervention. However, overriding the whole is the importance, for both students and teachers, of being able to reflect on their own situationality, of being able to "remain in touch with their lived worlds, their pre-understandings, their perceptual landscapes" (Greene, 1978, p102).

3.3 CONCLUSION

This chapter focused on two important areas in Environmental Education, namely attitudes and values, their links with behaviour, and values education; and the concept of environmental literacy. These were then extended according to the existential perspective adopted in this study. It was shown that there is not a direct link between attitudes, values and behaviour and that there is a poor predictability of behaviour from attitude. This might be explained by the fact that attitudes act in competition within the individual, allowing certain attitudes to dominate others, resulting in situationally different behaviours.

An implication of the above for this study is that, while one cannot assume that changing a person's attitudes will result in changed behaviour, one can attempt to tighten the connection between attitudes and behaviour. This can be achieved by exploiting the tendency for an individual to bring his attitude into line with his behaviour rather than vice versa. Through action (behaviour), one can expect to modify attitudes. Experiential learning, which is an active learning method, is thus felt to be appropriate for Environmental Education programmes.

This chapter explored the concept of environmental literacy, which involves knowledge about the environment; a personal conviction, which could also be described as an environmental ethic and a commitment to action, aimed at maintaining environmental quality, with both human and environmental goals. This concept was extended by means of the existential concepts of literacy, wide-awakeness and conscientisation. In this study the term

environmental literacy, apart from places where the context suggests otherwise, includes the existential perspective developed in this chapter.

The significance of this wider definition of environmental literacy for Environmental Education is that an environmentally literate person will develop a critical awareness of the values and assumptions dominant in society. Since the causes and effects of environmental problems are pervasive and inter-relate to such a high degree with political, economic, and other socially based factors, such an attribute in people is crucial, and an important goal for Environmental Education.

CHAPTER 4: THE PROGRAMME

The primary aim of this study (see Section 1.1) is to develop an Environmental Education programme for the training of primary school teachers. A foundation for the development of this programme is found in the first three chapters of this report. These chapters have dealt with Environmental Education: definitions, principles pertaining to its implementation and a framework for Environmental Education in teacher training. They have also isolated and examined two core concepts, namely environmental literacy and the area of attitudes, values and values education, and have extended these towards the existential perspective introduced in Chapter 1. This chapter goes on to deal with the programme itself: its aims, design constraints and considerations and a description of the programme.

4.1 AIMS OF THE PROGRAMME

The programme aims were intended primarily to encapsulate for students the essence of Environmental Education and thus provide a strong conceptual focus for them. For this reason, an appropriate vehicle, which would be simple but not simplistic had to be used. Environmental literacy, which is central to Environmental Education, was felt to be the most appropriate concept for these purposes. The aims of the programme were also based on the two parts of Hurry's (1982) model for teacher training in Environmental Education, namely the 'learning-and-responding' and the 'teacher-training' processes. The aims of the programme are thus as follows:

1) to develop environmental literacy in student teachers; and
2) to enable students to develop environmental literacy in their pupils.

These aims were presented to the students who registered for the programme and they were frequently reminded of their implications for themselves as educators.

4.2 PROGRAMME DESIGN: CONSTRAINTS AND CONSIDERATIONS

Using Hurry's (1982) work, the archetypal experience concept, the problem-solving approach and the concept areas of environmental literacy and attitudes, values and behaviour dealt with in previous chapters, a programme was designed for the purposes of this study. While for experimental reasons it would have been convenient to have had total freedom in the design, logistical and administrative considerations prevented this to a degree. A major restriction was the fact that the programme was offered as a regular part of the Johannesburg College of Education curriculum and as such, had to fit in with curriculum and time-table constraints. This can, however, be seen as an advantage, since the programme was designed and implemented under realistic circumstances.

Hurry's (ibid) recommendations that the development of environmental literacy be included as a basic principle of a college curriculum and that each department makes an appropriate contribution were too complex an issue for this study to have addressed. The programme was thus designed to be offered as a single course and no attempt was made to extend the scope of the study beyond these bounds. A related issue was the selection of the position in the Johannesburg College of Education curriculum where the programme should be offered.

All students at the Johannesburg College of Education are required to study Education, and in the final semester of their final year may choose to do one course selected from a range of special interest courses offered as part of the Education Studies Department elective programme. In the past, one of these electives was Environmental Education and it seemed sensible to repeat it for the purposes of this study. Fortuitously the extra teaching load required by the Environmental Education elective in no way clashed with the existing teaching responsibilities of the researcher.

The Environmental Education elective was accepted by the Education Studies Department and was duly advertised to the entire final year class. Of the twenty five students who applied, twenty

(a predetermined figure) were accepted, of which, one student changed courses, so finally, a total of nineteen students studied Environmental Education.

The programme was run over a period of twelve weeks. Each week consisted of four forty five minute lecture periods. There were no extended periods of time available for practical work, except in cases where, by negotiation with the students, a tea break or lunch period was added onto an existing lecture period. This occurred on three separate occasions.

Having made the decision to offer the programme as an Education Studies Department elective it then became necessary to adapt Hurry's model for teacher training (discussed in Section 2.2) to the level of a single programme. Obviously a forty eight lecture programme cannot include all of Hurry's (ibid) recommendations, so a degree of selectivity was necessary.

Of the eighteen key elements presented in Hurry's model, some made greater contributions to the programme than others. Some elements were easily integrated into the programme while others were only partially applicable or were even discarded as irrelevant in the context of the programme. Some elements, while relevant to Environmental Education, were deliberately disregarded because, to a large extent, these are catered for in other parts of the Johannesburg College of Education curriculum.

Thus, of Hurry's eighteen elements, twelve made a direct contribution, to a greater or lesser degree, to the development of the programme as follows:

In the 'learning-and-responding' process:

1) Environmental literacy, defined more broadly than Hurry's conception of it, as discussed previously, played a most important part in the design of the programme.

2) Values education, which was explored in Chapter 3, was also very significant in the programme, and permeated

most aspects of it.

3) Basic information on the total human-environment, which included aspects of the built environment, the natural environment and a wide range of environmental issues was provided.

4) Exposure to holistic teaching, as the comments concerning the provision of basic information, above, and the general philosophical stance adopted in this study suggest, was catered for. In addition, the programme was offered in the Education Studies Department and was not linked to any subject-based department such as Geography or Biology. This facilitated coverage of a wider range of content in a more integrated fashion than might otherwise have occurred.

5) Training in fieldwork and/or practical work techniques was provided primarily through the Parktown Heritage Education Week programmes students were required to design and implement. The accent here, though, was on the educational aspects of the programmes and not on the research aspects per se.

6) An involvement in local issues as an exercise in problem-solving was included in the programme by means of requiring students to select and attempt to solve a 'campus issue'. Issues ranged from student littering, refuse removal and the general appearance of the campus to leaking taps and the spread of exotic plants.

In the 'teacher-training' process:

1) Training with regard to holistic subject teaching and integrated studies was seen as an important part of the approach to implementing Environmental Education in primary schools.

2) Training in the planning and management of fieldwork, particularly with regard to the local environment was

given strong emphasis through the Parktown Heritage Education Week.

3) Values education, which was discussed above was a central concept in the programme. The wider concept of values education introduced in this study was emphasised in terms of Hurry's teacher-training process, but not under the label of values education and not by dealing with specific techniques. Rather there was an emphasis on extending or 'going beyond' the conventional lesson content into the area of values, morals and ethics in a way more suited to an existentialist approach.

4) Training with regard to problem solving was dealt with in the context of what is described above as 'campus issues'.

5) Teaching experience specifically related to Environmental Education was achieved by the requirement of a written assignment based on the Johannesburg College of Education teaching experience. The students, being in their final year, were required to teach full time, or continuously for the entire period. The assignment required them to incorporate an approach into their teaching which would develop environmental literacy in their pupils. Teaching experience was also provided through the Parktown Heritage Education Week.

6) Evaluation and updating of a programme in terms of the community at large formed an obvious part of the students' training in the sense that this entire study is a programme evaluation which relied heavily on the students as co-researchers. Also important is the principle of on-going programme development: the 'product' of this study can in no way be regarded as a fixed and final entity. It must be seen as part of a process which adapts itself to its context as flexibly as possible.

The programme emerged as a compromise between the ideals suggested by the theoretical aspects dealt with in the first three chapters and the more practical considerations discussed in this section. The result is described below.

4.3 PROGRAMME DESCRIPTION

This section starts with a brief synopsis of the programme, and provides a more detailed description thereafter. The twelve weeks of the programme were structured as follows:

Weeks 1 to 3: Introduction, definitions, philosophy, environmental ethics. The weekend camp took place after week 1.

Weeks 4 to 6: The built environment, focusing on urban processes, change, aesthetics, and the use of evidence in the landscape. Much of this was focused on preparing the students for the Parktown Heritage Education Week.

Week 7: No lectures, as students were participating in the Parktown Heritage Education Week.

Weeks 8 to 11: Environmental issues, focusing on the natural environment. The issues, based on water, air, soil, and energy, were dealt with problematically, not as fact-based lectures.

Week 12: Having dealt with environmental issues, this week focused on man as both a victim and a perpetrator of technicism and issued a challenge to an alternative lifestyle.

The description which follows is seen as an important part of the study, since one of the research aims was to design a programme. However, the programme per se is not seen as the major contribution of the study: it is merely the medium through which certain principles could emerge and be delineated for further applica-

tion. Thus, while the programme consists of specific events and experiences, it is not the content of these that is regarded as important, but the underlying principles. For that reason this section is a selective description.

WEEK 1: Introduction to the course, not through a theoretical discussion, but through an experiential approach. The main activity of the week was the Pieter Roos Park Exercise. This started in the first lecture period of the programme. Students had been told prior to the beginning of the programme that they were to meet in the park, which is very close to the Johannesburg College of Education. The students were required to use the time to investigate the educational possibilities of the park in preparation for later lectures when they would be required to devise, in outline form, a series of Environmental Education lessons based on their survey of the park. Once the lessons had been devised, they presented their ideas to the rest of the class.

The Rustenburg Nature Reserve Weekend: This weekend camp was placed at the beginning of the programme in order to facilitate social interaction, as it was felt that this would provide the group with an identity and would promote trust and acceptance among all the people involved in the programme. The camp incorporated a wide range of activities mostly designed to create an awareness of the natural environment in an experiential way. The camp programme is not presented here as it appears as Appendix 1. However, some of the exercises are outlined.

An important exercise which took place on the first evening of the camp was a discussion about the first week's activities. This examined what had been done, and how and why it had been done, and in particular, explored the underlying philosophy and methodology of the activities.

There were two Solitaire experiences, one in the evening (Friday), starting while it was light and ending after dark, about forty five minutes later, and the other the next morning, lasting about thirty minutes. The students were placed out of sight of each other in an area of natural bush. They were required to sit

quietly and to experience their surroundings with all of their senses.

The night hike consisted of a short walk up the mountain track near the camp to the top from where the students were asked to lie on their backs in the grass looking up at the night sky. From there they were taken to a vantage point from where the lights of Rustenburg could be seen.

The hike on Saturday consisted of an approximately ten kilometre walk along the existing National Hiking Way trail, with a deviation to a waterfall and pools area in which they were encouraged to swim.

The Conservation vs. Development debate consisted of the very realistic possibility of part of the reserve being taken over for the purposes of a dam. The students were placed in two groups which were required to prepare and present a case for or against the proposed development, respectively.

WEEK 2: Lecture 1 debriefed the camp in terms of the underlying philosophy and rationale and methodologies used and examined the quality of experience for the students. This was done through an open discussion, with the lecturer drawing the threads together. The rest of the week was spent more formally looking at philosophy and definitions of Environmental Education using a discussion basis, but with more direct input from the lecturer.

WEEK 3: The Environmental Ethics Painting Exercise: The painting exercise was only part of an entire section on environmental ethics, but it formed the major part. Three major environmental ethics: Domination, Participation and Stewardship were dealt with by providing the students with short extracts from a variety of sources dealing with environmental ethics and by requiring from them a symbolic response to what they had been given in the form of a painting on a large piece of paper using poster paints and thick paint brushes.

This part of the exercise took place within one lecture period of forty five minutes. During the next lecture the paintings were

displayed on tables and, with the group gathered around them, each student explained what his or her painting meant. This exercise was intended to encourage reflection and to act as a form of feedback and reinforcement. The methodology and approach used in the exercise was also discussed. The last lecture was used to introduce the next section of the course and to prime the students on the requirements of the forthcoming Parktown Heritage Education Week.

WEEK 4: The Parktown Walkabouts: There were two urban field trips, both of which used the local area, Parktown, and took approximately one hour each. The first focused, by means of a guided observation sheet (see Appendix 2), on processes of urban change. The intention of this exercise was partially to provide a basic knowledge of urban change and to raise the students' awareness of how change occurs, but more importantly, the intention was to make the students aware that not all change is good and that political action in this regard is the right and duty of all citizens. This was followed by a reflection on the walk and on the nature of the event as an educational experience, and a formal lecture on urban processes. The second urban field trip is referred to in Week 5.

WEEK 5: Following on some of the feedback received about the expectations of the Parktown Week and the assignment set for the Johannesburg College of Education Teaching Experience, the next three lectures were devoted to teaching methodologies. It was felt that there was a lapse in the students' general training which then significantly affected the programme. The main topics covered were Active Learning and Theme Teaching.

The final lecture of the week continued where the previous section on the built environment had left off, with another 'walkabout' in Parktown, this time focusing on aesthetics and the quality of the urban environment. Handouts used for this exercise are contained in Appendix 3. Theoretical aspects of aesthetics were dealt with by looking at a National Monument, Stone House, and by comparing it with a nearby modern office complex. The students were then taken to three office complexes in Carse O'Gowrie road, and were required, by means of assessment sheets,

to make a subjective appraisal and comparison of the aesthetic quality of the three. It should be pointed out that 'old' was not implicitly good nor 'new' implicitly bad.

WEEK 6: The week started with a visit by Mrs Rae Graham, the city councillor for the area who is also a well-known urban conservation campaigner. The next lecture, which should have followed immediately after the second 'walkabout' but had to be moved because of the visiting speaker's being available only on a particular day, acted as a reflection on the aesthetics walk, which included challenging the students about the political process of change and design, a discussion about Mrs Graham's talk, and some formal input about aesthetics. The final two lectures consisted of a talk on the historian's use of evidence in the landscape and some administrative detail relating to the Parktown Heritage Education Week.

WEEK 7: The Parktown Heritage Education Week: This exercise was integrated with the requirements of the Parktown Heritage Foundation who wanted to extend their normal weekend of activities for the general public to a week's activities for school children. Since the nature of the activities was ideal for the purposes of the programme, the lecturer volunteered his and his students' services for the entire primary schools section of the week.

Each day of the week approximately sixty Std Four pupils were booked to arrive at the meeting point in Parktown. The students were divided into pairs. Two pairs per day, dealing with thirty pupils each, were responsible for conducting an 'educational experience' lasting three hours according to the Environmental Education principles they had learned, using the Parktown area as their resource. The main aim was to develop environmental literacy in the pupils.

The students were encouraged to use the area creatively, rather than fit into the cultural heritage approach that might have been the obvious focus. For this reason the event was described as an 'educational experience' in order to avoid predetermining student thinking. During that week no lectures were conducted and the

lecturer spent as much time as he could spare with the two pairs of students in order to assess their programmes.

WEEKS 8-11: Environmental Issues: The approach used was to present the factual or scientific basis of the various issues, by means of selecting local examples or situations which affected the students' lives and to reflect on the implications of these issues. The main topics dealt with were as follows:

Water - the water cycle, rain formation, water pollution and water resources in South Africa;

Air - formation and constituents, pollution (ozone enrichment and depletion, Carbon Dioxide, acid rain);

Soil - formation, degradation (erosion, desertification). This section was ended with a general discussion on a variety of environmental issues such as invasive species, extinction of species and hunting and culling;

Energy - resources, problems, alternatives. Although this is the last of four 'environmental issues' topics, this week was seen rather as a build-up to the critique of nuclear power as the 'ultimate solution' to the energy crisis, and the concluding section on alternatives.

An illustration of the way in which local or personally relevant issues were used follows. Water, for example, was dealt with in two sections, one being pollution and the other, supply. The pollution aspect used research data based on the Hartbeespoort Dam catchment area and focused on eutrophication of inland waters. The water supply aspect was covered by using data for the Rand Water Board supply area and comparing it with rainfall figures. Calculations of water usage and waste at an individual household level were done, and simple water saving measures were discussed. Where appropriate, the other issues were dealt with in a similar fashion. The global nature of the issues was not ignored, but the local or personally relevant aspects of the issues were the starting points.

WEEK 12: The Alternative Lifestyle: a critique of conventional views of nuclear power, using ideas from authors such as Capra (1983); Fromm (1968); Moss (1982); Schumacher (1973, 1977); Sider (1980) and Toffler (1970, 1981). The programme ended with a challenge to an alternative lifestyle.

This chapter represents a synthesis of philosophical, theoretical, and practical considerations as represented by the Environmental Education programme that was designed for primary school student teachers and implemented in the 'elective programme' of the Education Studies Department, Johannesburg College of Education. The next chapter deals with the procedure by which the programme was evaluated. The evaluation of the programme rests on the analysis of student diaries by means of a phenomenologically based method.

CHAPTER 5: PROGRAMME EVALUATION

5.1 INTRODUCTION

The first four chapters of this report culminate in the presentation of an Environmental Education programme for the training of primary school teachers. This chapter deals with the evaluation of that programme. By means of the evaluation the study then aims to derive a set of principles which can be employed in the refinement of the programme and also be used by other environmental educators. Since this set of principles is seen as the major contribution of this study to Environmental Education research, the evaluation procedure had to be devised in a way which would allow for the emergence of such principles.

In outline, the evaluation of the programme consists of the following stages:

1) a pilot study, intended to devise a suitable way of obtaining relevant data;

2) the implementation of the programme, during which the data were collected; and

3) an analysis and interpretation of the data by means of a phenomenologically based method.

5.2 EVALUATION PROCEDURE

A proper evaluation of a curriculum is a big task, a research project in its own right, requiring validation against existing theory, validation for internal consistency and validation by its own achievements over a period of some years (White, 1975). Such an evaluation goes beyond the requirements of this study, yet some form of evaluation of the programme is felt to be necessary. Cronbach (1975) and McCormick and James (1983) insist that evaluation must be based on the nature of the programme being evaluated and on those aspects of the programme which are of focal

interest:

> "To suggest that evaluative techniques should be selected according to their capacity to illuminate particular problems may appear to be stating the obvious" (McCormick and James, 1983, p157).

Thus the evaluation procedure was selected according to the researcher's interest in the development of environmental literacy.

Environmental literacy is a process which takes place within a person over a period of time, and is essentially subjective, experiential and personal. Thus an evaluative method should allow the researcher to gain an appreciation of that experience and to investigate the 'meaning-making' process of students in relation to the various elements of a programme.

A 'before-and-after' type assessment tool such as Pohorille's test for measuring degree of Environmental Education (1985) or Keogh's Conservation Awareness Test (1982), both of which would have required some modification to make them more applicable to this study could have been administered in an attempt to gain an appreciation of students' experiences of the programme. Similarly, it would have been possible to make use of Bowman's (1974) work in assessing college students' attitudes towards environmental issues.

Had the scope of this study been wider, for example, if it had been a full curriculum evaluation, such tools, along with others would have been necessary and valuable. Hanley et al (1970), for example, used interviews with pupils and teachers, classroom environment checklists, pre- and post-tests, and classroom observation in a single curriculum development project).

However, while such 'before-and-after' tests may provide an indication of attitude change as a result of students' experiences during a programme, they reveal little more than the knowledge that a change has or has not in fact occurred. What was needed for this study was an approach which is able to lay bare as much

of the process by which change takes place; which will provide as much information about the individual elements of a programme as possible, so that those elements or principles which are effective can be investigated more closely, refined and incorporated into a new programme.

The source of data for this study is students' own experiences of the programme. The evaluative method thus has to allow the meanings contained in an unstructured and nebulous form within the data to emerge into a more formal and objective form without imposing any external structure or meaning onto them. For these reasons a phenomenological method of data analysis was chosen. This method is described in more detail below (Section 5.4).

Since the approach adopted for the evaluation is to investigate students' day by day experiences of the programme, a regular response from students was necessary. A daily response seemed unnecessarily detailed, so a weekly response was decided upon. It was also decided to use a written response, because a regular interview with nineteen students would have been too complex and time consuming to sustain.

The major evaluative technique consists of obtaining weekly diaries from each of the students, as described in the pilot study, and in submitting these to phenomenological analysis in order to extract the essential meaning implicit in them. This 'meaning' is recorded in the form of an 'Extended Description' (Chapter 6), and from this major principles concerning teacher training in Environmental Education will be delineated.

While certain new teaching skills were imparted to students during the programme, they are not assessed in practice for the purposes of this study for three reasons:

1) the Johannesburg College of Education's requirements of students and the constraints and artificiality of teaching experience make such research difficult and potentially invalid as an indicator of the activities of qualified teachers (Ballantyne, 1987).

2) the assumption that students who qualify as teachers do possess the basic teaching skills ought to be true, and, given this assumption,

3) the belief that a teacher who is not environmentally literate will probably not be successful in incorporating Environmental Education into his teaching returns the focus of the study to the first programme aim, (Section 4.1).

As has been pointed out, this study is not intended to be a formal curriculum evaluation project. Thus it is felt that the evaluation procedures as outlined above are appropriate to the needs of this study. These procedures make it possible to evaluate the programme, to assess which parts are better than others, which principles are more effective than others and to improve on or discard weaker aspects.

5.3 PILOT STUDY

It is important in a research project that the data gathering procedure be clearly worked out and refined before the main data gathering phase is reached. In the present context a pilot study consisting of experimenting with the procedure using groups of students as similar as possible to those who would be taking part in the programme was implemented. The researcher did not have direct access to such groups so lecturers who taught suitable groups were approached for assistance.

A consideration in the choice of experimental groups was the need to select lecture courses which had similar expectations and philosophical bases as those of the programme. Also, the experimental groups could not be final year students as the programme was advertised amongst the entire final year class, and 'contamination' of subjects may have had some influence on the actual study.

Aspects of the data gathering procedure that are included in the pilot study are as follows:

1) Identifying the best form of response, from options such as live interviews or written responses, with all or just a selection of the students, once, occasionally or regularly;

2) Posing the right question so as to elicit information which is appropriate to the research aims; and

3) Obtaining sufficient commitment so that responses are meaningful representations of students' experiences.

A convenient choice of response format, as is shown in Section 5.2, is a written response. In order to elicit a response an instruction or request has to be presented. The method generally used in phenomenological research is to pose a carefully phrased question. Thus a critical issue is the design of the question. It is important to phrase the question in a way which will elicit appropriate responses and also gain commitment to the study.

Bearing in mind the experiential nature of the phenomena being investigated in this study, it was initially decided that the question should contain the words 'experience' and/or 'meaning'. The first question to be used in the pilot study was thus as follows: 'What does this course mean to you?'

An issue related to eliciting suitable responses is that, in discussing the exercise with students, a preconceived idea of the task should not be given. Thus an attempt was made to describe the response format as neutrally as possible as 'a piece of writing', and the request as 'I would like you to write down...'

During the first implementation of the data gathering procedure, in order to ensure student commitment, the lecturer who assisted with the pilot study explained to her class that she was conducting research relating to the course they were doing and that the students' help was necessary for this. As it happened, the lecturer had in fact mentioned her actual research interests to the class prior to the pilot study and so the request was probably seen as entirely plausible and genuine. The request was for a single response to be handed in early the following week.

The response to this request was very disappointing. There was a low return and the quality of response in terms of the students' personal experience of the course was poor. Also, the responses were more in the nature of a 'lesson crit' than a personal response.

As a result of discussion the procedure was modified. The question was rephrased to be more personal and the task was described as a diary, in order to emphasise the importance of the individual's own experience and response. The question was thus rephrased as: 'How do I feel about my experiences this week?' This was in order to remove the word 'course' and hopefully the tendency towards providing a 'lesson crit'. The question was expressed in the first person in order to remind students that their responses were to be personal. The words 'this week' were added to focus attention more directly on what was immediate in their experience. In order to emphasise that it was important to answer the question as it was actually stated and not as they remembered it, students were asked to write out the question at the top of every page of their diaries.

The modified procedure was implemented with a new group of students. A greater emphasis was placed on the value of their contribution in the hope that this would elicit a greater commitment to the task. Students were told in this instance that they would be required to keep the weekly diaries for a period of three weeks.

Student response to the revised procedure was a great improvement on the first one. The responses were more of a personal reflection of the students' feelings about the course and the number of students who responded was higher. One noticeable trend was a fall-off in the number of responses over the three week period. In order to overcome this problem it was decided that diaries should be taken in promptly and regularly.

It became apparent that some form of coercion might become necessary in order to ensure a high number of returned responses each week, but that this could only be done once a firm commitment had been elicited from students. Although the possibility of making

the diaries part of the programme requirements was considered, this option was felt to be too coercive and contrary to the principle of the students 'owning' the study and hence viewing it with greater significance. It was also decided that the value of the study and thus of the students' contributions to knowledge should be emphasised, to gain further commitment.

The procedure that was finally adopted consisted of asking the following question: 'How do I feel about my experiences this week?', which was to be written at the top of every page of writing. Responses were described as diaries, and these were taken in each week. The request to students to assist with the study was made at the end of the Rustenburg Nature Reserve Weekend, when enthusiasm and commitment were generally high. It was emphasised that the study was potentially a very valuable contribution to the field of Environmental Education and that their assistance was a vital and indispensable part of it.

During the main study the number of responses each week was high, and a satisfactory commitment from a large proportion of the students to both the study and to the required quality of writing was sustained for the entire twelve weeks of the programme. Although on occasions a diary would not be handed in promptly, it was usually done later. Cases where diaries for a particular week were never done, were isolated and were usually accompanied by an apology from the student concerned.

There was only one student who did not keep a regular diary. After three consecutive weeks had gone by without a returned diary, the researcher wrote a letter thanking the student for her initial commitment to the research and requesting her continued support. This letter seemed to have the desired effect, although it was noticed that some of the subsequent diaries were not particularly descriptive or perceptive.

5.4 ANALYSIS OF STUDENT DIARIES: THE PHENOMENOLOGICAL METHOD

Once it had been decided to use student diaries to gain an insight into students' experiences of the programme, it was nece-

ssary to explore ways in which the data could be analysed. As has been mentioned, a phenomenological approach to the analysis was selected, since it allows what is implicit in subjective data to emerge into an explicit, objective form without imposing prior expectations of meaning onto them. A further justification and amplification of such an approach follows.

The phenomenological method of analysis is applicable to any area of the human sciences in which the researcher attempts to arrive at an understanding of the individual's experience of an event or aspect of his lived-world without imposing any pre-conceived notions of reality onto the data:

> "The student of phenomenological investigation should not prejudge any particular phenomenon nor see it through any given perspective merely because of previous knowledge about that phenomenon" (Stones, 1979, p 119).

This withholding of preconceptions is called 'bracketing', and it is vital to the phenomenologist. It does not mean that the researcher following the phenomenological method of analysis has no preconceived idea of what he is attempting to achieve, but rather that he cannot impose his preconceptions onto the data. Thus the phenomenologically orientated researcher must be led by the data or the phenomenon being investigated. An essential difference between this and most other forms of research is that there can be no a priori hypothesis which the researcher sets out to test. It is necessary to approach the phenomena directly and to describe them first before theories and hypotheses can be established.

Obviously the phenomenological method is not the only way for a researcher in the human sciences to arrive at an understanding of a situation, in fact, it is but one of many, each of which ought to be faithful to the style of research, the nature of the data and the sorts of questions which are being asked. Giorgi (1971, p11) says that

> "it is phenomenologically unsound to establish a method that must be used that is prior to and independent of the phen-

omenon to be investigated".

Thus by using one particular method this study is not implying that other methods, particularly the positivist approaches are invalid, rather it is emphasising that appropriate methods must be used. In the case of this study, the data are not quantifiable and must be seen for what they are: a response from a person's existence as an experiential being. Through an analysis of the data the researcher can gain an insight into students' experiences of the programme and how the programme affected them 'on the inside'.

It is argued that the method of analysis must parallel the content of research. Stones (1979) provides an example which illustrates this point admirably. He shows that in the natural sciences, for example, it is valid to investigate the behaviour of a stone falling through space by means of a quantified approach. This would be true enough for any object falling through space until that object is an experiential being. Surely then the more meaningful approach would be to investigate the experience of falling? Thus natural science research generally involves characteristics such as the setting up and testing of hypotheses, experimental controls and independent and objective researchers and it draws rigour from its empirical, positivistic and deductive nature. Within this paradigm much new knowledge has been gained. However, such an approach is inappropriate when applied to qualitative research. Murray (1984, p170) expresses this succinctly:

> "To treat the human as a purely physical force is to ignore the person's humanity, the aspect that makes the person and the study of him or her so distinctive".

Nevertheless, it is important to note that rigour and objectivity are not the preserve of the natural sciences, and that science does not necessarily imply the use of a quantitative approach. To rephrase this it can be asked: 'Can the phenomenological method be regarded as scientific?'

First it must be pointed out that in order to be rigorous, it is

not necessary for the researcher to quantify his data (Stones, 1979). The prime requirements of the scientific method are that the research is replicable and refutable. In other words, the method used ought to allow any suitably skilled person to achieve the same results as those of the original research, or to refute the original results by using recognised and appropriate research tools. If the procedure is not potentially replicable and the data not testable, then the work cannot be regarded as rigorous or objective.

For this reason Stones (1979, p124) warns that the:

> " 'procedure of explicitation' must be made publicly explicit so that the research may be replicated by another researcher if so desired".

He goes on to say that one cannot expect absolute replicability of results, thus validity and reliability rest rather on the re-appearance of the range of essential themes that emerged initially. Accepting that they will not be expressed in exactly the same words or be described identically, validation of these themes is

> "indicated by whether such differences in wording may be intersubjectively understood to reflect an identical meaning or indicate similar essential themes to those which emerged from the data as explicitated by the original researcher" (Stones, 1979, p131).

The 'procedure of explicitation' refers to the making explicit of what is implicit in the raw, qualitative and subjective data. While a careful reading of the data may reveal some of the meaning contained within them, perhaps even a significant proportion of this meaning, for this to achieve scientific respectability it must be arrived at by a less subjective approach, hence the phenomenological method of analysis. The specific steps in this method are referred to by Stones (1979) as "the scientific phase of the explication", which will be outlined in the following section.

That the data in this study are subjective is obvious: this is so because of the nature of the original question that was asked of students. However, the method which is used to analyse the data has been derived by numerous phenomenologists (Giorgi, 1970, 1971, 1975, 1985b; Hobbs 1981; Stones, 1979 and Wertz, 1983) so that the researcher in this field can now proceed rigorously and systematically, aware at each juncture of what is being done and why, and of what is being achieved. The phenomenological method of analysis can thus be regarded as scientific (Stones, 1979).

5.5 THE SCIENTIFIC PHASE OF EXPLICATION

> "A humanistic psychology acknowledges the relevancy and complexity and richness of man's existence and is struggling to arrive at a method that will do it justice" (Giorgi, 1971 p.52).

The above quote illustrates the difficulties of conducting research into the complexity of human experience. This creates the problem of deriving a suitable method of understanding in a way which is sensitive to the nature of the data. Wertz (1983) shows that the general approach and characteristics of phenomenological psychology have been well documented, but what is still in need of attention is the issue of praxis, the laying out of concrete procedures for conducting phenomenological research. He continues by presenting such a procedure, based on the work of Giorgi (1975). Hobbs (1981) derived a phenomenologically inspired procedure for developing an 'extended description' of his subjects' lived-experience. His procedure was based largely on Eppel (1976) and Stones (1979), who were in turn influenced by Giorgi (1970, 1971, 1975).

Through the work of the above a degree of methodological consensus has been achieved, yet because of the nature of the method, there should never be one procedure that is generally applicable (Wertz, 1983). This is because there must always be a dialectic between method and research content, which is true, not only of distinct paradigms, but of unique research cases and researchers within the phenomenological paradigm. As Wertz

states:

> "Aside from the fact that it is part of the very character of the phenomenological approach not to seize upon a single method and impose it indiscriminately in every case but rather to develop appropriate methods precisely in contact with each unique phenomenon under study, different investigators have developed worthy, however divergent, methods in accordance with their own preferences and personal styles of research" (1983, p 197).

Thus, while the method of data analysis used in this study is derived from the above-mentioned researchers, it bears in mind the needs of the study and the nature of the data.

From this point the approach of Hobbs (op cit) is followed, since it suits closely the requirements of this study. This approach is nomothetically oriented (as opposed to ideographic) and broad. Hobbs dealt with thirty protocols each derived from three to four hour interviews. The broadness of his approach is seen in his attempt to "allow the uniqueness of their (the Indian factory workers') life-experience to come to the fore,...to tap the richness and subtlety of their lives" (ibid, p30).

Most other phenomenologically inspired research, some referred to in this chapter, addresses a specific aspect of experience such as anxiety or guilt at a detailed psychological level using an ideographic approach. Hobbs's approach uses the methods derived for such research and applies them to an essentially non-psychological, non-specific aspect of experience. Since this study is similar in many respects to the above, Hobbs is regarded as an appropriate research model.

The method of data analysis, adapted slightly from Hobbs (1981), consists of six sub-phases which are listed below:

1) Intuitive holistic grasp of the data;
2) Spontaneous emergence of Natural Meaning Units (NMU's);
3) Clustering of NMU's into Natural Meaning Clusters (NMC's);

4) Emergence of Essential Existential Themes (EET's);
5) Clustering of EET's;
6) Extended description.

These sub-phases are not to be regarded as distinct and, while they are sequential, are seen to overlap to a considerable degree. Thus the primary purpose, of reducing the raw data and of drawing out essential meaning from them, occurs concurrently with the elimination of redundant or irrelevant material in a scientifically respectable manner.

The data collection process resulted in the writing of approximately nineteen A4 pages per week for a period of twelve weeks. This amounted to a total of about 228 pages. In the context of phenomenological research this is a vast amount of data which, if analysed in the detail implied by Wertz (1983) would be unmanageable. However, the data were not of a dense, deeply psychological nature and the number of NMU's was low in proportion to the amount of text being analysed.

Once sub-phase 1, the intuitive, holistic grasp of the data had been achieved, the further explication of the data was conceptually relatively straight-forward. This was expedited by the requirements of this study which were not to achieve a detailed and complex understanding of the students' experiences of the programme at a psychological level. The task was, nevertheless, demanding as strenuous efforts had to be made by the researcher to 'bracket' his presuppositions and to allow the data to speak for themselves.

The six sub-phases of the Scientific Phase of Explication are explained in detail below and are presented within the context of this study.

5.5.1 AN INTUITIVE HOLISTIC GRASP OF THE DATA

This sub-phase involves a careful, reflective and empathic reading of the data with the intention of acquainting the researcher with the lived-experience of the subjects. The researcher should

be careful to 'bracket his presuppositions', or at the very least, remain aware of his own preconceptions as completely as possible. Once an holistic sense of the data has been achieved "the protocols (diaries) are read again, if necessary repeatedly, with a more reflective attitude" (Stones, 1979, p128). In this way a sense of the wholeness of the data can be retained throughout the remaining sub-phases, which are reductionistic in nature.

Since the purpose of this sub-phase is to achieve an overall appreciation of the data as they were intended by the subjects, and not a detailed understanding of specific meanings contained within the data, it is useful if the researcher has had personal contact with the subjects and their lived-experiences. In this way he is more able to appreciate the experiences of the subjects as these are expressed in the data (Hobbs, 1981).

A further purpose of this phase is to select the specific protocols (diaries) that would be submitted to phenomenological analysis. Phenomenological analysis is intended to achieve as rich a description of the lived-experience of the subjects as possible, thus the most descriptive protocols are selected first and further protocols are added to those until nothing further can be gained from the addition of subsequent data. The statistical technique known as factor analysis can be used as an illustration of this procedure, since the first few factors which are generated are capable of explaining most of the variance among the data and there is little of value provided by subsequent factors.

In this study, in line with similar research (Matthis, 1983 and Parker, 1985), not all diaries were chosen for analysis. For example, Parker (op cit) selected eight out of eighteen protocols. Matthis (ibid, p45) suggests that the selection of protocols be based on those which are "the most adequate" in allowing the researcher to arrive at the essence of the phenomenon being investigated.

Submitting all of the diaries to analysis would have made the process complex and time-consuming. It also soon became apparent to the researcher once the richest and most descriptive diaries had been read, that further diaries were not adding anything new

and were, to a surprisingly high degree, repetitive. Thus in this study, four diaries were selected out of nineteen, but occasional reference is made to others where an aspect contained there illuminates a theme which has already emerged.

The above selection procedure does not rely on statistical concepts such as representative sampling. What makes it rigorous and scientifically acceptable is the fact that it is based on sound philosophical principles, is replicable, refutable and, by means of intersubjective validity, can be corroborated.

5.5.2 SPONTANEOUS EMERGENCE OF NATURAL MEANING UNITS

In this sub-phase the raw data as presented in the diaries are broken down into naturally occurring units of meaning. These units (NMU's) may be a word, phrase, sentence or even a paragraph, and may be defined as:

> "a statement made by S (the subject) which is self definable and self-delimiting in the expression of a single recognized aspect of S's experience" (Cloonan, 1971, p117).

The researcher is required to work through each protocol inserting a diagonal stroke after each NMU and to assign each a suitably derived code. In this study the code system consists of three parts, used in a particular order as follows:

1) Alphabetical, representing the student's identity;
2) Numerical, representing the week number;
3) Numerical, representing a specific NMU within any particular week.

In this study only four diaries are analysed phenomenologically, so where these are referred to they bear the letters A to D. In cases where reference is made to other diaries, letters beyond D are used. In these cases, since they are not analysed fully, no NMU numbers appear. The programme ran for 12 weeks, so the second part of the code uses the numbers 1 to 12. However, responses were collected after both the Rustenburg Nature Reserve

weekend and the Johannesburg College of Education teaching experience and as a final assessment in the last lecture period of the programme. These are assigned the letters W, T and F, respectively.

The numbering of NMU's starts at 1 and goes as far as the number of NMU's in a weekly diary. Where NMU's are quoted in this study, whether in their entirety or in part, or even as selections from a number of NMU's, the appropriate NMU numbers are appended. This allows the researcher to go back to the original source in the diary. The diaries are in the researcher's possession and are available for scrutiny.

An extract from a diary, with NMU's denoted, appears by way of illustration:

> "I felt very motivated and positive after Rae Graham's talk on Monday 6-1/. She is really a dynamic character and believes in what she is doing 6-2/. It motivated me in the sense that I wanted to get involved in my town 6-3/." (Student B, week 6, NMU's 1-3)

Each of the selected diaries was entirely re-written, listing the NMU's in the order in which they appeared. The purpose of this step is to simplify the expression and to cut down on the number of words in an NMU. During this process each NMU, following Stones (1979, p128) is "expressed in a reduced form as concisely and as accurately as possible." The student's own use of language and style are retained wherever possible so as to remain 'faithful to the data'. As was Hobbs's experience (1981, p48),

> "in practice this was not easily done because in attempting to retain the subject's own terminology and linguistic style one was forced to rely almost entirely on the form in which the subject's experience was expressed."

Using the extract quoted above, this stage may be represented as follows:

> '6.1 I felt motivated and positive after R.G's talk.

6.2 She is dynamic and believes in what she's doing.
6.3 It motivated me into getting involved in my town.'

During this stage of the analysis it sometimes becomes apparent, as new meanings emerge, that NMU's should be delineated slightly differently from the original delineations. Such changes may be made at any point in the process - the procedure as described by Hobbs (op cit) are in no way intended to be an inflexible framework. For this reason the researcher felt free to make such changes and did so during this and subsequent sub-phases of this analysis.

In this study each set of diaries produced a range of from 60 to 166 NMU's. In all, 441 NMU's were delineated, coded and re-written.

5.5.3 CLUSTERING OF NMU'S INTO NATURAL MEANING CLUSTERS

This sub-phase consists of gathering all NMU's which have "similar or related meanings or intentions" (Hobbs, 1981, p49) into clusters, termed 'Natural Meaning Clusters' or NMC's. This is part of the process of reducing the raw data down to essential existential themes (EET's).

NMC's should be given a heading or brief description and be coded so that sources can be traced. Thus, to continue with the extract from B.6.1-3 as an example, the re-written NMU's were clustered as follows:

'6(a) RG - stimulating talk/personality (1,2)
(b) Motivation to do civic action (1,3-5),'

where 6 is the week number, (a) and (b) are NMC numbers and (1,2) and (1,3-5) are the original NMU's from which the NMC was derived.

It is possible to derive a single set of NMC's from across a student's entire 12 week set of diaries, but it is felt that such a high degree of reduction would compromise the original purpose of

the study, which was to evaluate the programme event by event or week by week. Thus, in this study NMC's were generated within each week, within each of the four diaries.

In the clustering process many similar, or even identical NMU's are brought together. Stones (1979) mentions the elimination of all repeated NMU's and any irrelevant NMU's. In this study no NMU's were eliminated or classified as irrelevant at this stage, as the purpose of the study is not to investigate a specific phenomenon, and the researcher could not be sure when or how an apparently irrelevant NMU might become significant later.

5.5.4 EMERGENCE OF ESSENTIAL EXISTENTIAL THEMES

An Essential Existential Theme (EET) is defined by Hobbs (op cit, p51) "in terms of its reference to an essential element or elements of the lived-experience of the subject..., without which, a description of the subject's lived-experience would be incomplete." The word 'essential' refers to the 'essence' of meaning, that is, it is an essential part of the subject's existential relationship with his world.

This sub-phase deals with the identification of EET's at an inter-week and intra diary/student level. That is, for the first time analysis is aimed at combining the twelve weeks into a unity, but the focus is still ideographic, and no attempt is made to integrate across diaries/students.

In fact, it is only in the sixth sub-phase, the Extended Description, that some important insights and relationships became apparent. This is because prior to this sub-phase the procedure is reductionistic and tends to dissect the data. It is for this reason that the researcher is warned by Stones (op cit, p129) "to be aware that each meaning unit exists in the context of the other inter-related meanings of a protocol." However, there is such a complexity of interrelationships among the NMU's in fifteen separate 'weeks' (including W, T and F) and four different students, that in spite of the 'intuitive and holistic grasp' of the data, maintaining a general overview proved very difficult

until the synthesising process of the Extended Description was undertaken.

The emergence of EET's required the researcher to work through NMC's (still organised weekly), as follows. Firstly, sub-phase 1 was repeated with each of the diaries in order to regain the 'intuitive and holistic grasp'. Then, using one of the diaries, the first NMC in week 1 was given a brief description. This was to facilitate the clustering of similar NMC's. Each NMC was described in turn, and, if it was similar to any previously described NMC's, it was clustered with it. This process was continued until all NMC's had been assigned to clusters, or EET's.

This procedure was carried out for all four diaries. A coding system was used as before to aid the identification of the original sources. By this stage the original extracts used as an example have been lost within various EET's, so a fresh extract is used to illustrate the coding. Student B's diary produced ten EET's. The tenth one was called 'Knowledge gained' and was recorded as follows:

10 Knowledge gained -

[W] (l) 22,44; [5] (f) 8,9; [8] (a) 1; [11] (a) 1; [F] (c) 4).

where the 10 refers to the EET number, the [W],[5],[8],[11] and [F] refer to week numbers, the letters in lower case refer to the NMC's from which the EET was derived, and the rest of the numbers are the NMU's that formed the respective NMC's.

5.5.5 CLUSTERING OF ESSENTIAL EXISTENTIAL THEME'S

In this sub-phase, the ideographic EET's obtained in sub-phase 4 are themselves clustered, so that the reduction process, having already combined weeks, now combines diaries. The result is a list of nomothetic EET's which should "form as complete as possible a framework for understanding and communicating the essential elements of the total lived-experience of the subjects" (Hobbs, 1981, p52). Obviously the 'total lived-experience' in

the case of this study refers to the experience of the programme itself.

The coding system employed allows for reference to the original sources, but more importantly, serves as a reminder that the EET's are derived directly from those sources. They are the product of the students' experiences of the programme and, insofar as the researcher was able to 'bracket', are faithful to the original data. It is true that the specific wording chosen to describe the EET's may differ from researcher to researcher, but the actual themes must be seen (once again taking the researcher's inability to be perfectly detached from the meaning-making process into account) as truly representative of the students' experiences.

There could probably never be total agreement among different students, so some diaries will contain themes that others do not. It is remarkable, however, that of the total of sixty EET's which emerged, only seven were not common to each of the four diaries, and these seven were evenly spread amongst them. This suggests that virtually any one of the four diaries could have been selected, and it alone would have produced a high proportion of the meanings contained within the Extended Description that is presented in Chapter 6. The fact that there was such strong agreement among the four diaries suggests that the themes which emerged are 'essential' parts of the programme experience, and that the generalisations derived from the study are both valid and reliable.

The extended description is based on the list of nomothetic EET's, so the ordering of the list is significant. Nomothetic EET's are frequently arranged hierarchically, according to the number of NMU's or NMC's represented in the EET. This may produce a meaningless or irrelevant arrangement, and so they can be arranged in clusters or groups, also in an hierarchical fashion according to the meanings inherent in the themes. Hobbs (op cit, p53) "arranged the given themes in an order that was most communicable and that seemed to 'flow existentially'". The EET's which emerged in this study were arranged initially according to the number of NMU's represented in each, but this ordering was modi-

fied in line with Hobbs's approach, which appeared more meaningful.

In spite of the apparent significance attached to the identity and boundaries of the EET's and to their ordering, they are in fact a means to an end, their purpose is to "facilitate the final phase of the explication which is the Extended Description" (Hobbs, ibid), thus they should not be seen as exclusive and definitive.

5.5.6 THE EXTENDED DESCRIPTION

For the first time in the analysis, the process is not reductionistic but synthetic. By this is meant that where the first five sub-phases reduce numerous pages of raw data to a small number of EET's which are the skeletal, but essential representations of students' experiences, the Extended Description restores the flesh to the skeleton in a scientifically respectable way so that a full description, and hence an understanding of the students' experiences can be obtained. Even at this stage the data are referred to extensively to enable the researcher to avoid integrating his own perceptions into the Extended Description and to allow the data to speak for themselves.

In this study extracts from the data are faithful to the original diaries and changes have been made only where spelling mistakes occurred or where, for the sake of consistency, events described by students are referred to differently in this report. For example 'Education week' was changed to 'Parktown Heritage Education Week'. Otherwise the usual conventions of quoting have been maintained.

Stones (1979) suggests that the first, or most significant, EET be described as fully as possible. To this description is added a description of the next EET in such a way that the original description is extended or modified. This procedure is repeated until the Extended Description is complete and full, and the addition of further EET's is unnecessary. The procedure adopted in this study entails a systematic description of all of the

EET's, since each is a separate aspect of a widely defined set of research phenomena. While there is a significant degree of cross-referencing among the EET's, the description of the students' experience of the programme would not have been complete without each of the EET's being included in the analysis.

Having outlined the procedure by which the programme was evaluated, the following chapter presents an extended description of the students' experiences of the programme. This description is based on the structure which emerged from the analysis of the data and, while it still remains true to the data, contains interpretive commentary by the researcher.

CHAPTER 6: THE EXTENDED DESCRIPTION: RESULTS OF THE PHENOMENOLOGICAL ANALYSIS

Chapter Five indicates that programme evaluation centred on a phenomenological analysis of selected student diaries. From this analysis emerged a set of 'essential existential themes' (EET's), which represent the essence of students' experience of the programme. These EET's emerged from the raw data according to the phenomenological principle of 'bracketing'. This means that they are derived from the data themselves and are not the researcher's subjective interpretation thereof.

The EET's form the basis of this chapter, called the 'Extended Description'. The aim of the description is to make explicit the meaning that is implicit in the raw data. As far as possible, students' actual words are used in order to communicate more precisely their experiences, and to remain true to the data themselves. Exercises which took place during the programme are occasionally referred to in the description. These exercises have been described in Section 4.3.

An important principle to be borne in mind is that the names chosen as titles of EET's have no intrinsic meaning beyond their function as foci for clusters of NMC's. The titles are merely convenient labels. In the analytic process, groups of similar NMU's become NMC's, and groups of similar NMC's become EET's. The data themselves provide the groupings, the researcher merely chose suitable descriptions for these clusters after they had emerged.

A list of the EET's, and a systematic description of each of them follows:

1) Learner-Centred, Active and Experiential Learning
2) Greater Awareness
3) Nature
4) Values Education
5) The Practice of Teaching
6) Knowledge Gained

7) Factors Influencing the Learning Experience
8) Commitment to Environmental Quality
9) Definition of Environment

6.1 EET 1: LEARNER-CENTRED, ACTIVE AND EXPERIENTIAL LEARNING

This is by far the most dominant theme to emerge from the analysis of students' diaries. While the programme contains virtually the entire spectrum of learning milieux from the formal, content-based lecture to a more creative experiential approach, learning which was based on personal experience and was active or learner-centred proved most successful.

'Learner-centred' refers to that learning which begins from the point of view of the learner and which makes the learner an active participant in the process, able to influence and alter its course. Active learning involves both cognitive activity, as opposed to passive acceptance of information, and physical activity, such as walking, looking or painting.

The range of learning activities included in the programme, from teacher-centred to learner-centred, will be dealt with in turn, indicating student perceptions of their value. From the discussion it is possible to discern and isolate educational principles which are significant in the development of environmental literacy. The most important principle which emerges from this section is that the implementation of a learner-centred and active, and experiential approach to education is of great benefit in Environmental Education. This is because such an approach is instrumental in the development of attitudes and values and in affective learning.

6.1.1 FORMAL LECTURES

Formal lectures are teacher-centred and are characterised by the lecturer presenting to students a specific body of information about a topic. Students are seldom required to speak or respond in any way other than by listening and taking notes. These types

of lectures are acknowledged by students as necessary and even interesting, but are not felt to be a valuable use of time:

A.2.1-3 I didn't feel exceptionally excited this week. It was, I suppose, of some interest to define what Environmental Education is, but I feel it was dragged out a bit.

A.2.8 ...sitting in a lecture and adding to a discussion is nothing new and exciting.

B.8.2 Tuesday's lecture I didn't feel fascinated and excited about those facts. (This was perhaps the most content-based lecture of the entire programme).

B.F.11 Lectures were sometimes boring because of pure input but at the same time I saw the relevance.

This last comment reveals that students appreciate receiving 'input'. This is confirmed in the discussion of EET 6, Knowledge Gained. The negative response is thus not so much because of the factual basis of the lecture, but because of the passivity of the method itself, thus:

B.5.8-9 Monday's continuation of the urban processes lecture was interesting for me. I enjoy knowing the theory behind the way things happen. (This lecture was illustrated with slides of local examples and related these to theoretical concepts).

C.8.1 I enjoyed the factual approach (use of real examples) so that the theory had a concrete basis.

The most negative response is to those formal lectures which consist of the lecturer providing a purely academic input. NMU B.8.2 above illustrates this. However, when the lecture contains information which is personally relevant through use of local examples, or of environmental issues affecting Southern Africa, such as desertification, or affecting students directly such as statistics concerning water resources, there is a more positive

response:

A.10.1-2 I enjoyed the lecture on the desertification of the Karoo. It's really frightening to think that...

B.11.1 I found this week's lectures on energy interesting and informative. Especially the section on nuclear energy. I didn't know about the radiation energy all around us and that which is emitted from coal (referring to power stations).

6.1.2 DISCUSSIONS

In this type of learning activity the lecturer attempts to involve students in discussion so that they can verbalise their opinions, feelings and reactions in the context of a particular topic.

A.3.6-7 When we discussed,...I enjoyed that as well. It was interesting to hear about the three different ethics and how people interpreted the ethic they had read. Discussion clarified each ethic and allowed me to internalize the ethic and to formulate my own feelings.

Perhaps the best example of this experience occurred when the students, after having agreed that invasion of exotic species (amongst other issues raised) was undesirable, were asked to support their case. Two responses follow:

E.10 I enjoyed Friday's discussion. I like contributing and being actively involved instead of just sitting passively and being filled with facts.

H.10 The discussion on Friday was by far the most fruitful experience all week. It benefited me in that I had to think objectively and not purely on an emotional level and I had my eyes opened and applied knowledge.

6.1.3 CLASSROOM-BASED ACTIVITIES

Typical of this category of learning experience are simulation games, role-play and the use of art and drama. For convenience, the use of visiting lecturers is also included here. Although during the entire programme only one painting exercise, one partially completed Street Theatre exercise and two visiting lecturers occurred, these activities rate very highly and two of them feature significantly in the creation of awareness, ethics, motivation and commitment, as will emerge in the discussion of later EET's.

The painting exercise, for example, was responded to as follows:

B.3.1-5 This week I enjoyed greatly. I felt very positive about my experience and paintings as a means of expressing ideas. I felt that the representations of the article as a painting helped me to summarize the thought or main idea of the article I read...I do not personally agree with this view and found it hard to represent it. But the fact that I 'painted' the ethic made it easier to stand side by side with the view.

The exercise's efficacy as a learning experience is acknowledged widely, as is the enjoyment derived from it. There is clear evidence that successful and efficient learning and enjoyment need not be mutually exclusive, and probably even enhance one another, thus:

A.3.1-5 I enjoyed this week much more than last week. Initially I didn't like the idea of painting but after I began I enjoyed it. It was a way of really getting my teeth into the ethic...It was really a change from reading, writing and discussion.

The visit by Councillor Graham was a highlight of the programme. The educational benefits of the visit will be expanded upon in other EET's, but as a 'classroom activity' the visit was stimulating, interesting and inspiring.

H.6 Wow, what a week. For the first time just about I am feeling really inspired and excited about the course ...Why do I feel so good? Firstly, Rae Graham on Monday was dynamic and a pleasure to listen to. At least I now know what I as an individual can do...

6.1.4 OUTDOOR ACTIVITIES

There were five outdoor activities in the programme: two in the natural environment (Pieter Roos Park exercise and the Rustenburg Nature Reserve weekend) and the rest in the built environment (two Parktown walks conducted by the lecturer and the Parktown Heritage Education Week). An interesting observation here is that Pieter Roos Park is an urban open space serving Hillbrow, Berea and Parktown as its immediate surroundings, yet it is perceived by students as a natural area. This aspect is dealt with in EET 3, Nature.

The Pieter Roos Park exercise occupied the first lecture period of the programme, so student reactions to this are clouded by their feelings about beginning a new course, particularly seeing that they were required to begin the course in what was probably a unique way - outside. Nevertheless there are indications that the exercise itself was responsible for generating excitement and awareness, for example:

C.1.1,3,4 ...will look at Parks with new insight - 'unobvious' aspects of park exciting to explore - park does add dimension classroom can't - as initial stimulus.

H.1 The feeling of excitement and curiosity were increased as we walked around the park along with feelings of enthusiasm and creativity of what can we do to have exciting, different lessons in the park.

The Rustenburg Nature Reserve weekend proved to be an exceptionally valuable experience, particularly in relation to EET 2, Greater Awareness; EET 3, Nature; and Section 6.7.1, Social Interactions. It is thus important to note that the experience

receives very positive comment which suggests that active and experiential learning are responsible for significant growth in a number of areas, in particular, the affect and the development of attitudes and values:

A.W.1,18,25 I found this week-end to be a unique experience...The week-end was a wonderful experience...The entire week-end was an amazingly wonderful experience for me.

C.2.1 After the week-end I was exhilarated.

One of the activities conducted on the Rustenburg Nature Reserve weekend was a Conservation vs. Development debate. The extract used below shows the significance of the activity in the personal development of the students. This is one of many examples in which some of the most significant learning to be reported is associated with personal involvement in experientially based learning activities:

B.W.41-44 I found our little debate very valuable. It helped me work out some moral issues in my own mind and it taught me once again that there needs to be a balance in everything in life. A balance in the way you argue, you can't stubbornly stand on your own view point. You have to see other people's views and come to a compromise. For me I am discovering the solution to the problems in relationships with people.

The other major outside activities were the two Parktown walks. Their significance and value is, once again strongly supported by other EET's. As learning experiences, the two walks are shown to be highly successful. This is the result of a number of factors. One is that the need to know had been created through the requirements of the Parktown Heritage Education Week. This is explained by the fact that there was anxiety before the Parktown Heritage Education Week which was partly allayed by the experience gained on the Parktown walks:

C.4.3 I came back to JCE feeling far more open and confident

about our practical work to follow.

Another reason is that the event itself was perceived to be significant beyond the limited context of formal education:

C.4.6,7 I was delighted when we drove through the area on Sunday, to share with my family some of the observations. My husband actually stopped the car and we got out and walked around and I enjoyed sharing and was amazed at what I'd actually retained.

The walks were successful also because they were enjoyable:

B.4.5-6 I enjoyed our walk to Parktown. It was good to be learning in the open again;

A.5.1,2,6 I thoroughly enjoyed the walk around Parktown...and I was, through the walk, stimulated to want to go on the actual heritage week open to the public;

I enjoyed the walk on Friday and learned much that I didn't know;

Finally, the walks were successful because the experiences were perceived as intrinsically worthwhile and interesting:

A.4.1,2 Last week I enjoyed walking around Parktown and I was very intrigued by the old houses and by what you had to tell us.

The Parktown Heritage Education Week proved to be an excellent example of experiential learning. Prior to the event there was considerable insecurity experienced about what was expected and how theory was going to be translated into practice. (See Section 6.5.2 Security/Insecurity about Practice). As the day drew nearer, so the tension mounted: the Parktown Heritage Education Week was seen as a daunting experience (C.3.1; B.7.1,3,4) and the fact that the students were being required to deal with a real-world situation created uneasiness:

A.7.2 Once the...Parktown day was completed in theory, I felt nervous about putting it into practice.

However, student responses after the experience are overwhelmingly positive and indicate that considerable learning occurred in many of the aspects of teaching such as confidence, knowledge, experience and methodology. For example:

C.7.5 I was pleased to have formulated my own knowledge in this form and to have reached more clarification by being 'forced' into this teaching experience - firstly the actual walking around to see where we wanted to go - secondly the making of formal lesson plans and worksheets - thirdly actually putting the above into practice and seeing the effects and results.

F.7 I do feel by doing this enviro day, it made me aware that our course should consist largely of this type of activity - instead of having lectures which are far less beneficial.

B.7.5 ...but I felt that I had also benefited to a great extent. I not only learned much more preparing the day but also participating in the day with the children.

Although a comparison is probably not consciously intended in B.7.5 above, the 'much more' suggests that less would have been learned in other circumstances. It is probably realistic to suggest that the student was thinking of less experiential forms of learning.

It can be seen that there is a strong positive response to active learning methods and experiential forms of learning and although their value is acknowledged, the teacher-centred experiences are perceived as less beneficial. This conclusion must be seen in the context of students' experiences of their four years of training, of which the programme occupied the final semester. It appears that the majority of their training consisted of teacher-centred formal lectures or discussions during which student participation was limited. This is supported by the following observations:

C.2.8 Sitting in a lecture and adding to a discussion is nothing new.

D.1 A very different week of lectures. The first week of Educational Studies I have enjoyed in four years. I enjoyed it because the lecture was approached from such a different angle - student-centred for a change.

While D.1 seems a bit harsh, it does provide a context for understanding the responses to the methods employed in the programme.

In summary it can be said that the more successful types of learning experiences were learner-centred and required personal and active involvement in the learning process. The principles on which such experiences were based are listed below:

1) Information which is personally relevant or which is backed up by real-life examples makes lectures more beneficial.

2) Discussions are enhanced when they encourage active involvement, where students can verbalise their thoughts and feelings.

3) Creating the need to learn, through making students personally responsible for an actual, real-world educational event acts as a powerful catalyst for much significant learning, especially in the area of attitudes and values.

4) Personal enjoyment enhances learning experiences.

5) Experiential, active and learner-centred learning allows for the development of far more than the cognitive: it is also significant in the area of values, ethics and attitudes.

6) Classroom based activities where students can experience the learning material in a format which is diff-

erent from the conventional, usually printed or spoken, style of presentation are valuable. In the programme such activities rely chiefly on art and drama.

7) The use of a visiting lecturer, who can sustain a high level of enthusiasm and interest over a short period of time, is a successful technique.

8) Exercises which allow students to see new educational potential in a familiar resource such as a park are stimulating and are perceived as valuable.

9) The provision of learning experiences which are perceived as intrinsically valuable, worthwhile and significant is important. The reasons why such perceptions of worth exist is explained by the other principles in this list.

If the phenomenological precept of allowing the data to speak for themselves is adhered to, the last word can safely be left to the students:

F.F ...when we were left alone to work out and discover these aims by ourselves it was magic. This self-achievement was amazing. Discovery is amazing.

6.2 EET 2: GREATER AWARENESS

The title of this EET has no special meaning. It is simply a phrase which acts as a convenient focal point for all related NMC's. The EET deals with two related yet distinct facets of awareness, namely, the development of environmental awareness and the development of self-awareness, or personal growth. These are complementary facets of the general theme of awareness and have been dealt with as two categories under the heading 'Greater Awareness.'

It is important to note that the creation of environmental awareness and the facilitation of personal growth in the area of values and ethics are two cornerstones of Environmental Educ-

ation. Thus it is significant that this EET emerged as one of the dominant themes in the study.

6.2.1 GREATER ENVIRONMENTAL AWARENESS

In the discussion of EET 1, Learner-Centred, Active and Experiential Learning, the significance of outdoor learning was highlighted. Their importance in the programme is supported here, as the majority of NMU's dealing with environmental awareness appear within student's descriptions of these activities.

D.10.3 I feel the practical activities heightened my awareness of the environment around me.

This does not suggest that being outside is the prime requirement, but that experiential learner-centred learning be the methodological focus. The Pieter Roos Park exercise is the first part of the programme to feature under this category.

D.1.2 The visit...made me open my eyes. How many times have I driven past this lovely park, yet never noticed it? The visit...made me very aware of my surroundings and, every time I drive past a park I try to take a good look.

The awareness caused by the park exercise is largely of the park's potential as an educational resource. This growth, in conjunction with the Rustenburg Nature Reserve weekend and the lectures on environmental ethics led a few weeks later to:

D.5.2 ...after re-reading the article ("We may be brothers after all" - Chief Seattle), I was standing by my window looking out and contemplating what he said, when I suddenly looked and really saw this tree. I take it for granted that it is there...and with this view in mind began to regard it with far more respect.

This illustrates the point that the development of environmental awareness is a long term process, requiring a variety of experi-

ences over a period of time. Apart from this incidental reference to heightened awareness, all other references relating to this category refer to a specific component of the programme. These will be dealt with in chronological order.

Surprisingly, the Rustenburg Nature Reserve weekend experience does not receive much attention in the context of environmental awareness. This can be explained by the fact that the focus of the event was not on the natural environment per se, but on the affective, inner response to it. On occasions the lecturer referred to it as a 'bush party' or in more sophisticated language, a 'celebration of wilderness'. Thus the weekend features much more significantly in the category below, Personal growth and awareness. Nevertheless, some NMU's relevant to the present category do appear:

D.W.1,2 I really feel I experienced and enjoyed the environment about me during 'Solitaire', especially the evening 'Solitaire', where I was forced to use my other senses - hearing, smell, instead of just looking. I became aware of rustling, chirps and many other sounds I usually do not listen to, although I might hear them.

D.W.5 The hike...was the first hike I have done (during which I) speculated and examined each animal dropping. Usually I walk past...and leave it at that. I realised just how much information we can glean from a so called 'mere' dropping.

The learning experiences that were most significant in the creation of environmental awareness are the two Parktown walks. The actual contact time during the two walks was thirty five minutes and sixty minutes respectively, which represents about 5% of the actual, time-tabled contact time (i.e. excluding the Rustenburg Nature Reserve weekend, self-study time and lost lectures). It can be seen then, that the use of that time was most efficient and productive. The experience of really seeing or of noticing something new in a familiar environment as a result of these exercises was common and was so marked after the second walk (Friday) that students raised this point spontaneously and

excitedly on the Monday morning. This is reflected in the diaries by the following:

C.5.2,4 I was delighted with the walk through Parktown and the exercises we did. The buildings had just been 'there' before and now, with focus, I could 'see' so much more.

D.5.4 One tends to look at a building and decide that they don't (sic) like it or do...and it forced me to write down my feelings about them, therefore making me think of reasons why they did/did not appeal to me.

There appear to be two reasons why these exercises were successful. The first is that students were required to look closely at a variety of details by means of a guided observation sheet on the first walk and a Building Impact sheet on the second:

A.5.5 I found the activity using the Building Impact sheet useful. It focused my attention on specific details whereas I may not have been so specific.

The second reason is reflected in D.5.4 above and refers to the making of value judgements, of engaging the affect with the object so that significant personal meaning can be created. This process allows for the internalisation of feelings. Working at the affective level is a fundamental principle of the programme: the results of this approach are apparent from the analysis. Further evidence of the concept of 'engaging the affect with the object' follow:

I.5 It was the whole aesthetic experience that was really meaningful, rather than looking for various shapes and textures.

J.4 I had mixed feelings about what I preferred, the old or the new buildings - I guess each has its own dynamics - but the Anglo American building is the pits.

K.4 Others have also tried to keep the area looking unified

while others did not care at all. This really upset me.

There are many indications in the diaries that generalisation of environmental awareness did take place, for example:

A.4.5,6 I'd just like to add that whilst on holiday at the coast I was so much more environmentally inclined than I had been before. I was aware, for example, of the distinct contrast between the lush vegetation and the smoke pouring out of the sugar mill...I was more environmentally aware and I felt good about it.

Further generalisation is evident in the reports of the Parktown Heritage Education Week where students show that they gained sufficient from the programme to be capable of developing environmental awareness in their pupils. The following comment refers to the Parktown Heritage Education Week during which the students took pupils on 'educational experiences' in the area:

D.7.5 We (pupils and students) went to Stone House and compared the old and the new, where we had great debates as to which was the best. For although Stone House looked very interesting, the building opposite looked the best. However, if we had to knock down Stone House - it was unacceptable, because it blended in better and had more valuable things in it; about it, like ghosts!, while the new building was too clean; did not really blend in and had no historical value.

Obviously, the above merely reflects the discussion between students and pupils and does not prove that environmental awareness was created in the pupils, nevertheless the possibility is supported by other students' comments, such as:

C.7.2 ...it was amazing to see them (pupils) becoming more aware of their surroundings...

After the Parktown Heritage Education Week the programme focuses on environmental issues, which were dealt with in the classroom.

'Awareness' was no longer of surroundings, but of issues. Students show that in learning about various issues such as water pollution or desertification, they became worried and concerned about the implications of these processes. They also frequently translate this concern into some kind of action, whether actual or implied. Those lectures that were personally relevant to students and gave them some ability to do something about an issue, thereby overcoming a sense of helplessness, were the most successful in creating environmental awareness. The following extracts illustrate the above comments:

C.10.5,7 I found becoming aware environmentally quite scary and am happier when there is something that can be done to halt e.g. - forests dying; ammonium rain; the encroachment of the Karoo etc. Who is going to do something?

I kept trying to remember that it is the little steps that count and the little actions that count!

A.10.4,5,6 You have achieved your aims in making me aware of the ways we are slowly and surely adding to our own environmental destruction. I found myself telling my mom to put a brick in our toilet (cistern), telling my boyfriend to carry on using roll-on deo etc. etc. It's really amazing how aware one actually becomes if we only are aware of the ways we can help/make a slight contribution.

B.11.2-4 It made me realize how complex this environment which man has made has become complicated with all these problems. It arouses in me a sense of hopelessness of a solution to these problems. But when I think apart from my emotions I realize that there is always hope.

6.2.2 PERSONAL GROWTH AND AWARENESS

This category focuses on the development of self-awareness, values and ethics. It is regarded as significant that personal growth and awareness are given consistent prominence in the diaries since these are closely related to the development of environmental literacy. An interesting observation regarding the appearance of this category is that it is reported deliberately in relatively few places except the final assessment, where such responses could have been elicited in at least two specific categories. Elsewhere, the category is more implicit than explicit, which suggests that students were not fully aware of their growing self-knowledge, but that on being asked to reflect on their learning were able to see that they had experienced a definite personal growth.

The Rustenburg Nature Reserve weekend experience allowed a certain type of personal growth as students were provided with time and space for reflection while enjoying an experience of nature. It was a time of introspection and of coming to terms with values and self:

D.W.2 'Solitaire' gave me time to think of where exactly I fit in with my environment...

C.W.8 I enjoyed the quiet, aloneness, unpressurisedness and time to explore thoughts alone.

B.W.13,16 But that time spent in solitude was really peaceful and restful...I just cleared my thoughts of the city and of worries.

C.W.1,3 I realised the philosophy of a healthy body is necessary for a healthy mind...once I'd decided to do something about it, diet and try to get fit and do my best, I felt better.

An illustration of the degree to which the experiences of the Rustenburg Nature Reserve weekend are significant and not transient is that a year after comment C.W.1,3 was made, the student

reported a loss of ten kilograms through exercise and dieting as a direct response to that experience.

For some the experience of nature has a religious quality. Nature is so big and overwhelming that the individual shrinks into insignificance and is faced with questions of existence:

I.W. 'There is a God'. This thought came to me strongly while I was sitting in solitaire one evening. I couldn't get over the vastness of the universe. It was just so enormous and I felt so minute, so small...From these feelings I got a lot of my thoughts in perspective...It was a wonderful experience in that the environment encourages you to gain perspective of your world, being removed from it.

The painting exercise dealing with ethics proved to be another significant growth experience. The emphasis in the diaries reflects attempts to formulate an appropriate environmental ethic. The painting exercise enabled students to grapple with the ethics being considered and to make unrestricted choice among alternatives, thus:

A.3.6,7 It was interesting to hear about the three different ethics and how people interpreted the ethic they had read. Discussion clarified each ethic and allowed me to internalize the ethic and to formulate my own feelings.

I.3 It made me very conscious of the fact that I felt as though I had to sort out in my own mind which ethic I saw myself as fitting into at present! I found conflicts within myself and came to the conclusion that I was not going to put myself or my ideas into a box, but to give myself time to come up with something after more experience.

F.3 I found seeing other people's art work helped me come to terms with where I am going.

D.3.1,2 This week has me reflecting as to just what ethic I follow, I like to believe it is the 'Stewardship ethic' ...I am watching what I am doing and I am trying to find out. I feel that maybe I do take my environment a little for granted - I am genuinely trying to change this...

It is interesting to note that the process of clarification and internalisation referred to above was also generalised and influenced the way students acted, as is reported in D.3.1,2:

"I am genuinely trying to change this..."

This confession appears to be more than a passing mood, because two weeks later, in a situation described earlier under 'Environmental Awareness', the same student describes really seeing a particular tree, having previously taken it for granted and, becoming aware of the tree as an individual with biographical details, "began to regard it with far more respect" (D.5.2).

An important lesson was learned from the painting exercise by a student who had been required to 'paint an ethic' she didn't identify with. The exercise enabled her to "stand side by side with the view" (B.3.5) and this

B.3.6,7 ...reminded me of a lesson in life. In everything in life we need to see the other person's point of view. See it in such a way that for a moment we can agree with them and not just keep pushing our view onto them. I felt wonderful afterwards when I thought about the painting experience and saw that it was related to my learnings or experiences in life generally.

Other evidence to suggest personal growth and the development of an environmental ethic relates to environmental issues. In most cases students report feeling strongly about a situation where man is causing a deterioration in the environment, for example:

C.10.5 I found becoming aware environmentally quite scary...

D.6.3 It made me sad to think that something of such value, which was once covered in plants, trees, animals, is now camouflaged by man's influence.

B.8.4 When I heard how things are happening today, i.e. Karoo moving inland because of overgrazing it made me angry.

The rest of the evidence relevant to this category appears in the final assessment. There is strong support there for the contention that the primary aim of the programme (that is, the development of environmental literacy in students) was achieved. Such support occurs in every diary in an unequivocal form and is exemplified by the following:

A.F.2,6,7 I definitely feel that you have created an environmental ethic in me. I feel I've grown environmentally as a person through this course. I've become more aware of environmental issues and my world that surrounds me.

B.F.13 I am sure this point needn't be laboured. It has definitely benefited me as a person. It has also helped me work through my philosophy of teaching.

C.F.1,6 I am definitely more environmentally aware in noticing, in thinking and worrying. My own values as regards Environmental Education have been clarified and internalised. I'm sure this awareness will stay with me and my own ethic will truly become 'striving towards a more livable future.'

E.F. I had all the ideas but they weren't really very strong. Now I've 'fed my soul' I've committed myself to environment, i.e. I know <u>why</u> I value different aspects of the environment, also <u>how</u> to value it, i.e. play an active role.

An important point to be noted here is that the above comments are in response to a question concerning the achievement of the programme aims. Apart from the strongly affirmative response, it is also clear that students' experience of the programme caused

personal growth and development in the areas of ethics, values and attitudes. Perhaps more importantly, they appreciated the fact that, for them, growth in these areas is central to the development of environmental literacy. In other words, of all the learning which took place, 'feeding the soul' emerged as perhaps the most important benefit of the programme.

In summary, this EET provides some important principles for the development of environmental literacy. These are listed below:

1) Experiential, active and learner-centred learning are significant in the creation of environmental awareness. In terms of lectures specifically, those which are personally relevant to students are the most successful in creating environmental awareness. A further characteristic of such lectures is that they assist students to do something about an environmental issue, thereby overcoming a sense of helplessness.

2) Development of environmental awareness takes place in all environmental contexts and is not restricted to the natural environment.

3) Growth in such characteristics as environmental awareness is a long term process and requires a variety of experiences over a period of time.

4) The experience of really seeing or of noticing something new in a familiar environment results from exercises which require students to look closely at a variety of details in an object. An important component of this 'seeing' is the making of subjective or affective value judgements about the object so that significant personal meaning can be created.

5) Awareness of the potential of an urban park as an educational resource in terms of a wide definition of environment can be created by requiring students to devise simple Environmental Education exercises using a park as the context for the exercises.

6) Providing students with time and space for reflection while they enjoy an experience of nature facilitates a process of personal growth, and of coming to terms with values and self.

7) The freedom to choose among alternatives in the area of environmental ethics contributes significantly to personal growth.

8) Students who have to work with a viewpoint that does not accord with their existing set of values experience more significant personal growth in many areas than do students who work with a viewpoint they do support.

9) The development of environmental awareness cannot be divorced from personal growth. In other words, personal growth and development in the areas of ethics, values and attitudes facilitates the development of environmental awareness. This suggests that learning must be holistic.

6.3 EET 3: NATURE

This EET deals with references in the diaries to the natural environment. Since the programme is placed predominantly in the built environment, there is very little direct contact with nature. The Rustenburg Nature Reserve weekend is the only event in the programme which provides direct contact with the natural environment. The only other obvious reference in the programme to the natural environment, namely the section which deals with environmental issues, is less directly experiential.

In the context of the Rustenburg Nature Reserve weekend it appears as if being in nature is conducive to the 'introspection and coming to terms with values and self' as described in EET 2. Nevertheless, there is a distinction between what is described under personal growth and awareness and what emerges under the theme of nature. A selection of NMC's from which this EET emerged, illustrates the distinction:

1) reaction to nature;
2) peace in nature;
3) being engulfed in nature, its peace and beauty; and,
4) peace and tranquillity in nature.

From this it can be seen that nature provides the physical context for much of the growth in personal awareness which occurred during the Rustenburg Nature Reserve weekend experience.

This EET emerges from a relatively restricted range of NMU's, which is not surprising considering the design of the programme. It is, nonetheless, a dominant theme as it provides almost half of the NMU's that were written about the Rustenburg Nature Reserve weekend experience. Three sub-themes emerge from these descriptions, namely,

1) the dichotomy between nature and Man;

2) the engulfing grandeur and beauty of nature resulting in experiencing a oneness with nature; and,

3) the fear and tension created by the unknown, unpredictable and uncontrollable forces of nature.

These sub-themes are illustrated by a selection of typical statements:

A.W.9,20,24 I was upset by the way someone had abused the beauty of nature by throwing away a yoghurt container along the trail.

Sitting through solitaire almost moved me into another world - a world unspoilt by man.

...how much peace and tranquillity there is among that which has not been destroyed or interfered with by man.

B.W.45 I felt sad to leave Rustenburg because I knew what it meant. Leaving nature and becoming part of the city again.

A.W.2,3,5 The experience of losing myself in nature's beauty was in itself an excellent way to feel close to nature and a way of being engulfed in an environment that lacks noise, hustle and bustle, stress and rushing around. The mystique of the mountains simply engulfed me into their beauty and wonder.

B.W.23,24,25,27 But just the fact that I was out there, sometimes exerting myself conquering 'mountains' and hills made me feel part of nature. Even though people surrounded me and were talking, I was alone in nature. But what struck me most was the oneness with nature and solitude.

C.W.9,12 I felt alone, but connected to all around me when I lay flat in the grass at night. I was overawed by the grandeur and complexity of the rock formations, hills, craggy mountains, waterfalls...

B.W.2,4 My orientation walk was very tense and yet relaxed. It was strange to be <u>so</u> close to real animals. When I stopped walking there was dead silence, almost unbearable silence.

B.W.37,38 Saturday solitude time I was extremely frightened. I was sitting in the open and kept hearing noises behind and in front of me and the silence became unbearable once more...the fear and silence was too overpowering. So on Saturday night when I felt at peace in my bed I thought it was quite an achievement.

It is argued that the major focus of the above comments relates to the 'archetypal experiences' (Raimondo, 1985) which were included in the Rustenburg Nature Reserve weekend. It thus seems clear that where the natural environment is used for educational purposes, significant benefits can be derived from the use of archetypal experiences.

The only NMU's in this EET to emerge outside of the Rustenburg Nature Reserve weekend experience were reported after the Pieter

Roos Park exercise. The park may be perceived as a half-way point between the concrete jungle and unsullied nature, for example:

A.1.2,6 To me, visiting the park was just the beginning of the journey to experiencing and appreciating nature and the natural environment. The park did not have as much impact on me as did the camp, probably because it was not untouched by man, as well as the fact that it was surrounded by noise and concrete jungles.

The park was not always recognised as belonging specifically to the natural environment, but simply as a 'place' where city people could relax:

C.1.5,6 ...space for people in crowded flats, Hillbrow, hostels, high-rise buildings - quiet, peaceful, time-out place, place to think, place to just 'be'.

Nevertheless, many of the attributes normally associated with nature are present, thus justifying the park's 'honorary' natural status.

From the evidence it can be seen that students perceived nature to represent that which is good, although only when it is knowable and controllable. The activities of man are perceived as a negative influence in nature, and the city as a profane or hostile 'wilderness', as opposed to the real wilderness which is perceived as sacred and peaceful.

In conclusion, important principles which can be derived from EET 3 above are:

1) Archetypal experiences add significantly to the benefits of educational programmes conducted within the natural environment.

2) The natural environment, depending on how it is used, provides a context for valuable personal growth in the areas of values and ethics.

3) There is a need for students to experience nature. Although few people can enjoy a true 'wilderness' experience, it appears as if urban open spaces, specifically parks, can fulfill this need.

6.4 EET 4: VALUES EDUCATION

Through its inherent nature and approach the programme allows students to be educated in the area of values and attitudes as an on-going process rather than through the use of a series of deliberately structured exercises. Although such exercises are included in the programme they are always intended to be a means, not an end. This EET deals with references in the diaries to all educational experiences which deal, implicitly or explicitly, with values education.

Such experiences are characterised by their ability to enable students to confront, clarify and modify personal values and attitudes. Their value is directly related to the development of environmental literacy. As was pointed out previously, although environmental literacy consists of cognitive, affective and behavioural components, without appropriate attitudes and values, environmental knowledge is of limited value and behaviour is not likely to be environmentally beneficial.
The exercises designed specifically to allow a values education process to occur are the painting exercise and the Conservation vs. Development debate. It appears that being exposed to other people's ideas and opinions is important to the process:

A.3.6,7 It was interesting to hear about the three different ethics and how people interpreted the ethic they had read. Discussion (which was not teacher-centred) clarified each ethic and allowed me to internalize the ethic and to formulate my own feelings.

A.W.12 I felt it was beneficial to experience other people's feelings as well as my own.

B.3.8-10 Tuesday's lecture (discussion) actually formed part of

my thinking and reflecting on the experience. It was encouraging to see that maybe others had the same point of view and different. The whole exercise of talking about the paintings really helped me to see the 3 ethical view points in an abstract or rather concrete form (sic).

An important product of this exposure to a variety of opinions is the lesson of compromise:

B.W.43 ...you can't stubbornly stand on your own view point. You have to see other people's views and come to a compromise.

Just as exposure to a variety of ideas is important, so too is the freedom to choose among these alternatives, the emphasis here being on personal freedom. This point is made in EET 2 and is also supported here, as the following extracts show: (present author's emphasis)

A.3.7 Discussion clarified...and allowed me...

I.3 ...I had to sort out in my own mind...I was not going to put myself or my ideas into a box...

F.3 ...reflecting as to just what ethic I follow...

Another important aspect in the process of values education seems to lie in being forced to consider or even defend (not necessarily publicly) a position which is contrary to one's current beliefs. Consistently, those students who report the most learning in the area of values and attitudes were those who had been uncomfortable bedfellows with a particular view. Thus:

E.W I found the debate interesting - I initially felt strongly about conserving the reserve - yet once I was actually forced to stand for the opposing view I became inclined to adopt a new view/attitude - just shows the power of the mind.

B.3.4,5 I do not personally agree with this view and found it hard to represent it. But the fact that I 'painted' the ethic made it easier for me to stand side by side with the view.

References to a process of values education are made in response to a variety of experiences, many of which are not designed primarily as values education exercises. For example the aesthetics exercise during the second Parktown walk showed students that tastes and preferences differ among people - there is no right answer:

C.5.5 The building we liked best...was commented on by someone who came out of the building as being 'horrible'...Interesting!

Other students found that even within a group of three, consensus could not easily be found. The significant principles here are, once again, being exposed to differing opinions, and compromise.

The matter of compromise became important to some of the students as it was raised during discussions in relation to other people's behaviour. An example from a diary illustrates this:

C.9.5 I feel worried that a person like N sees things only from an 'own' view...

These principles are of great importance in the development of environmental literacy. Environmental problems are usually fraught with conflicting values or vested interests, and sound solutions are usually to be found through a process of compromise. People who have been exposed to values education are more likely to be able to make a positive contribution to such situations. The importance of the link between values education and environmental literacy is thus emphasised.

This link can be seen in the above student comments in that the programme has encouraged students to examine their own perceptions and to compare them non-judgementally with the views of others. This demonstrates a consonance between student experien-

ces of the programme and the existential perspective which underlies it. Students are seen to stand aside from what they might normally take for granted and to show a willingness to alter their understandings of reality.

Perhaps the most important aspect of values education is the approach of the educator. This is discussed in more detail later (Section 6.7.4), but comments relevant to the present EET are included here.

Students report that they were given due respect as people and adults and that they did not have ideas imposed on them by the lecturer:

F.F It was good that we could be...treated like human beings and not just machines who were to believe and accept all that was said.

C.2.9,10 ...we are being lead out of ourselves towards insight and are not having values dumped onto us or being used as buckets to fill with knowledge. Paulo Freire and Martin Buber would approve of the approach used.

This is vital since the principles of exposure to a variety of opinions and the freedom to choose among alternatives, which have emerged as important, depend on such acceptance and mutual respect, as does the learner-centred approach mentioned in Section 6.1 above. It can also be seen that the programme allowed students to experience being treated 'like human beings'. This demonstrates again that the existential perspective of the programme is evident in students' experiences of it, and also that students found this to be very positive.

In summary, important principles which emerged from this EET and which are applicable to future Environmental Education programmes are as follows:

1) Exposure to a variety of ideas and opinions, especially where there is no obviously right answer is important in the development of tolerance and compromise. These two

characteristics are seen to be highly relevant to the solution of environmental problems and to the development of environmental literacy.

2) Just as exposure to a variety of ideas and opinions is important, so too is the personal freedom to choose among alternatives.

3) Consistently, students who report most learning in the area of values and attitudes are those who have been required to consider a position which is contrary to their current beliefs. This principle is described in Section 3.2.3 as the creation of classroom situations which "make it difficult to maintain peace of mind" (Greene, 1973, p281) and is an important part of the approach to wide-awakeness, also described there. Standing 'side by side' with a view students initially did not support is such an experience. It is thus most significant that it emerged here in a section so closely related to the development of environmental literacy.

6.5 EET 5: THE PRACTICE OF TEACHING

There are many references in the diaries to practical aspects of Environmental Education. Some of these are about programme requirements, for example, the Parktown Heritage Education Week and the assignment set for the Johannesburg College of Education teaching experience, while others relate to students' anticipated activities as qualified teachers. Although three separate categories connected with the practice of teaching emerged from the analysis of diaries it seems appropriate to incorporate these into a single EET. The three categories are:

1) teaching methodology and ideas;
2) security/insecurity about practice; and
3) enthusiasm/desire to implement Environmental Education.

An interesting feature of the NMU's which constitute this EET is that, apart from being among the most abundant in any of the

EET's they are the most widely distributed throughout the twelve weeks of the programme. This spread is explained by the fact that the programme was not designed to deal directly with the practice of teaching. In this respect the abundance of NMU's is significant. Their widespread nature suggests that students constantly relate their experiences of the programme to the classroom situation.

Nevertheless, by separating out the NMU's related to each of the three categories in this EET, some interesting clustering emerges. This will be dealt with within each category.

6.5.1 TEACHING METHODOLOGY AND IDEAS

The majority of methodology and teaching ideas gained by students from the programme did not emerge from deliberate attempts to provide this type of input. Where methodology was dealt with, however, for example, the extracts from Bowman's (1979) set of lesson suggestions which were handed out, students found this useful, as the following show:

C.8.4 I was pleased to have actual lesson plans given to us - again the practical approach;

D.F.5 The handouts with lesson ideas were most valuable to me;

The major methodological input was by example. The lecturer made a point of presenting the programme by means of a wide variety of teaching styles and educational experiences, as described in EET 1. The following NMU's illustrate the variety of exercises which students found useful as teaching ideas:

A.1.1 The activity in the Pieter Roos park enabled me to see how to utilize the park in different ways.

D.4.4 This trail (the first Parktown walk) made me think that for the Parktown Heritage Education Week I will concentrate partially on history and the history of Parktown;

and what we have to lose.

E.3 I am definitely going to use this approach (the painting exercise) in my teaching. Thanks for the idea.

L.3 In fact I thought it was a very good method of teaching (the painting exercise)...

B.9.5.6 I enjoyed the Street Theatre report back. I thought it was a good idea.

C.F.4,16 I learned new methods, e.g., street theatre, the whole urban aesthetics, theme-linked teaching was clarified and intensified, directed looking, e.g., Parktown Heritage Education Week. I've found your 'lectures' well prepared, <u>varied</u>...(author's emphasis).

Apart from the lesson suggestion hand outs, which were merely given out at relevant points in the programme without much discussion, there was only one deliberate attempt to provide a methodological input, namely the theme teaching section during week 5. The term 'theme teaching' is used here to mean teaching across subject boundaries by means of an umbrella theme which links relevant aspects of separate subjects. While there was initial resistance to a theme teaching approach, typical responses to it are generally positive:

C.5.11 The theme teaching was another concrete, worthwhile input.

B.5.1,7 I feel very positive towards integrated teaching according to the environmental emphasis. It was good to listen to an experienced teacher talking about integrated teaching, to see and know that it can work in the classroom.

Even here (B.5.1,7) the value of teaching by example is emphasised. Thus it appears that, although formal methodological input is valuable and appreciated it is also important that the

lecturer is seen to be practising good teaching methods. In this regard it is clear that the lecturer plays a significant role and all planning must be informed by the knowledge that the lecturer is a role model in many respects.

There is no strong clustering or significant distribution pattern of NMU's evident in the present category except that the majority of responses were stimulated by activities which may be described as unusual or different. The following category, however, shows a striking clustering of NMU's in the weeks preceding the Johannesburg College of Education teaching experience and the Parktown Heritage Education Week.

6.5.2 SECURITY/INSECURITY ABOUT PRACTICE

It is evident that students found the idea of putting Environmental Education into practice frightening. This is more so in the case of the Parktown Heritage Education Week than the Johannesburg College of Education teaching experience, which was more of a known entity. The inclusion of a teaching experience assignment in the programme was perceived as an irritation rather than as a major hurdle. Thus:

C.3.1 The idea of the Parktown Heritage Education Week I found most daunting...who...what...how...?

B.7.1,3 In the preparation stages I was insecure because I didn't quite know where we were going. Monday morning I was nervous.

C.7.1 I felt pleased that the 12 September 1986 had actually arrived and that all our preparation work would be put to the test.

The latter comment does not reflect fear, but it does illustrate the extent to which the event created anticipation. By contrast, the following NMU's, which refer to the Johannesburg College of Education teaching experience, illustrate a fairly general sentiment of little more than irritation or reluctance.

B.4.1-4 I am a little concerned about our teaching experience and implementing Environmental Education...I am prepared to do it...I feel that I have some experience and maybe don't need the extra pressure during continuous (teaching). If I have to do it I will.

Part of the resistance is because the assignment was announced after many students had almost finalised their preparation for the Johannesburg College of Education teaching experience. The lecturer assumed that three academic weeks and the July vacation would be adequate warning. Nevertheless, a significant contributor to the anxiety evidenced in the diaries is the students' perceived lack of ability and knowledge.

What is interesting about the experience of insecurity is that, were it not for the practical requirements of the programme, particularly the Parktown Heritage Education Week, these fears may never have emerged. This observation is based on direct communication with students rather than the diaries. Nevertheless, the clustering of NMU's referred to above and, with the exception of a single NMU in the final assessment, the abrupt termination of insecurity related NMU's after Week 7 support the observation.

It is as a result of reading the diaries each week and also of direct communication with students that the methodology in Week 5 was inserted in place of other Environmental Education activities. This insertion was intended to allay some of the fears, which, judging from student comments, it seemed to do:

B.5.1,2 I also feel enthusiastic about applying this technique (integrated teaching) in my classroom one day. I feel more relaxed about my teaching experience as this week I had a brilliant idea of what I should do.

In fact, it appears as if the major fear was of the unknown, both pedagogically and administratively:

C.2.11 I feel worried about the Parktown Heritage Education Week - until I start getting involved in the actual

planning I suppose.

C.3.2 Perhaps with more work in this direction and I know we'll be handling more in the weeks to come, I'll feel more confident.

C.4.3 I came back to JCE (from the first Parktown walk) feeling far more open and confident about our practical work to follow.

It seems clear that to be pushed into a learning situation where a lack of confidence would otherwise remain a permanent barrier is one way of building confidence. (It is assumed that the 'learning experience' is reasonably within the ability of the student). Dewey's (1910) concept of learning supports this contention, since he suggests that in order to solve problems, the individual needs to apprehend the elements of the problem through the senses. Learning is thus the result of an experiential process through which the individual's knowledge can be restructured. In this regard the practical requirements of the programme appear to have been successful in adding vital skills to students' teaching repertoires:

E.7 I wasn't sure where to begin...I felt structure was missing (from the lecturer's explanation of what was required of the students for the Parktown Heritage Education Week).

I learned I could organise and do a tour. I <u>can</u> do it!!

G.7 I was, at first, rather unhappy about having to do this programme, but now I could not be more thankful for the opportunity to learn and help other pupils, parents and teachers to learn about their environment.

In spite of the above evidence that greater security in tackling the Parktown Heritage Education Week type of education exercise was achieved, there were some students who felt the need for more practical experience:

A.F.3 I do feel though, that I need more practice and security within myself to create it (environmental literacy) in my pupils.

This is probably a normal concern for any newly qualified teacher and as is suggested by evidence already cited, the practice afforded by the programme may be sufficient to enable training to survive into the school: time will tell.

6.5.3 ENTHUSIASM/DESIRE TO IMPLEMENT ENVIRONMENTAL EDUCATION

The clustering of NMU's in this category across the twelve weeks of the programme is remarkable in that none appears in the weeks after the Parktown Heritage Education Week (with the exception of the final assessment). In addition, none appears in week 2 which, as inferred in EET 1, Learner-Centred, Active and Experiential Learning, was not experienced as a high point in the programme. It appears, in fact, that those educational events which were experienced most positively, as discussed in EET 1, were also those which generated most enthusiasm to implement Environmental Education. A selection of NMU's to illustrate this follows:

B.1.3,4 It was the first time that I had...looked at (the Park) from an Educational and environmental point of view. I was very enthusiastic about planning the lessons around the environment.

C.W.5 I want to put into practice the laid-back control we were 'subjected' to this week-end.

D.W.4 I would like to let my friends and family experience the environment in a solitaire situation...

C.4.6 I was delighted when we drove through the area on Sunday, to share with my family some of the observations...

B.5.1 I feel very positive towards integrated teaching

according to the environmental emphasis and I also feel enthusiastic about applying this technique in my classroom one day.

B.6.6 Rae Graham also stimulated in me a positive attitude towards involving children and teaching the 'environmental way'.

B.T.1,4 I found it motivating and stimulating to work with children in this area. It was encouraging to see how motivated children are...But once I had started and seen how the children responded it motivated me.

D.F.3,10 I found myself trying to instil and make my pupils aware...and I enjoy teaching and trying to educate my pupils towards caring, environmentally aware people.

The above comments show the strong correlation between a learner-centred, active and experiential approach to learning and the generation of a desire to implement Environmental Education principles in a classroom situation. This has important implications for improving the transfer of teacher training into practice.

From the above section a number of principles relating to the practice of teaching can be derived. These are:

1) Enthusiasm to implement Environmental Education is generated most successfully by those educational events which are experienced most positively. These are learner-centred, active and experiential learning situations as discussed in Section 6.1. The use of such educational approaches is likely to enhance the transfer of teacher training into practice.

2) Although the programme did not, apart from one specific instance, cater specifically for teaching methodology, students constantly related their experiences of the programme to the classroom situation. It is important for the teacher trainer to be aware of this tendency and to exploit it where possible. This ensures a more

efficient use of time and carries significant implications for the ways teacher trainers undertake their tasks.

3) Although formal methodological input is shown to have been valuable and appreciated, it is also important that a lecturer is seen to be practising good teaching methods. The value of teaching by example is thus important. A significant component of teaching methodology by example is the variety of educational styles and exercises which students experience. Variety is beneficial in two ways. It enhances the interest value of the programme, and also provides a valuable repertoire of methodological suggestions.

4) Insecurity and anxiety can play a positive role in teacher training. In this respect a positive experience of an actual applied situation adds both confidence and enthusiasm. Were it not for the practical requirements of the programme, particularly the Parktown Heritage Education Week, fears may never have emerged. The experience of having to face and cope with a challenging situation, where a lack of confidence may otherwise have remained a permanent barrier, results in a significant improvement in students' perceptions of their abilities.

6.6 EET 6: KNOWLEDGE GAINED

Although the programme is aimed primarily at the affective level, an essential component of environmental literacy is a factual understanding of the issues being considered. Emotional environmentalism is frequently counter-productive and informed opinions are a vital necessity.

It is interesting to note students' responses to the knowledge component of the programme. All students report that they learned new facts. They perceived that this information was selected so as to be relevant to them:

D.F.4 I felt the facts that were given to us were carefully chosen so as to be relevant to us and interesting.

B.F.4 I was enlightened to facts I didn't know (sic).

A.F.4,5 I learned a lot through this course. My general knowledge about environmental facts was greatly enhanced.

Some NMU's concerning knowledge gained are responses to specific aspects of the programme, for example:

B.8.1 I was fascinated by the biological and ecological facts...

However, the majority of NMU's relating to this EET appear in the final assessment, thus suggesting that much of the information was not relevant or interesting enough to warrant a mention in the diaries of the particular week when it was provided. What emerges from the above is that facts for facts' sake are not perceived as important. The more personally relevant and applied they are, the more valuable they become.

An in-service teacher (student C), whose training was completed in 1959, and who confesses having a limited knowledge of environmental issues (C.4.4) shows considerably more appreciation of the factual, practical input than did the pre-service students.

This appreciation of the provision of information is borne out by comments made by other in-service teachers in the programme and can tentatively be explained by observations made from the researcher's experience with this and other in-service teacher training situations. First, such teachers are usually older than pre-service students, and as such have achieved a measure of experience of life and of teaching which tends to make them more goal-directed in their approach to studying.

Secondly, their experience of teaching has provided them with a context against which the new learning can be measured. While this can have the effect of making them more critical, when worthwhile information is passed on to them, they are able to

appreciate its value for them as teachers. This appears to be the situation as reported by student C, above.

Finally, it appears that in-service teachers experience a slight sense of inadequacy, which tends to enhance the perceived status of the lecturer, and hence of any information which the lecturer provides.

The implications of the above for in-service teacher training are that a greater level of understanding and commitment and a more rapid pace can be expected of such students. They can be relied upon to deal with the basics with the minimum of formal input, and thus the lecturer can deal with more advanced or interesting material at an earlier stage than might generally be expected with pre-service students. In-service teachers also seem more prepared to accept and experiment with unconventional or creative alternatives in education. This has important implications for the introduction of Environmental Education in schools, since in-service teachers will have more power to change things in their schools than will newly qualified teachers.

Overall, while all students gained new knowledge, there are certain principles which influenced its acquisition. For example:

1) Information which is personally relevant to students is perceived as more valuable and interesting than information which is presented for its own sake. This is especially true of information which applies to a real-life situation affecting students themselves.

2) In-service teachers should be provided with more advanced material at an earlier stage than might generally be expected with pre-service students.

3) In-service teachers seem more prepared to accept and experiment with unconventional or creative alternatives in education than do pre-service students. This has important implications for the introduction of Environmental Education in schools, since in-service teachers have more power to change things in their schools than

newly qualified teachers. Further research into this aspect of teacher training is required in order to shed more light on the above tentative findings.

6.7 EET 7: FACTORS INFLUENCING THE LEARNING EXPERIENCE

This is a broad theme with a number of categories, each of which could have been investigated in greater detail if the purpose of the analysis had required it. However, for the present purposes they have been combined and dealt with more briefly.

6.7.1 SOCIAL INTERACTIONS

By their fourth year students generally know each other reasonably well. However, of the twenty one NMU's that relate to this category, eighteen refer to the Rustenburg Nature Reserve weekend. In other words the day to day contact students have with each other, even in the context of the programme, does not appear to attract comment in the diaries. Such comment was generated only by an extra-mural, uninterrupted period of contact with each other. This suggests, if social interaction and the development of general relationships among members of a group is desired, that a specific event such as the Rustenburg Nature Reserve weekend should be planned.

A comment reflecting the response to the weekend follows:

A.W.11-13 I had a good time with those that accompanied us on the camp...it was beneficial to experience other people's feelings as well as my own. I feel that sitting and simply chatting, just about anything, was an essential part of my experience.

'Having a good time', in itself, is not necessarily of benefit to an educational programme. It is the educational results of the social interactions that are significant. The Rustenburg Nature Reserve weekend appeared to generate a group identity and a sense of belonging and trust which, in a participatory type of pro-

gramme are vital:

C.3.7,8 I'm enjoying the real contact with the students in this group - the contact is real because of our excellent weekend experience which we shared.

C.F.7 The visit to Rustenburg 'gelled' the group and for me getting to know the students better was an enrichment.

Another aspect of the social interactions relates to the lecturers (two other lecturers accompanied the researcher on the weekend). Students found the equality of relationship between themselves and staff refreshing, encouraging and valuable in the development of trust. The fact that there was an element of openness and acceptance bore fruit in that students felt free to express themselves. Through this, the growth they experienced in numerous aspects of environmental literacy was enhanced.

B.W.5 ...it was tremendous to see how you three lecturers and the 'old and the young' could get to know each other so well and in such a relaxed way.

Finally, the positioning of the week-end within the programme was deliberate - it was designed to allow the group to 'gel' at an early stage and to set the tone for the rest of the programme.

C.W.16,17 Placing this weekend at the beginning of the program was clever because it established I-Thou relationships ...and I look forward to each meeting experience.

6.7.2 THE CREATION OF ANTICIPATION

There is a degree of overlap between this category and others, particularly Section 6.5.2. This overlap has not been rationalised, since Section 6.5.2 refers to the practice of teaching, while this one refers to the experience of learning.

This category represents both a positive and a negative response to the unknowns contained in the future. Some students felt the

need to be told more about what was due to happen and found the lack of this sort of information unsettling. Others found that the brief mentioning of events to come whetted their appetites. The major source of anticipation/fear was the Parktown Heritage Education Week. Initially the response was one of excitement:

A.3.9 Hearing about the Parktown Heritage Education Week, I found myself feeling enthusiastic about it and excited as well...

However, as the time drew closer nervousness and insecurity became the dominant emotion:

B.7.1 In the preparation stages I was insecure because I didn't know where we were going.

C.7.1 I felt pleased that 12 September had actually arrived and that all our preparation work would be put to the test.

The excitement that was created by the unknown seems to have been a positive aspect most of the time:

B.1.1 During last week I felt excited because I didn't know what to expect.

C.5.1 I enjoy the way Alistair just mentions something he has in mind for the next week and so my enthusiasm and curiosity have been aroused.

Nevertheless, there are times when enthusiasm turned to frustration:

B.F.7 I must admit at times I was feeling frustrated and not knowing what was going on.

Usually the provision of extra information eased the frustration and even rekindled enthusiasm:

C.8.2 I was pleased too to see the work plan and look forward

to...

B.3.12,13 I must say it (a detailed programme outline) has given me security about the course and it made me excited about...

What seems important concerning the experience of anticipation and the learning process is that a careful balance must be maintained between providing students with too much information about the programme, and keeping them uninformed about it. There is a distinction between the two, since information about the programme itself is generally of a mundane, routine nature, while the creation of anticipation and excitement relates to information concerning specific events such as the Parktown Heritage Education Week.

In the former case students felt the need to know where the programme was going and it appeared that provision of a full programme outline gave them a feeling of security. In the latter, the intrinsic excitement of certain events was heightened by occasional reference to them, but as they drew closer, more specific information was needed in order to maintain a sense of security.

6.7.3 FULFILLMENT THROUGH ADVERSITY

This category follows on directly from the previous one in that they share a sequence of responses to specific events. This sequence was a raising of anticipatory or anxious emotions beforehand and a feeling of well-being and achievement once the event had passed. It is possible that despondency may have resulted from events unsuccessfully done, but either these were not reported, or all events tackled were dealt with relatively successfully.

The most significant events to be reported on in this context are the Rustenburg Nature Reserve weekend, the painting exercise and the Parktown Heritage Education Week.

There are two aspects reported on in the Rustenburg Nature Reserve weekend. One is physical activity:

A.W.17 I'm sure she was glad she made it up (the hill...)

B.W.24 ...exerting myself conquering mountains and hills made me feel part of nature.

The other is overcoming a fear of the unknown:

B.W.37,38 ...the fear and silence (during evening solitaire) were too overpowering. So on Saturday night when I felt at peace in my bed it was quite an achievement.

The painting exercise was resisted initially, but enjoyment developed:

A.3.2,3 Initially I didn't like the idea of painting, but after I began I enjoyed it.

The Parktown Heritage Education Week was viewed as a major hurdle, the anticipation of which created both excitement and anxiety. However, the response after it is similar to those already reported.

B.7.2,9 Once we were in Parktown preparing and discussing what we could do the motivation started to well up inside me. I found it a very tiring experience and worthwhile.

C.7.5 I was pleased to have formulated my own knowledge...by being 'forced' into this teaching experience.

The implications of the above for the learning process are that the inclusion of challenging experiences in a programme, provided they are within the capabilities of most students, can have positive effects on their emotional well-being and enhance the learning process.

6.7.4 THE LECTURER

Important components of any learning experience are the characteristics and style of the educator. These can range from authoritarian to laissez-faire, conservative to liberal, aloof to friendly or personal and so on. Comments about the lecturer are unlikely to have been reported freely in the diaries, so such comment was requested in the final evaluation. Nevertheless comments, both positive and negative, do appear elsewhere. A theme which emerges refers to the lecturer's authenticity, concern and enthusiasm, and shows that these attributes play an important role in the learning experience:

A.F.16 I found your enthusiasm and love, as well as total dedication for your subject a pleasing attribute and it contributed to my enthusiasm for your subject.

D.F.11 I found your enthusiasm and love for the environment very infectious, which in turn made me very keen to complete your course successfully.

B.F.18 ...as a person I regard you as in touch with yourself and your environment.

The following criticism relates also to a previous category, The Creation of Anticipation, and reveals perhaps why there was some frustration concerning 'what was going on':

B.F.16,17 People may criticise you on this course as being 'not knowing what you want us to do', but I feel that this criticism has overlooked the fact that you are lecturing something new and experimental.

Another theme contained in the comments refers to the lecturer's ability to facilitate open discussion and to the free atmosphere that was created:

C.2.7,9,10 I was amazed at how many students talk, as, other than in tutorials, the students are quite silent...we are being lead out of ourselves towards insight and are

not having values dumped onto us or being used as buckets to fill with knowledge. Paulo Freire and Martin Buber would approve of the approach used.

As was mentioned in Section 6.7.1, such openness is important to the success of the programme, since so much of it is based on learner-centred educational principles. The student responses in this regard are also valuable feedback concerning the existential basis of the programme. It suggests that the theory, practice and personal example are consonant.

The form of control (discipline) is related to the above, as it set the students free to 'be':

C.W.4-6 (Referring to feelings of inadequacy and embarrassment experienced on an earlier hike) Alistair freed me of this because he said the other hikes would be lead by him at a different pace and they were! I want to put into practice the laid-back control we were 'subjected' to this week-end...I realised how everything happened with less obvious control.

The process of learning is fundamental to Environmental Education, thus any principles relating to learning which can be derived from a study such as this are of great significance. Several such principles have been extracted from the above section, and these are listed below:

1) Social interactions are of educational significance since their positive development generates group identity and a sense of belonging and trust which, in a participatory type of programme are vital. The deliberate positioning of an event encouraging this development generates a group spirit which influences the rest of the programme.

2) The relationship between students and staff should encourage the development of trust. Teacher training lecturers should be authentic and show concern and enthusiasm and should display the ability to create a

free atmosphere and facilitate open discussion. These attributes play a significant role in learning and are important to the success of a programme which is based on learner-centred educational principles. Through this students experience a development in numerous aspects of environmental literacy.

3) The consonance between the philosophical basis of a programme, the programme as it is perceived by students, and the personal example of the lecturer adds credibility to the programme and generates acceptance of it among students.

4) Frustration concerning an apparent lack of direction in a programme is a negative influence which can be avoided by the provision of more routine information. The excitement inherent in certain events is heightened by casual reference to them early in a programme, but as they draw closer, more specific information is needed in order to maintain a sense of security.

5) The inclusion of challenging experiences in a programme, provided they are within the capabilities of most students, has positive effects on their emotional well-being which enhances the learning process generally. This process involves a raising of anticipatory or anxious emotions before an event and a feeling of well-being and achievement once the event has passed.

6.8 EET 8: COMMITMENT TO ENVIRONMENTAL QUALITY

Students felt strongly at the end of the programme that they were more environmentally aware and committed to maintaining the quality of the environment than previously. A commitment to environmental quality broadly defined had been presented to them as the ultimate goal of Environmental Education, as is suggested by the concept of environmental literacy. It is thus clear from student responses that the programme was successful in causing a development of environmental literacy.

A.F.12 I definitely became more aware environmentally and grew as a person.

C.F.10.11.18 My awareness is heightened - dripping taps at home and at school, tins in the playground, littered toilets, paint crumbling, neglected worthwhile places. I'm sure this awareness will stay with me and my own ethic will become 'striving towards a more livable future'.

It is interesting to note that there are three, apparently unrelated places in the diaries where these sorts of comments appear. The first, the visit by Mrs Rae Graham, was a highly motivating event which occurred immediately after the section in the programme on the built environment, itself a high point in terms of generating environmental literacy. This visit is also significant in that it is referred to positively in EET 1, Learner-Centred, Active and Experiential Learning, and stimulated a strong 'behavioural intentions' response:

B.6.3-5 It motivated me in the sense that I wanted to get involved in my town...I feel that I can contribute towards the Secunda environment with my knowledge. Maybe...I'll join the council. Or even be part time involved within the next four years. In four years many trees can grow and much conservation can occur.

A.6.4 She made me feel that I can do something.

The second event mentioned above is the Johannesburg College of Education teaching experience, where students were required to introduce an Environmental Education approach where possible. This was found to be a rewarding experience as it showed students that environmental literacy could be developed in school children:

B.T.1 I found it motivating and stimulating to work with children in this area. It was encouraging to see how motivated children are to care about their environment.

Finally, the lectures on environmental degradation in weeks 8 to 11 provide the following responses:

C.10.5,7 I found becoming environmentally aware quite scary and am happier when there is something that can be done... I kept trying to remember that it is the little steps that count and the little actions that count

B.11.3,4 It arouses in me a sense of hopelessness of a solution to these problems. But when I think apart from my emotions I realise that there is always hope.

These three events contributed in a significant way to making students aware of the processes and implications of environmental degradation and to developing their commitment to doing something about it. They thus appear to have made a substantial contribution to the development of environmental literacy. It cannot be stated, however, that the rest of the programme is less significant than these events in the development of environmental literacy, but rather that statements about commitment to environmental quality appear in response to these events.

The following general principles emerge from the above section:

1) The development of a commitment to environmental quality is aided by the catalytic effect of events which share a common characteristic: they provide a stimulus towards, or even a way of taking action. This is achieved by various means such as providing a knowledge of specific action strategies and skills, or simply an awareness of actions which can be taken.

2) The above comment and, in fact, the emergence of this EET make it possible to state that the programme did cause the development of environmental literacy in students.

6.9 EET 9: DEFINITION OF 'ENVIRONMENT'

The emergence of this EET is interesting because most students began the programme with a definition which correlated with the natural environment, and after about four weeks showed that they had become aware of a much wider view of the environment. For example:

A.4.3 ...introducing buildings, urban settlement etc. opened my eyes wider to the fact that environmental education is not simply nature.

This is contrasted with the same person's earlier perception that the programme:

A.1.2 was just the beginning of the journey to experiencing and appreciating nature and the natural environment.

Further clarification of the concept of environment was achieved through the second weeks' discussions about Environmental Education:

I.2 I had some misconceptions of what Environmental Education was all about. I had thoughts in my mind of running through fields of poppies and swimming in cool mountain streams, sure, that has a place, but what has really struck me is the fact that one's environment is here and now as well.

At this stage of the programme the researcher was not sure that this wider definition of environment was appreciated by the students, so in the fourth week the group was requested to write what they thought the environment was. These responses were not submitted to phenomenological analysis, but demonstrate a clear adherence to a wide definition, including natural, built and social aspects and an interaction among them. In addition, the act of students committing their thoughts to paper, aided them in their conceptualisation process:

D.4.1 Being asked to write a definition on what the environ-

ment is to me, I once again found myself realizing that there is more to the environment than just nature, and that as an adult my environment is far larger and sometimes (more) abstract than a child's.

The process of learning was active and students were challenged cognitively. This comment relates to EET 1, Learner-Centred, Active and Experiential Learning because the act of committing themselves to writing forced the students to think about the issue.

Overall then, the programme can be seen to have developed and refined student understanding of the concept 'environment'. However, this understanding was achieved only after a period of time had elapsed and during which information specifically related to the topic was dealt with. It seems important, therefore, not to assume a particular understanding of a commonly used term, but to clarify it until it is fully appreciated.

An accurate definition of the term 'environment' is important since it tends to determine further conceptualisations of Environmental Education. If it is true that a narrow definition of 'environment' will produce a narrow approach to Environmental Education, then, ultimately, counter-productive educational practice will ensue. This is because, bearing the concepts of wide-awakeness and environmental literacy in mind, a sound environmental solution requires both a broad and a deep appreciation of social, economic, political and 'environmental' processes.

6.10 CONCLUSION

This chapter is an extended description of student teachers' experiences of an Environmental Education programme. The extended description, which is based on a phenomenological analysis of diaries, deals systematically with each of nine themes which emerged from the analysis. The discussion of each theme ends with a summary of principles which emerged from it. A compilation of these principles is presented in Appendix 4.

These principles, which are the main findings of the study, represent a significant contribution to Environmental Education, particularly in the area of teacher training. They fall into two main areas, namely, the development of environmental literacy and methodology. They are, however, closely related and should not be interpreted separately.

The significance of the findings is supported by what can be described as 'triangulation'. Triangulation refers to the corroborative value which results from two factors independently providing support for each other. It is used in qualitative educational research as a means of avoiding bias and of avoiding the many misunderstandings that can arise if, for example, participant observation is conducted by only one researcher, or if researchers use only one type of observation style. (See Cohen and Manion, 1980).

In this study mutual corroboration exists between many aspects which emerged from the analysis. For example, learner-centred, active and experiential learning were identified as important approaches to learning. Independently, issues such as the growth of personal and environmental awareness were shown to have been strongly influenced by such learning styles.

A particularly important aspect to emerge from the analysis is the large degree of corroboration which exists between the many facets of environmental literacy. These range from, for example, teaching methodologies; particular events or experiences; and increased environmental knowledge to personal growth experiences; greater environmental awareness; and the development of environmentally appropriate attitudes and values. From this it can confidently be stated that the programme was successful in promoting the development of environmental literacy.

The next chapter focuses on environmental literacy by exploring the two main areas mentioned previously: the process by which it develops and methodologies which encourage that process.

CHAPTER 7 : CONCLUSIONS

This study involved the design, implementation and evaluation of an Environmental Education programme intended for teacher training. The aim of the programme, much of which is informed by an existential perspective, is to develop environmental literacy in students and to enable them to develop environmental literacy in their pupils. The programme was implemented over a twelve week period with a group of nineteen final year students at the Johannesburg College of Education.

The evaluation of the programme involved collecting weekly student diaries and analysing these by means of a phenomenologically based method. During the analysis the raw data as contained in the diaries were reduced to a list of themes, as follows :

1) Learner-Centred, Active and Experiential Learning
2) Greater Awareness
3) Nature
4) Values Education
5) The Practice of Teaching
6) Knowledge Gained
7) Factors Influencing the Learning Experience
8) Commitment to Environmental Quality
9) Definition of Environment

These themes are called essential existential themes (EET's) and represent the essence of students' experiences of the programme. The names chosen as titles of the EET's have no intrinsic meaning beyond their descriptive function, and act merely as convenient labels.

The EET's were used as the basis for writing an extended description. This was a process of fleshing out the skeleton represented by the EET's. By means of this process a comprehensive set of principles was derived which identifies those aspects of the programme which were significant in the students' experience of it and suggest how the programme could be improved. It is believed that all environmental educators, and especially those involved

in teacher training, would benefit greatly from employing such principles, as would students who experience programmes based on them. A synthesis of these principles forms the basis of the discussion presented below.

It is important to point out that, true to the phenomenological method, the data were allowed to 'speak for themselves'. The researcher made stringent efforts to withhold his own preconceptions, and the EET's emerged spontaneously from the data. Thus the findings of this study, although qualitatively derived, are the result of an explicit, repeatable and rigorous process.

7.1 RESULTS

The study provides valuable insights into the development of environmental literacy and identifies principles embodied in the programme which are significant in this development. The principles tend to fall into two distinct but interrelated areas, namely, the process by which environmental literacy develops and methodologies which encourage that process. These two areas and the principles which they represent are the major contributions of the study to the field.

Some of the findings are not new and are often taken for granted by environmental educators. Nevertheless, this study accentuates their importance. For example, the word 'environment' is commonly perceived as 'nature', as was demonstrated in the study. Such a perception is likely to have a strong influence on the environmental educator and encourage a limited approach to Environmental Education. A wider, holistic perception of the word 'environment', which includes the bio-physical as well as the economic, political and social spheres, assists in avoiding this problem. Bearing in mind the complexities of environmental issues and the breadth of the concept of environmental literacy, the above issue cannot be treated lightly.

The principles derived from the evaluation of the programme are discussed below within the two categories previously mentioned.

7.2 THE PROCESS BY WHICH ENVIRONMENTAL LITERACY DEVELOPS

The concept of environmental literacy was dealt with in detail in Chapter 3. It should be pointed out that it is not possible for the environmental educator to create environmental literacy, nor is it possible for the individual to claim that he or she is fully environmentally literate. The process of achieving it is on-going and never ends. This section, therefore, explores the process by which environmental literacy develops. A clear understanding of this process is vital for the promotion of good Environmental Education. The principles which follow have been shown in this study to be essential parts of the process by which environmental literacy develops. They should thus form part of all Environmental Education programmes, particularly those intended for teacher training.

7.2.1 LEARNER-CENTRED, ACTIVE AND EXPERIENTIAL LEARNING

A major finding of this study is that the effective development of many aspects of environmental literacy, in particular, attitudes, values and appropriate behaviour, are associated with learner-centred, active and experiential learning situations. While this finding is more appropriate to the next section, dealing with methodology, it is important to point out that the process by which environmental literacy develops is enhanced by such approaches to learning. This highlights the importance of carefully conceived and executed learning experiences.

The existential nature of the programme is responsible for the learner-centred approach, whereby the individual is treated as important and significant. The study has shown that this perspective underlies much of the growth and learning which occurred as a result of the programme. This is discussed in more detail in the sections which follow.

7.2.2 ENVIRONMENTAL AWARENESS AND CONTEXT

An important aspect of environmental literacy is environmental awareness. People who are environmentally aware will notice details in their surroundings and will be alert to its various qualities, moods and effects on them as well as to any changes that take place. Environmental awareness is not dependent upon the possession of formal knowledge about the environment, but will be enhanced by such knowledge.

This study has demonstrated that the development of environmental awareness can occur regardless of the specific environmental context thus, while a 'wilderness experience' is desirable, it is not necessary for such development. It was found, for example, that a strong growth in environmental awareness was generated by the two 'Parktown walkabouts' and the exercises that were undertaken during them.

It is significant that most Environmental Education programmes focus on the natural environment, yet the local environment, whatever it may be, can be used very effectively for the creation of environmental awareness. This does not deny the value of environmental resources such as nature reserves, but does suggest that these usually more distant and 'exotic' resources need not be the major focus of Environmental Education. It is important for environmental educators to take note of this finding, since it has a direct bearing on approaches to the development of environmental awareness in particular and Environmental Education in general.

By establishing that the specific environmental context is not critical to the development of environmental awareness, it becomes possible to identify more closely those factors which are. The section which follows deals with one of these factors which this study found to be of particular importance in the development of environmental awareness.

7.2.3 ENVIRONMENTAL AWARENESS AND PLACE

The study has established that the development of environmental awareness is substantially enhanced by the sort of exercise which requires students to look closely at a variety of details in an object or area. An important component of this is the making of subjective or affective value judgements. Through this process the individual is able to identify with the object or place and personalise it. This leads to a degree of intimacy and, instead of being merely spaces, external and impersonal, places are imbued with meaning by the individual.

The implications of this for Environmental Education are twofold. If an intimate awareness of a place exists, any changes, for good or bad, which may influence the nature of the place will probably be noticed by the individual. Likewise, since the place has achieved significance for a person, a degree of commitment probably also exists. As a result appropriate environmental behaviour is more likely to occur.

7.2.4 ATTITUDES, VALUES AND THE IMPORTANCE OF VARIETY AND CHOICE

Attitudes and values are critical components of environmental literacy. Accordingly, insights into their development are important and must receive close attention. This and the next section, which also deals with attitudes and values, therefore, are seen as an important set of findings.

The study has demonstrated that experiencing other people's ideas and opinions and being exposed to a variety of possibilities from which unrestricted, subjectively relevant choice can be made is important in the development of values and attitudes and also in characteristics such as tolerance. It is important, too, that an exercise which uses such an approach takes place in a context in which no clearly right or wrong answer is available. These two principles, of exposure to variety and of unrestricted choice from alternatives are significant contributors to the development of environmental literacy.

7.2.5 ATTITUDES, VALUES AND 'SHOCK'

Another valuable finding involves the concept known as 'shock' (Section 3.3.2), in which a person's basic assumptions are challenged. This occurs in situations where students have to identify with a position they did not previously support. The effect of such an enforced change of loyalties is a breaking away from own beliefs, attitudes or values and growth in an appreciation of the multi-faceted nature of the issue being considered. The concept of 'shock' is drawn directly from existential thought, as was shown in Section 3.2.3, and is intended to cause a shift in people's consciousness to a point where they are no longer able to take the assumptions of daily life for granted. This shift is an essential step in enabling individuals to understand their social context and any aspects of it which may be responsible for dehumanisation or environmental degradation and to take appropriate action.

It is clear, therefore, that the 'shock' principle contributes significantly to the development of environmental literacy and to the attempts in Environmental Education to secure a better quality of life for all.

7.2.6 THE FOCUS ON THE PERSONAL AND RESPECT FOR THE INDIVIDUAL

In the existential approach adopted in this study the individual is important and enjoys respect regardless of personality or achievements. Educationally, students are expected to make subjective appraisals of their experiences, and are frequently led to a point where they have to decide for themselves what is significant. Their personal opinions are important, and these are accepted in open discussion.

As a result of the above approach, the study showed that students gained confidence to express themselves openly, and in the process, were able to clarify their thinking, learn from others, and experience personal growth. It is important, therefore, that an acceptance of individuals as they are forms the basis of all interactions in an Environmental Education programme if effective

development of environmental literacy is to occur.

7.2.7 THE FOCUS ON THE PERSONAL AND RELATIONSHIPS

The study has revealed that authenticity and sincerity in people, particularly the lecturer, and relationships among the programme participants are an important factor influencing learning. This finding is of particular importance in the areas of personal growth, values and attitudes. It is significant too in enhancing the participatory nature of such a programme by the trust it engenders. As a result of this atmosphere of trust, mutual respect and acceptance, students are set free to express themselves without fear of judgement. This openness and acceptance is thus a significant factor in the personal growth of students and should be an intrinsic part of the approach used in any educational situation.

7.2.8 THE FOCUS ON THE PERSONAL AND CREDIBILITY

It has been shown that student perception of consonance between the philosophical basis of a programme, the programme itself and the personal example of the lecturer serves to enhance the credibility of the programme. It has also been shown that the personal example of the lecturer is important generally, and has a strong influence on the learning experience. These findings are important since they have a bearing on student attitudes to learning.

Specific personality traits are not factors which can deliberately be built into a programme. Nevertheless, the consonance referred to above is significant. Perhaps what is important is that the educator should be aware that he or she is as much on the path of self discovery as are the students. In such a context, arrogance and dogmatism ought not to have a place. Rather, the educator must strive to achieve wide-awakeness. Such a challenge is issued here, based on the findings of this study.

Most of the above sections are evidence of the value of an education rooted in an existential tradition. The results show clearly

the significance of this personal philosophy in the development of environmental literacy.

7.3 METHODOLOGIES ENCOURAGING THE DEVELOPMENT OF ENVIRONMENTAL LITERACY

Having explored the process by which environmental literacy develops, this section presents teaching methodologies which support that process. The findings of this study suggest that these methodologies are particularly effective in the development of environmental literacy. For this reason they are seen as major contributions to the field. It is thus believed that these methodologies should be present in all Environmental Education programmes, since the development of environmental literacy is central to Environmental Education.

7.3.1 LEARNER-CENTRED, ACTIVE AND EXPERIENTIAL LEARNING

A major finding of this study is that learner-centred, active and experiential approaches to learning are important in the development of environmental literacy. In fact, many aspects of the learning process are positively influenced to a large degree by such approaches, as is apparent from the sections discussed in this chapter. It has been shown that those aspects of the programme which were presented by means of such approaches are consistently those given prominence in the evaluation of the programme.

Of specific interest here is the finding that learning experiences which provide a stimulus towards, or a means of taking, environmental action generate a commitment to such action and hence to maintaining environmental quality. Knowledge and awareness of appropriate environmental action strategies and skills, which are most effectively learned through carefully structured experiences, assist in providing this stimulus.

The above finding is supported by Sia et al (1986) who found that the three variables which best predict responsible environmental

behaviour are perceived skill in using environmental action strategies, level of environmental sensitivity and perceived knowledge of environmental action strategies.

In view of the importance of the above, it is recommended that learner-centred, active and experiential approaches to learning be included in all Environmental Education activities.

7.3.2 ENVIRONMENTAL AWARENESS AND ARCHETYPAL EXPERIENCES

The study has established that archetypal experiences play a major role in enhancing students' experiences of the natural environment, and facilitating growth in both personal and environmental awareness, both important components of environmental literacy. It appears as if the fear or anxiety which are inherent in archetypal experiences are a necessary part of such experiences. Thus, while they are essentially 'wilderness' experiences, it is the underlying anxiety which in fact makes them effective. This issue is dealt with again in Section 7.3.7, Confidence and the 'Anxiety-Event-Fulfillment' Cycle.

7.3.3 ENVIRONMENTAL AWARENESS AS A LONG TERM PROCESS

It has been demonstrated by the study that growth in personal attributes such as environmental awareness is a long term process which requires a variety of experiences over a period of time. Providing students with the time and space for reflection, particularly if this takes place in a natural environment, facilitates a process of personal growth and a coming to terms with values and self.

This finding accentuates the earlier assertion that environmental literacy is an on-going, life-long process. In its application to methodology the finding suggests that a reliance on short term, intensive courses in Environmental Education, while not denying their validity, cannot be regarded as sufficient. In cases where such specialist courses are allowed to take the place of day-to-day, classroom-based responsibilities of promoting environmental

literacy, there is cause for concern since it has been shown that all educational activities should, to a greater or lesser degree be responsible for the development of environmental literacy.

7.3.4 THE VALUE OF PERSONALLY RELEVANT INFORMATION

The study has established that environmental literacy is promoted by the incorporation in learning situations of information or experiences which are perceived as personally relevant. This is true particularly in the case of formal lectures, which are less experiential and involve the individual less directly or actively in the learning process. The sort of information which is most valuable for this purpose applies to or is drawn from real-life situations, especially if these are also related to students' own experiences. This finding is closely related to the concept referred to as 'making connections' in Section 3.1 which suggests that all learning should be based on a direct, personal experience of that which is to be studied.

7.3.5 THE VALUE OF PERSONAL RESPONSIBILITY FOR LEARNING

It has already been shown that learner-centred, active and experiential learning approaches are of great importance in the development of environmental literacy. An issue which emerges from the use of these approaches is the fact that, being learner-centred, they require a degree of commitment and hence of responsibility from students.

It was found in this study that the degree of responsibility expected of students for a particular educational event and the value of learning which results from that event are directly related. The nature of the responsibility being referred to here is that experienced in a professional context, namely, that which rests on intrinsic motivation and accountability, not to an authority figure, but to the consumer. The sorts of learning experiences referred to in this section are responsible for a wide range of learning. Apart from promoting the development of environmental literacy, they also aided the development of pro-

fessional and personal confidence.

7.3.6 THE VALUE OF PERSONAL EXAMPLE FOR METHODOLOGICAL TRAINING

It has been demonstrated that good personal example on the part of the lecturer is important in the area of methodological training. Although formal training in methodology is important, the example provided by the lecturer's teaching methods, specifically the variety of methods used, is of great value to student teachers. This variety is also valuable because of the inherent interest which it adds to a programme.

In terms of the development of environmental literacy, this finding emphasises the importance of using good teaching methods. In the context of an Environmental Education programme for teacher training this is doubly important because such a programme should cater for the development of environmental literacy in students and also enable students to promote the development of environmental literacy in their prospective pupils. It is recommended, therefore, that careful attention to methodology is vital in a teacher training course in Environmental Education.

7.3.7 CONFIDENCE AND THE 'INSECURITY-EVENT-FULFILLMENT' CYCLE

An important finding of this study concerns the process involving pre-event anxiety or stress, the event, and post-event fulfillment. This process was found to be common to almost all situations in which personal growth, in particular, the development of personal confidence, was in evidence. A feeling of insecurity before an event appears to be a necessary part of this process. It is also necessary to provide practical and moral support to convey students beyond this state of insecurity in order for them to overcome it and achieve a degree of fulfillment from the event.

A principle governing the above is that whatever the learning experience, it must not overwhelm or prove too difficult. Thus experiences must be carefully designed and structured so that

students are able to deal with them successfully. Another governing principle, based on the existential perspective, is that the educator must be at the side of the student, supporting and encouraging and, within a context of mutual respect and trust, challenging the student to go beyond the assumptions of the everyday, to an understanding of the world and of self.

The fulfillment which results from coping successfully with an initially stressful situation has also been found to be responsible for the development of professional confidence in students. A specific result of this is an increase in perceived professional ability and a deeper commitment to implementing Environmental Education in schools.

This finding is important since it influences the transfer of training into practice. It does not deny the importance of structural and institutional factors found in schools, as reported by Ballantyne (1987) and Denscombe (1982), but casts light on the preparation of teachers before they are influenced by those factors. This area is believed to be worthy of further research as it could prove to be a significant factor influencing the transfer of training into practice.

A further observation concerning the 'insecurity-event-fulfillment' cycle is its association with archetypal experiences. These experiences contain, to a greater or lesser degree, an element of fear or anxiety which suggests that archetypal experiences may be seen simply as an application of the 'anxiety-event-fulfillment' cycle within a specific context. This observation has great significance for the development of environmental literacy, since it appears that whatever the specific context, if the underlying process is understood and appropriately implemented, the educational event will be more effective.

7.3.8 IN-SERVICE TEACHER TRAINING

Two interesting observations concerning in-service teacher training emerge from the study. The first is that in-service teachers can be provided with more advanced or challenging material at an

earlier stage of the programme than might be expected with pre-service students.

Experience of in-service teachers in the programme suggests that they are more prepared to accept and experiment with unconventional or creative alternatives in Environmental Education than pre-service students. This has an important bearing on the introduction of change into the existing school system, since such teachers have probably learned how to cope with the various conforming tendencies that are found in schools. They have probably also achieved a degree of seniority and would thus be able to implement change more easily.

In contrast to this viewpoint is Ballantyne's (1987) finding that while senior teachers have positive attitudes to learner-centred Geography education and practice, they generally use a more teacher-centred approach than their attitudes suggest.

The in-service teachers referred to in this study are highly motivated and capable, which is borne out by their willingness to return to college. Thus there may well be a distinction between the in-service teachers in this study and the senior teachers of Ballantyne's study (1987). Initial observation, however, supports the notion that the implementation of Environmental Education in schools may be accomplished more successfully through the use of in-service rather than pre-service training. Since the introduction of Environmental Education into schools is important and urgent, this is an issue which should be researched further.

7.4 RESEARCH IMPLICATIONS

This study has established some important principles relating to the training of primary school teachers in Environmental Education. Research possibilities which emerge from this study are as follows :

1) Teachers who experienced the programme should be followed up in their teaching situations. Aspects that need investigating are the degree to which, and the process

by which, training transfers into practice.

2) An issue which is consequent on the above research possibility is an investigation into the development of environmental literacy in the pupils of teachers who experienced the programme.

3) The possibility that Environmental Education may be implemented in schools more effectively by in-service rather than pre-service teacher training programmes in Environmental Education needs to be investigated.

4) The programme was developed in a specific context and takes the form of a case study rather than a normative study. For this reason the degree to which the findings of this study may be generalised needs to be determined.

5) This study is a restricted form of curriculum development. Valuable insights would be gained from a full curriculum development study since this would provide an understanding of wider issues such as the feasibility of implementing the programme, or at least its basic principles, on a much wider scale according to the suggestions outlined by Hurry (1982).

6) The programme as it is described in this report is not presented as a final product, but as the medium through which important principles were derived. The present implementation of the programme should therefore be repeated in order to refine further the principles which emerge from this study.

7) The phenomenological method of analysis adopted in this study has been valuable in providing important and sometimes unique insights into the learning process in Environmental Education. Since many of these insights are unlikely to have been achieved by other, more conventional research methods, it is recommended that the phenomenological and other qualitative research methods be used more widely in Environmental Education.

7.5 CONCLUSION

This study is a personal exploration of ideas and concepts within a context of teacher training and Environmental Education. It has covered ground and has employed research methods not normally associated with Environmental Education. The result is a deeper understanding of the learning process from a personal, ideographic perspective rather than a normative one. The contributions of the study are relevant not only to Environmental Education generally, but also to any educational practice.

The study focused on environmental literacy, whose importance within Environmental Education is widely accepted, and the concept area of attitudes, values and behaviour and the links between them, and extended this towards an existential perspective. This wider perspective proved to be most fruitful in its application to Environmental Education and teacher training. The study afforded valuable insights into the process by which environmental literacy develops and also into methodologies which are significant in promoting this process.

The methodological approach adopted in this study is, as far as can be ascertained, unique in Environmental Education. By making use of a phenomenological method of analysis a clearer understanding of the subjective experiences of students and hence of some of the complex processes involved in Environmental Education has been gained. For this reason, the phenomenological method of analysis is believed to be of great value for Environmental Education research.

This study challenges educators methodologically, and, more importantly, personally. Its findings demand that educators examine themselves as human beings, and question their assumptions and motives. It suggests that a desire to improve the quality of life for all, with all the complexities implied by that goal, should be uppermost in educational thinking. It also implies that Environmental Education should be an all pervasive factor in education and not merely another component competing for space in the curriculum.

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APPENDIX 1: RUSTENBURG NATURE RESERVE WEEKEND CAMP PROGRAMME

Johannesburg College of Education

Department of Educational Studies

Environmental Education Week-end Camp

13 to 15 June 1986

AIM: The aim of this camp is to allow students to experience a natural or 'Wilderness' environment in a variety of ways so that they can develop an awareness of and an appreciation for the natural environment. The main focus will thus be on a personal experience.

"The ability to perceive beauty may, in the long run, prove man's salvation."

"Man needs to discover what Nature can offer him, not what he can take from Nature"

PROGRAMME

FRIDAY:	14h30 Prepare to leave J.C.E.
	16h30 Arrive at Rustenburg Nature Reserve, unpack and orientate.
	18h30 Supper
	19h30 Meet to reflect on the activities of the first week of the EE Elective.
	Night Hike
SATURDAY:	06h30 Awake
	07h00 Solitaire
	08h00 Breakfast
	o8h30 Ecology Exercise - sample plots, 5 groups.
	10h30 Walk to the waterfall, SWIM ! and lunch.
	14h30 Expected return time.
	15h15 Tea
	15h30 Talk by Conservation officer and discussion about conservation.
	17h30 Solitaire
	18h30 Supper - Braai followed by campfire jol.
SUNDAY:	07h00 Awake
	08h00 Breakfast
	09h00 Drive through the reserve incorporating walking the 'Peglarae' trail.
	12h00 Discussion and feedback about the camp.
	13h00 Lunch.
	14h00 Depart.
	16h00 Expected time of arrival at J.C.E.

EQUIPMENT NEEDED

Cutlery and crockery
Sleeping bag (or blankets and sheets) and pillow
Personal effects
Warm clothing
Hiking shoes and clothes and swimming costumes, hat if necessary
Camera, binoculars, torch, clipboard, paper and pen, day-pack
Musical instruments
Books on trees, birds etc.
Open eyes

NO FIRE-ARMS OR RADIOS/CASSETTE PLAYERS

Students are encouraged to treat this week-end as a learning experience and to record as much as possible in their notes so that they may be able to repeat the exercise with pupils, with or without the assistance of a Nature Conservation Officer. In this regard, the building up of resource files is highly recommended.

APPENDIX 2: GUIDED OBSERVATION SHEET - PARKTOWN

This guided observation sheet focusses on the area between St Andrews Road and Wellington Road.

1) Note the state/condition of the land either side of St Davids Road.

2) What evidence is there of
   - past land-use
   - present land-use
   - future land-use ?

3) Take particular note of the caravan(s) - interpret this evidence.

4) With increasing numbers of people and cars in the area, to what extent are the original residential roads capable of handling the load ?

5) What parking facilities can you see ? Are these sufficient ?

6) Go to the Johannesburg City Council board near the corner of St Davids Road and Wellington Road. How does this aid your interpretation of the area ?

7) Look at the houses at the junction of St Davids Road and Wellington Road. What do these suggest to you about possible changes in the area ?

8) Using the above, visualise (and sketch if you have time) this area in ten years' time.

A MAP OF THE AREA WAS APPENDED IN THIS POSITION

The above worksheet was used to encourage careful observation of evidence in the area and to facilitate interpretation of it. The worksheet was thus not intended to be used in isolation. It formed the basis of the educational experience, and the lecturer directed the students, posed other questions and encouraged further observation and interpretation as the need arose.

APPENDIX 3: AESTHETICS AND THE QUALITY OF THE BUILT ENVIRONMENT

The following extracts were used to assist students observe and appraise aesthetic qualities of selected buildings and 'street-scapes' in Parktown. They do not represent the only inputs provided during the events, but acted as the main foci of attention for the observation and discussions which took place.

This list of words may help you decide how you feel about a place, building, part of a building or scene:

ELEGANT	BORING	WEAK
INTERESTING	PLEASANT	EXCITING
VERNACULAR	UNCONVINCING	INVITING
SIMPLE	MONOTONOUS	POSITIVE
UNDULATING	DECREPIT	THREATENED
VERTICAL	EXPLOITED	COMPLEMENTARY
HORIZONTAL	RENOVATED	VARIED
STRAIGHT	REHABILITATED	HARMONIUS
CURVED	CONTEMPORARY	SENSITIVE
INTIMATE	MODERN	AWKWARD
OPEN	TRADITIONAL	CONVINCING
EXPOSED	RESTORED	COMFORTABLE
LIMITED	RECONSTRUCTED	ENHANCING
REGULAR	MODIFIED	OSTENTATIOUS
UNIFORM	ADAPTED	THOUGHTFUL
REPETETIVE	RESTRICTED	STIMULATING
RESTRAINED	VARIED	SUBTLE
ORDINARY	SIMILAR	CLAUSTROPHOBIC

A table, providing a visual representation of the following five aesthetic elements was also provided:

SHAPE AND SIZE COLOUR AND LIGHT TEXTURE AND MATERIALS

SPACE AND MASS LINE AND DIRECTION

The following assessment sheet was extracted from Art in the Built Environment (Adams and Ward, 1982 p60). Its use is not restricted by copyright.

BUILDING IMPACT SCORE SHEET

Name of streetworker ----------
Group ----------
Date ----------

Name of building

Assess each building against each criteria and score from 0 (awful) to 10 (excellent)

1	2	3	4	5	6	7	8	9	10

Criteria

Impact of building on the street										
Size and scale										
Relationship of building to surroundings										
Choice of materials, textures, colours used										
Standard of design of details										
Value of external space made by building										
Your possible enjoyment of living or working here										
Satisfactory use of possibilities of site										
General appearance of building as a whole										
How well is it standing up to the effects of weather										
Totals										

Building location

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Total score ☐

APPENDIX 4: CONCLUSIONS DERIVED FROM EXTENDED DESCRIPTION

A) Learner-Centred, Active and Experiential Learning

1) Information which is personally relevant or which is backed up by real-life examples makes lectures more beneficial.

2) Discussions are enhanced when they encourage active involvement, where students can verbalise their thoughts and feelings.

3) Creating the need to learn, through making students personally responsible for an actual, real-world educational event acts as a powerful catalyst for much significant learning, especially in the area of attitudes and values.

4) Personal enjoyment enhances learning experiences.

5) Experiential, active and learner-centred learning allows for the development of far more than the cognitive: it is also significant in the area of values, ethics and attitudes.

6) Classroom based activities where students can experience the learning material in a format which is different from the conventional, usually printed or spoken, style of presentation are valuable. In the programme such activities rely chiefly on art and drama.

7) The use of a visiting lecturer, who can sustain a high level of enthusiasm and interest over a short period of time, is a successful technique.

8) Exercises which allow students to see new educational potential in a familiar resource such as a park are stimulating and are perceived as valuable.

9) The provision of learning experiences which are perceived as intrinsically valuable, worthwhile and significant is important. The reasons why such perceptions of worth exist is explained by the other principles in this list.

B) Greater Awareness

1) Experiential, active and learner-centred learning are significant in the creation of environmental awareness. In terms of lectures specifically, those which are personally relevant to students are the most successful in creating environmental awareness. A further characteristic of such lectures is that they assist students to do something about an environmental issue, thereby overcoming a sense of helplessness.

2) Development of environmental awareness takes place in all environmental contexts and is not restricted to the natural environment.

3) Growth in such characteristics as environmental awareness is a long term process and requires a variety of experiences over a period of time.

4) The experience of really seeing or of noticing something new in a familiar environment results from exercises which require students to look closely at a variety of details in an object. An important component of this 'seeing' is the making of subjective or affective value judgements about the object so that significant personal meaning can be created.

5) Awareness of the potential of an urban park as an educational resource in terms of a wide definition of environment can be created by requiring students to devise simple Environmental Education exercises using a park as the context for the exercises.

6) Providing students with time and space for reflection

while they enjoy an experience of nature facilitates a process of personal growth, and of coming to terms with values and self.

7) The freedom to choose among alternatives in the area of environmental ethics contributes significantly to personal growth.

8) Students who have to work with a viewpoint that does not accord with their existing set of values experience more significant personal growth in many areas than do students who work with a viewpoint they do support.

9) The development of environmental awareness cannot be divorced from personal growth. In other words, personal growth and development in the areas of ethics, values and attitudes facilitates the development of environmental awareness. This suggests that learning must be holistic.

C) Nature

1) Archetypal experiences add significantly to the benefits of educational programmes conducted within the natural environment.

2) The natural environment, depending on how it is used, provides a context for valuable personal growth in the areas of values and ethics.

3) There is a need for students to experience nature. Although few people can enjoy a true 'wilderness' experience, it appears as if urban open spaces, specifically parks, can fulfill this need.

D) Values Education

1) Exposure to a variety of ideas and opinions, especially

where there is no obviously right answer is important in the development of tolerance and compromise. These two characteristics are seen to be highly relevant to the solution of environmental problems and to the development of environmental literacy.

2) Just as exposure to a variety of ideas and opinions is important, so too is the personal freedom to choose among alternatives.

3) Consistently, students who report most learning in the area of values and attitudes are those who have been required to consider a position which is contrary to their current beliefs. This principle is described in Section 3.2.3 as the creation of classroom situations which "make it difficult to maintain peace of mind" (Greene, 1973, p281) and is an important part of the approach to wide-awakeness, also described there. Standing 'side by side' with a view students initially did not support is such an experience. It is thus most significant that it emerged here in a section so closely related to the development of environmental literacy.

E) <u>The Practice of Teaching</u>

1) Enthusiasm to implement Environmental Education is generated most successfully by those educational events which are experienced most positively. These are learner-centred, active and experiential learning situations as discussed in Section 6.1. The use of such educational approaches is likely to enhance the transfer of teacher training into practice.

2) Although the programme did not, apart from one specific instance, cater specifically for teaching methodology, students constantly related their experiences of the programme to the classroom situation. It is important for the teacher trainer to be aware of this tendency and to exploit it where possible. This ensures a more

er-centred, active and experiential learning situations as discussed in Section 6.1. The use of such educational approaches is likely to enhance the transfer of teacher training into practice.

2) Although the programme did not, apart from one specific instance, cater specifically for teaching methodology, students constantly related their experiences of the programme to the classroom situation. It is important for the teacher trainer to be aware of this tendency and to exploit it where possible. This ensures a more efficient use of time and carries significant implications for the ways teacher trainers undertake their tasks.

3) Although formal methodological input is shown to have been valuable and appreciated, it is also important that a lecturer is seen to be practising good teaching methods. The value of teaching by example is thus important. A significant component of teaching methodology by example is the variety of educational styles and exercises which students experience. Variety is beneficial in two ways. It enhances the interest value of the programme, and also provides a valuable repertoire of methodological suggestions.

4) Insecurity and anxiety can play a positive role in teacher training. In this respect a positive experience of an actual applied situation adds both confidence and enthusiasm. Were it not for the practical requirements of the programme, particularly the Parktown Heritage Education Week, fears may never have emerged. The experience of having to face and cope with a challenging situation, where a lack of confidence may otherwise have remained a permanent barrier, results in a significant improvement in students' perceptions of their abilities.

F) Knowledge Gained

1) Information which is personally relevant to students is perceived as more valuable and interesting than information which is presented for its own sake. This is especially true of information which applies to a real-life situation affecting students themselves.

2) In-service teachers should be provided with more advanced material at an earlier stage than might generally be expected with pre-service students.

3) In-service teachers seem more prepared to accept and experiment with unconventional or creative alternatives in education than do pre-service students. This has important implications for the introduction of Environmental Education in schools, since in-service teachers have more power to change things in their schools than newly qualified teachers. Further research into this aspect of teacher training is required in order to shed more light on the above tentative findings.

G) Factors Influencing the Learning Experience

1) Social interactions are of educational significance since their positive development generates group identity and a sense of belonging and trust which, in a participatory type of programme are vital. The deliberate positioning of an event encouraging this development generates a group spirit which influences the rest of the programme.

2) The relationship between students and staff should encourage the development of trust. Teacher training lecturers should be authentic and show concern and enthusiasm and should display the ability to create a free atmosphere and facilitate open discussion. These attributes play a significant role in learning and are important to the success of a programme which is based

on learner-centred educational principles. Through this students experience a development in numerous aspects of environmental literacy.

3) The consonance between the philosophical basis of a programme, the programme as it is perceived by students, and the personal example of the lecturer adds credibility to the programme and generates acceptance of it among students.

4) Frustration concerning an apparent lack of direction in a programme is a negative influence which can be avoided by the provision of more routine information. The excitement inherent in certain events is heightened by casual reference to them early in a programme, but as they draw closer, more specific information is needed in order to maintain a sense of security.

5) The inclusion of challenging experiences in a programme, provided they are within the capabilities of most students, has positive effects on their emotional well-being which enhances the learning process generally. This process involves a raising of anticipatory or anxious emotions before an event and a feeling of well-being and achievement once the event has passed.

H) Commitment to Environmental Quality

1) The development of a commitment to environmental quality is aided by the catalytic effect of events which share a common characteristic: they provide a stimulus towards, or even a way of taking action. This is achieved by various means such as providing a knowledge of specific action strategies and skills, or simply an awareness of actions which can be taken.

2) The above comment and, in fact, the emergence of this EET make it possible to state that the programme did cause the development of environmental literacy in

students.

I) Definition of 'Environment'

Overall, the programme can be seen to have developed and refined student understanding of the concept 'environment'. However, this understanding was achieved only after a period of time had elapsed and during which information specifically related to the topic was dealt with. It seems important, therefore, not to assume a particular understanding of a commonly used term, but to clarify it until it is fully appreciated.

An accurate definition of the term 'environment' is important since it tends to determine further conceptualisations of Environmental Education. If it is true that a narrow definition of 'environment' will produce a narrow approach to Environmental Education, then, ultimately, counter-productive educational practice will ensue. This is because, bearing the concepts of wide-awakeness and environmental literacy in mind, a sound environmental solution requires both a broad and a deep appreciation of social, economic, political and 'environmental' processes.