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Teachers' concerns about implementing environmental education through their classroom programmes

Karen Malone
Edith Cowan University

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**TEACHERS' CONCERNS ABOUT IMPLEMENTING
ENVIRONMENTAL EDUCATION THROUGH THEIR
CLASSROOM PROGRAMMES.**

BY

**KAREN MALONE
Dip. Tch. (Monash)**

**A Thesis Submitted in Partial Fulfilment
of the Requirements for the Award of**

**Bachelor of Education, Honours,
at the Faculty of Education,
Edith Cowan University**

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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

This study examined the concerns of teachers when implementing environmental education into classroom programmes. A metropolitan district of Perth was used for data collection. Four schools and thirteen teachers participated in the study.

The measure of concern was calculated using the Stages of Concern Questionnaire. The concerns were then subjected to a SAS computing analysis programme to determine the relationship between level of concern and predetermined factors. These factors were personal factors: teaching experience; knowledge of the principles of environmental education; colleague support and year level taught; and school-level factors: the presence of school policies; participation in inservices or workshops; Principal advocacy; and available resources and support.

To substantiate the quantitative data collected, a multi-method approach to data collection and analysis was incorporated into the study. Three styles of qualitative measure were included in the study design. These qualitative measures were obtained by: an open-ended statement of concern; a demographic profile for each individual; and informal interviews, discussions and observations.

The results showed that knowledge of the principles of environmental education, the presence of school policies,

participation in workshops and the availability of resources and support had the greatest influence on level of teacher concern. The overall response pattern of the district was of a nonuser. Interpretation of individual responses and patterns of individual profiles revealed that teachers could be categorised into five sub-groups. These sub-groups were the anxious user, the experienced user, the inexperienced anxious user, the nonuser, and the unconcerned user. The presence of anxiety was indicated to be the product of lack of knowledge about the innovation.

The conclusions made from this study were:

1. Teachers implementing environmental education were, on the whole, confused and lacked understanding of what environmental education constituted.
2. The characteristics of environmental education, and the conflicting ideologies that it presents with implementation, have a relationship to the anxiety of the implementing agents.
3. The absence of structured professional development in preservice and inservice institutions has increased the level of concern and anxiety towards the innovation.
4. There was no significant relationship between teaching experience, colleague support or year level taught to the level of concern.

DECLARATION

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Karen Malone

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CHAPTER ONE: INTRODUCTION

Background

Australian Perspective

Environmental education, as a term, emerged in Australia in 1970. Out of growing concern worldwide on the environmental crisis, the Australian Academy of Science convened a conference in April of 1970 under the theme 'Education and the Environmental Crisis'. The results of the conference and subsequent research overseas and in Australia (Reid and Linke, 1972-73) led to the formation of the Curriculum Development Centre 'Environmental Education Committee' in 1974. Skilbeck (cited Linke, 1977, p. 9) states,

The task of the committee was to identify major areas of need and formulate action proposals for support of environmental education in Australia by the Curriculum Development Centre.

The committee produced an interim report that was disseminated at the National Commission for the UNESCO seminar in 1975. The aim of the UNESCO seminar (Linke, 1977) was to bring together those people who had been associated with the most recent developments in environmental education in Australia. The major areas of deliberation were: the interdisciplinary character of environmental education; teaching styles and organisation strategies; the provision of resources; evaluation; and community/school relations. A working party involved in producing a report on styles of teaching and learning and methods of school organisation for environmental education,

outlined recommendations for the achievement of long term goals. A summary of these recommendations included:

- a. urgency for all schools to develop their own environmental policy;
- b. programme development in, and information about, these programmes to be fed back to schools;
- c. teachers who show a commitment to environmental education be identified and supported;
- d. teacher education, at both inservice and preservice levels, to include reference to the affective domain; and
- e. the further encouragement and investigation of environmental education.

The seminar revealed above all that the most perceived need was for teacher education. Greenall (cited Robottom, 1992, p. 5) stated :

The committee accepted teacher education as the primary focal point for CDC involvement, with the ultimate focus being students and a proposed action plan.

The report provided a base for deliberations for the newly established CDC Environmental Education Study group. The CDC study group believed that the priority of environmental education was teacher awareness. Five areas of recommended development were disseminated by the study group. The areas were sequential, and included: developing general acceptance of environmental education, providing support for diffusion and teacher awareness, developing materials, expanding the CDC information service, and facilitating the formation of a National Environmental

Education Council (Greenall, cited Robottom, 1992). The recommendations guided the CDC environmental education programme from 1977 to 1980. The first published works of the group did not eventuate until late 1980, and although past experience had highlighted the importance of efficient dissemination of materials in schools, the projects received little support. By 1980 the momentum for environmental education had succumbed to competition from other growing areas in education. Environmental studies was included as a core curriculum area in the 'nine learning areas' for Australian schools in 1980, but with the disbanding of the CDC in 1981, the policy statement had little time to expand or influence curriculum development in schools.

Western Australian Perspective

The Western Australian Department of Education was one of the first agencies within Australia to produce a state policy on environmental education. The key policy statement, disseminated in August 1977 from the Director-General's Office, was based on the framework of the Belgrade Charter. The Belgrade Charter was the result of an inter-governmental workshop on environmental education, held in Belgrade in October 1975. The purpose of the policy statement was to define the meaning and the implications of environmental education in Western Australian schools.

The policy endorsed an interdisciplinary approach to environmental education and determined the role of the classroom teacher as "the key to a worthwhile environmental

component in the curriculum". The one page document established a base for environmental education at this time but provided little support for teachers to implement it. Thirteen years elapsed before another document was presented to the schools on environmental education.

The report on the 'Provision of Environmental Education' in Western Australian schools was produced in 1990. The report was the consequence of an initiative by the Ministry of Education to identify how environmental education was being addressed in schools. Contained within the report were submissions, provided by individual schools and districts, of environmental education programmes that were being initiated at the school level. Mapping of suggested subject areas for environmental education programmes and seven 'action for the future' recommendations were provided. A summary of these recommendations included:

- a. review and updating of the 1977 policy;
- b. successful programmes made available on computer disk;
- c. development of environmentally-based units for lower secondary school;
- d. strengthening of links between the Ministry and external agencies;
- e. the endorsement of an environmental education strategy group;
- f. preparation of guidelines for superintendents and principals to monitor environmental education programmes; and
- g. the investigation of corporate sponsorship for awards of excellence in environmental education.

The Ministerial report also encouraged schools and districts to develop programmes relevant to their locality and encouraged a priority for environmental education in school development plans.

Inquiries into the realisation of recommendations have found that their achievement has been curtailed due to deficiency of funding allocations within the Ministerial budget. The 1990 classification of environmental education as a priority development area has since been withdrawn.

Environmental education at this time suffers from a lack of commitment by the Ministry to provide adequate and substantial professional development and funding. This is not a new phenomenon in Australian schools. Linke (1979, p. 25), after extensive research into environmental education in schools, concluded that:

while many teachers have taken an interest in environmental issues their initiative in setting up appropriate courses has often been hindered by a lack of administrative support.

In addition, O'Neill (1980) stated that most of the environmental education instruction in schools was given at the discretion of individual teachers. Schools implementing environmental education programmes in Western Australia are reliant on the dedication of a select group of individuals working out of school hours. The formation of Greenteach, a self-funded teacher organisation, provides a forum for interested teachers to exchange views and ideas, and serves to alleviate the isolation often encountered by these individuals. The group also disseminates information on workshops and conferences

through a printed newsletter, and offers the publication of teachers' experiences and achievements in environmental education.

Definition of Terms

Environmental Education

Environmental education is a process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man [sic], his culture and biophysical surroundings. Environmental education also entails practice in decision making and self formulating of a code of behaviour of issues concerning environmental quality. (International Union for the Conservation of Nature and Natural Resources, cited Greenall, 1986b, p. 9)

Concerns

Feelings, attitudes, thoughts, ideas or reactions an individual has to a new practice. (Hord, 1981, p. 5)

Implementation

Implementation is the actual use of an innovation, or what an innovation looks like in practice. This differs from both intended and planned use, and from decision to use, the latter being defined as adoption. (Fullan and Promfret, 1977, p. 335)

Statement of the Problem

Research into the implementation of environmental education programmes in Western Australian schools has never been documented nor presented for review within this State. Evidence that schools are implementing environmental education was apparent through the publication of the 1990 report on 'The provision of Environmental Education in Western Australian schools'. Little is known about the extent of environmental education input in curricula, the strategies used by teachers and their concerns when implementing. Because of the non-existence of preservice and inservice training in environmental education and the linguistical problems characterised by environmental education, the study evolved as a means of assessing how teachers contend with these factors. By isolating teacher concern as a focus for study, the research intention was to assess teachers' needs and present recommendations to alleviate teacher concern.

Significance of the Study

The study endeavoured to determine the relationship and significance that personal and school-level factors have on teacher concern, when teachers are implementing environmental education into classroom programmes. The data analysis served to suggest those factors, from the eight that were investigated, which had the most significant influence on teacher concern. By providing a sample of concerns and using information collected from other

research studies in this same area, the study provided recommendations that could be transferable to other schools in similar situations. The study also provided a foundation for future research.

Research Questions

Major research question directing the study

What concerns do teachers have about implementation of environmental education programmes?

Subsidiary questions

1. What is the relationship between school-level factors and the concerns of teachers implementing environmental education programmes?

Factors for investigation included:

1. School-based plans or policies.
2. Inservice courses or workshops.
3. Principal advocacy.
4. Available resources and support.

2. What is the relationship between personal factors and the concerns of teachers when implementing environmental education programmes?

Factors for investigation included:

1. Teaching experience.
2. Knowledge of the principles of environmental education.
3. Colleague support.
4. Year level taught.

Assumptions and Limitations of the study

It was assumed that items, and the measuring instruments used, measured what they were intended to measure. It was further assumed that all respondents gave honest and truthful responses to the questionnaire and the other forms of data collection. This assumption was enhanced by the consideration of ethical issues, the personal manner in which the study was conducted and the assurance to all participants that the information they provided would not be divulged to any third party.

The study, however, had limitations. Firstly, the size and selection of the sample did not allow for generalisations to be made for the whole of Western Australia. The results can only be inferred to be transferable to similar situations. The sample could not be considered a true representation of the general teaching community due to the restrictions of time and available resources for a larger sample size. The use of the CBAM questionnaire was also a limiting factor in the study because of the nature of the innovation and its non-fidelity. This last limitation was overcome through the use of alternative data collection methods to substantiate questionnaire results. The shortage of other research studies to which the research could be replicated limited information for the purposes of validity and comparison.

Overview of the Study

Chapter two presents a review of related literature associated with the innovation under study, research in teacher concern when implementating new innovations, and an analysis of the research instrument. The literature determines the relationship between implementation of innovations, teacher concern, and factors related to innovation characteristics and the context of implementation.

Chapter three presents the theoretical context of the implementation environment by formulating a contextual model for environmental education implementation and a conceptual framework for teacher concern.

Chapter four contains an outline of the research design, sample selection and the instrument used. The validity and reliability aspects of the instrument are studied, together with the data collection techniques employed.

Chapter five contains details of the data analysis and the procedures adopted to substantiate the findings. Patterns of responses for three subgroups are investigated, and comparative analysis of factor responses and questionnaire results are interpreted.

A summary of the results, implications and recommendations are discussed and presented in chapter six.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

The development of the reviewed topics has been presented in two parts: a tabulation of literature and a descriptive analysis of literature. The former orients the reader to the characteristics of the literature discussed. The latter provides a descriptive analysis of literature under the three topic headings of environmental education, teacher concern and the Concerns Based Adoption Model.

Tabulation of Literature Presented

The literature presented for analysis was compiled from a variety of sources, namely, journal articles, conference papers, unpublished works, Government reports, and text books. The topics for literature selection were guided by the research question and collected under the three topic headings listed above. For the purposes of the tabulation, literature topic selection has been restricted to single topic headings, although many of the articles reviewed overlapped into all topic areas. Compilation of an extensive review of literature incorporated using CD-ROM facilities, inter-library loans and dissemination of conference proceedings.

Table 1
Review of literature type by topic.

Type of Literature	Environmental Education	Teacher Concern	Concerns Based Adoption Model
Journal Articles	Albrecht(1992) Ham,Rellergent & Krumpe(1988) Ham&Sewing(1988) Fien (1985) Greenall (1986a) Greenall (1986b) Huckle (1986) Maher (1986) Robottom(1987) Robottom(1990)	Berman(1976) Fullan & Pomfret(1977) Hook & Rosenhine(1979) Loucks(1983) Czajkowski & Patterson (1979) Rice & Rodgers(1980) Hall & Loucks (1977)	Fullan(1972) Lucas(1983) Marsh (1983)
Conference Papers	Bowen(1989) Charters & Pellegrin(1973) Fien (1992) Hunt (1990) Murdoch(1990) Radbone(1990) Greenall-Gough(1989) Card(1990)	Hord(1981) Chamberlain (1986)	Bethel(1981) Hall(1980) Heck & Goldstein (1980) Huling & Hall(1983) Louck & Lieberman (1983)
Unpublished Works	Lucas (1972)	Edwards(1981)	Boyd(1982) Oliver(1986) Popkewitz (1982)
Government Reports	Ed. ^a Depart of WA (1977) Fensham(1976) Linke(1977) Ministry of Ed. ^a WA (1990a) (1990b)		Hall, George & Rutherford (1979) Keeves(1985) Marsh & Stafford (1989)
Text	CDC ^b (1981) Linke (1979) O'Neill(1980) Gough(1992) Robottom(1992) Stevenson(1992)	Hall & Hord (1987)	Tuckman(1978)

Note. ^a = Education
^b = Curriculum Development Centre

Table 2
Review of literature type by Year of Publication

Type of Literature	1972-1977	1978-1983	1984-1989	1990+
Journal Articles	Berman (1976) Charters & Pellegrin (1973) Fullan (1972) Fullan (1977) Promfret (1977) Hall & Loucks (1977)	Hook Rosenhine (1979) Lucas (1983) Marsh (1983) Loucks & Lieberman (1983) Czajkowski & Patterson (1979) Rice & Rodgers (1980)	Bowen (1989) Fien (1985) Greenall (1986a) Greenall (1986b) Ham, Rellergent & Krumpe (1988) Ham & Sewing (1988) Huckle (1986) Maher (1986) Robottom (1987a) Robottom (1987b) Greenall-Gough (1989)	Robottom (1990)
Conference Papers		Bethel & Hord (1981) Hall (1980) Heck & Goldstein (1980) Hord (1981) Huling & Hall (1983) Louck & Lieberman (1983) Marsh (1982)	Chamberlain (1986)	Albrecht (1992) Fien (1992) Hunt (1990) Murdoch (1990) Radbone (1990) Card (1990)
Un-Published Works	Lucas (1972)	Boyd (1982) Edwards (1981) Popkewitz (1982)	Oliver (1986)	
Government Reports	Ed. ^a Depart Of WA (1977) Fensham (1976) Linke (1977)	CDC ^b (1981)		Ministry of Ed. ^a (1990a) (1990b)
Text	Berman (1976)	Hall (1979) Linke (1979) O'Neill (1980) Tuckman (1978)	Keeves (1985) Marsh & Stafford (1990) Hall & Hord (1987)	Gough (1992) Robottom (1992) Stevenson (1992)

Descriptive Literature Review

Overview

Research on teachers' concerns, when implementing environmental education into classroom programmes, has not been well developed in Australia, due to lack of sufficiently interested and qualified research scholars in this newly developed field (Fien, 1985). The evaluation and production of new and innovative curriculum materials has dominated research studies, while little documented work has been carried out to ascertain the diffusion, effects and current usage of these materials. The practical issues and barriers that act as constraints to the implementation of environmental education policies, have received minor attention in the research arena. The successful implementation of curriculum depends on the commitment of the teacher to incorporate new curricula into classroom practices. Hart (cited Robottom, 1990) states that it is important to ascertain the key strategies for teacher change and direct attention to supporting the teacher. While revealing the unique characteristics and implications of environmental education on teacher change, the literature review presents a summary of factors likely to have the greatest impact on teacher concern. These findings have been incorporated into an analysis of the research instrument to determine its effectiveness to measure the relationship of factors to teacher concern.

Environmental Education

The review of literature in environmental education encompasses three areas: a philosophical perspective of environmental education, the characteristics of environmental education curriculum and the factors that influence teacher concern.

Philosophical Perspective

According to Albrecht (1992), the main positions for environmental philosophy are located on a continuum between anthropocentric and ecocentric poles. Anthropocentric is human centred and places human needs and preferences at the centre of the scheme of things. In contrast, ecocentric views uphold beliefs in the value and quality of all living things. Albrecht (1992) refers to extreme anthropocentric views as 'despotic' and places them at the opposite pole to 'gaian' and 'deep ecological' ecocentric beliefs. He believes a major expansion in environmental philosophy has been evident in the latter half of the twentieth century. Michael and Anderson (cited Greenall-Gough, 1989, p. 3) substantiate these claims by stating, "Anthropocentric ideologies which have dominated Western society have been unravelling for several decades." Albrecht (1992) associates the decline in anthropocentric views with the concept of 'rights'. He claims changing social views on human rights have been extended to include the rights of the natural environment. He concludes a shade of 'light green' emanates world view, due in most instances to social

reform from community lobbying. Although according to Albrecht (1992, p. 4):

visions of the 'darker green' environmental philosophy are certainly not prominent on the current international agenda...they clearly represent a threat to the 'status quo' and are actively being resisted.

The philosophical foundations of environmental education are deeply entrenched in ecological and educational debate. According to Gough (1992, p. 52), "it is a product of both the older and emerging world views and to some extent reflects the contradictions and conflicts that accompany a major paradigm shift." He argues that a shift in paradigms is essential to achieve long term goals in environmental education and encompasses the re-emergence of conceptual foundations from past ecological ideologies. He further expounds, that the epistemological paradigm which has dominated Western thinking for the past two hundred years, follows an ecological paradigm which has links to ecological perceptions spanning over two thousand years. The purpose of past ecological paradigms was "to help resolve the practical problems faced by humans when their desires failed to match their circumstances" (Gough, 1992, p. 51). Present environmental education principles, which are essentially problem centred, are not consistent with, and challenge present epistemological paradigms. A shift in paradigms as proposed by Gough (1992), raises the issues of schools being institutions for social transformation and reform. This would entail, according to Gough (cited

Greenall-Gough, 1992, p. 3), a "change in our total world view."

Within the confines of the present epistemological paradigm, two approaches to environmental reform have emerged. Stevenson (1992), identifies these two approaches as conservative reform and radical reform. Conservative reform incorporates the technical approach (inherent belief that science can resolve environmental dilemmas) and the political approach (using decision-making processes as a means of addressing concerns). Both conservative approaches support and maintain the status quo by supporting environmental improvement through existing political and economic systems. Radical reform also adopts two approaches, the socially critical (environmental crisis is due to larger societal problems) and the alternative approach (an utopian approach to transform existing dominant society structures). Radical reform approaches support an ecological paradigm, as proposed by Gough (1992). They criticise the effectiveness of current social structures and are concerned with an informed commitment to social improvement. Conservative approaches uphold epistemological views and incorporate ecological awareness (a light shade of green) within the constraints of the existing system. Pepper (cited Greenall-Gough, 1989, p. 4), views the goals and principles demanded by a radical environmental education curriculum as socially transformative and states:

since education is currently more a means of maintaining the political and economic status quo than anything else, then nothing short of radical reform of the curriculum, and the system, is demanded.

Knowledge of the philosophical perspectives reveals the difficulties of implementing environmental education into the current education system. Classroom teachers, when determining the organisation of their environmental education programmes, will need to be conversant with the underlying structures and constraints of the current epistemological paradigm. The philosophical orientation of environmental education is one of many unique characteristics presented by its implementation. Other characteristics will be revealed in the following section.

Curriculum Development

Environmental education in Australian schools is a school-based subject for policy development. A policy, as described by Lucas (1983), is a soft innovation. Lucas (1983) makes the clear distinction between soft and hard innovation. He describes the soft innovation as a collection of ideas (policy) that are susceptible to interpretation and change. In contrast, he describes the hard innovation as having explicit (if not fixed) mechanical forms and functions. The role of the teacher changes according to these parameters from a technician (with hard innovations) to an engineer and technician (with soft innovations).

Environmental education involves the teacher in pedagogical debate on the structure and extent of

environmental infusion into the school curricula. Conflicting consensus on the domain of environmental education (Schneider, cited Robottom, 1987) has caused confusion of the role and processes involved in environmental education teaching. Lack of preservice training and professional development in principles and goals of environmental education have led to dilution or misguided curriculum development. Maher (1986) sees these as programmes with only reduced characteristics of the environmental education objectives.

Environmental education has been advocated by the Curriculum Development Centre (CDC) and the Australian Association for Environmental Education (AAEE) as an interdisciplinary subject. Shaw (cited Robottom, 1987, p. 23) asserts that:

concepts like 'environmental education', 'issues-based curriculum', 'problem-solving', and 'interdisciplinarity' all tend to be variously interpreted, and their meanings and justifications are subject to debate.

Linke (1979) identified that the domain for environmental education in the school curricula could be either as a separate interdisciplinary subject, or as a component or theme within other disciplinary subjects. The pattern used in curriculum development is subject to debate. Integration has, according to Murdoch (1990), become an effective and inviting pathway towards achieving environmental goals. Unfortunately, Murdoch claims (1990) many programmes, described as integrated programs, would be better called 'correlated' curriculum. "Correlated curriculum becomes a way of 'fitting the environment in' to

existing subject areas" (Murdoch, 1990, p. 115). Successfully integrated programmes should be planned sequentially, show real purpose, and the environmental content should drive the teacher's planning, rather than the processes. Theories on the relation of teachers' pedagogical approaches to curriculum organisation and assessment, put forth by Bernstein (cited Greenall-Gough, 1989), imply that a problem-centred or interdisciplinary curriculum creates problems for the classroom teacher in classroom organisation, pedagogical control and the assessment of student learning. Greenall (cited Robottom, 1992, p. 16) stated:

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

Models for curriculum development in environmental education have been presented. The most definitive and widely used model is the one proposed by Lucas (1972). Lucas defined three primary classes of environmental education: education about the environment, for the environment, and in the environment. Greenall (1986a, p. 24), defining Lucas's dimensions of environmental education, describes education in the environment as: the environment taking the form of a classroom location, education about the environment discovering the nature of a study area, and education for the environment seeking to develop students' informed concern and responsibility towards the environment. She expands on these definitions

to add, "it is only when education for the environment is the intention that environmental education is actually taking place." Huckle (1986) established that only education for the environment offered teachers the theory and practice with which to make a genuine contribution to environmental well-being. Education for the environment has the revolutionary purpose of critically analysing society and the political decision-making process. It seeks a radical reform approach to environmental improvement and ultimately challenges the existing epistemological paradigm. Education for the environment is the most radical of dimensions and, as Maher (1986, p. 23) states, has been abandoned by many teachers as being too controversial and, therefore, receiving "the least coverage and support in Australian schools." Environmental education, according to Maher (1986), poses many difficulties for the classroom teacher because it challenges traditional features of curriculum knowledge through emphasis on relevance, its interdisciplinarity, and its accent on studying information and values that question socio-political and economic processes. The role of the school was not, in the past, intended to develop critical thinking, social inquiry or active participation in environmental and political decision-making. Contemporary environmental education according to Stevenson (1992, p. 74):

has the revolutionary purpose of transforming the values that underlie our decision making, from present ones that aid and abet environmental (and human) degradation to those which support a sustainable planet.

The contrast of the schooling role creates a major conflict between environmental education and schooling. Present ideologies relating to the function of schooling, the interdisciplinary nature and the conflicting role of the teacher in classroom organisation and student assessment, pose difficulties and barriers to the implementation of environmental education into school programmes.

Factors that influence teacher concern

Ham and Sewing (1988) identified four categories of barriers that existed in relation to teacher incorporation of environmental education into the schooling system. These were conceptual barriers, logistical barriers, educational barriers, and attitudinal barriers. Conceptual barriers, according to Ham and Sewing (1988), stemmed from a lack of consensus about the scope and content of environmental education; logistical barriers, from the lack of time, funding and resources; educational barriers, from teachers' misgivings about their competency to conduct environmental education; and attitudinal barriers, from teachers' attitudes about environmental education. Card (1990) expressed that these barriers were not distinct entities but were interwoven to present a state of confusion. Earlier studies by Charters and Pellegrin (1973) identified barriers to the innovation process, while reporting on differentiated staffing in four case studies. Their findings were similar to those encountered by Ham and Sewing. Charters and Pellegrin (1973) summarised the

problems encountered by implementing agents. They stated such problems related to the tension that existed between the ideologies of the teacher and the strategies required by the change; the lack of clarity related to the innovation; lack of time; failure to recognise teachers' experience and training in the innovation; and the assumption that schools needed few additional resources to cope with the innovation. The studies by Ham and Sewing (1988) and Charters and Pellegrin (1973) affirm the assumption that resistance factors are due to lack of knowledge, time, resources and support available to the implementing agents. The absence of professional development in environmental education, its classification as a soft innovation, the lack of consensus of its role and its unique characteristics, influence the extent and ease of environmental education implementation into school curriculum.

Teacher Concern

Teacher concern, when implementing new innovations, has been widely researched. From initial studies by Fuller in the late sixties, the IDEA studies, Rand Corporation studies and the University of Texas studies in the seventies, teacher concern has centred on identification of teacher resistance, adaption and implementation of change within the classroom. Edwards (1981, p. 3) introduced five assumptions regarding the issue of changing teacher practice:

1. that change within the educational system is necessary, even inevitable;
2. that schools are complex social institutions in which change does not easily occur;
3. that the function of schooling is to produce outcomes in students;
4. that teacher practice is directly related to student outcomes;
5. that a desired change in student outcomes can be facilitated by an appropriate change in teacher practice.

Despite a common basis for the existence of these assumptions, there are a number of diverse beliefs and approaches regarding the issue of teacher change (Edwards, 1981). The behaviourist approach, in both intent and methodology, differs to that of a cognitive developmentalist approach. The behaviourist approach emphasises direct training in classroom management and specific skills, with the assumption that if teachers follow the correct procedure, the desired student outcome will result. In contrast, the developmentalist approach views facilitation of student development as the teachers' responsibility, but does not hold teachers accountable for predictable outcomes in students. Research findings can be different, due, in many instances, to the conceptual base from which they were derived.

The implementation perspectives incorporated into a research study will affect outcomes. Implementation, as defined by Fullan and Promfret (1977), has two perspectives. The fidelity perspective, which attempts to measure the extent to which the actual use of an innovation corresponds to planning, or intended use, and the mutual adaption perspective, which concentrates on portraying the process of implementation to highlight its complexities.

The Concerns Based Adoption Model (CBAM), developed from research at the University of Texas, emphasises the fidelity aspect of implementation. The Berman (1976) perspective, utilised in the Rand studies, takes on the latter perspective of mutual adaption. Fullan and Promfret (1977) believe the most desirable form of implementation research should employ an eclectic perspective in any given situation. They also point out that it is possible to identify common factors that influence implementation. These factors would include characteristics of the innovation, strategies used to assist the implementing agent and characteristics of the adopting unit. Factors influencing implementation, suggested by Rice and Rodgers (1980), include the degree of complexity of an innovation, the problems presented by its implementation, the extent of support available by external structures and the lack of detailed knowledge for the implementing agents about the innovation. The two authors believe active participation by the change agents in the development, and sound knowledge of the innovation, are necessary requirements for successful implementation of a new innovation. Czajkowski and Patterson (1979, p. 18) further substantiate these claims by stating that "schools which meaningfully coordinate curriculum change, staff development, and programme evaluation toward specific aspects of programme involvement are more likely to reach successful implementation than those who don't."

Berman (1976) discussed the importance of teacher characteristics in the implementing process and claimed:

"Above all a teacher's sense of efficacy has major positive effects on all classroom level outcomes." He implied teacher concern was directly influenced by not only the external factors at the school level but also personal factors. Berman's (1976) claims were substantiated in the study by Ham and Sewing (1988), which were discussed earlier, where attitudinal barriers (the teachers' attitude to environmental education) and the educational barriers (the extent of self competency) were found to be principle causes of resistance to implementing environmental education programmes. Edwards (1981, p. 26), reflecting on the issues of resistance, states:

When teachers are caught between the pushes and pulls of school efforts to operate within economic restraints, to meet changing society demands, and to maintain philosophical commitments, they often develop a sort of patchwork functioning which combines several different forms of belief and practice.

Teachers, according to Edwards (1981), were not likely to change classroom practices if there was risk of unaccompanied success. Change not supported by colleagues and/or the principal, were not likely to be pursued.

The philosophical orientation of an innovation, according to Hall and Hord (1987), has important implications for teachers in classrooms. Hall and Hord (1987, p. 112) state, "when a philosophical orientation is the basis for defining an innovation, it is difficult to make real and concrete descriptions of practice." This statement has implications for the characteristics of environmental education. Environmental education, according to Gough (1992), involves a change in world view, and

evolves from a changing philosophical orientation from the epistemological to the ecological paradigm. Because the basis for implementation is reliant on the internalisation of the philosophy of environmental education, this action can cause, according to Hall and Hord (1987, p. 113), "an increased ambiguity and feelings of uncertainty about what should be happening in the classroom." Teachers involved in implementing innovations, defined from a philosophical orientation, need specific suggestions, advice and prescriptive coaching, and success is dependant on the priority given to assessing teachers' needs.

The extent of knowledge about the innovation, the changes required with its implementation, the role and characteristics of the implementer and the extent of assessment undertaken in the needs of the implementing agent, are key factors to the success or failure of a new innovation.

The Concerns Based Adoption Model.

The conceptual basis for the Concerns Based Adoption Model (CBAM) was derived from work by Fuller (cited Marsh and Stafford, 1989). Fuller's work with preservice teachers allowed her to identify what she conceived as a sequence of concerns that developed on a continuum from concerns about self, task and the impact of their teaching on the students. Hall (1980) and his associates (University of Texas), extended the initial sequenced concerns to an examination of practising teachers and their implementation of new innovations. The two instruments, initially

developed by Hall (1980) and his associates, were Stages of Concern (SOC) and Levels of Use (LOC). The instruments use general categories or stages to rate teachers' behaviours and attitudes during the implementation of a curriculum (see Table 3). The SoCQ (Stages of Concern Questionnaire) that was incorporated into the present study, focuses on the affective issues relating to teachers' involvement with implementing an innovation. The CBAM, conceptualized from behaviourist theories, identifies the sequential development of the individual to change when incorporating an innovation. The CBAM is dependant on five assumptions of the change process.

These are:

1. Change is a process, not an event, requiring time, energy and resources to achieve it.
2. Change is achieved incrementally and developmentally.
3. Change is accomplished by individuals first.
4. Change is a highly personal experience.
5. Change can be facilitated by change agents providing diagnostic, client-centred support to individual teachers.
(Hall and Loucks, 1977)

The SoCQ measures affective issues that concern teachers when implementing an innovatory curriculum. The outcome of the data analysis derives the level of concern and the type of concern the teacher encounters. Inservice or support structures can then be developed to be effective and beneficial to the implementing agent. Through test-retest studies, using the CBAM instruments, the achievement

of teacher assimilation with an innovation is assessed over a period of the implementing time.

The fidelity aspect of the CBAM assumes that there is a specific curriculum or innovation available to teachers at the school. The instrument was devised to assist the user, through diagnostic processes, to become independent of the innovator and achieve full assimilation of the new curriculum. With a soft innovation (as with environmental education) the fidelity aspect of CBAM cannot be easily assessed. Heck and Goldstein (1980), when assessing the potential of CBAM in terms of implementation studies, discussed two approaches. Through their discussions they argued that the CBAM could be used to assess innovations in both structured and unstructured approaches. According to Heck and Goldstein (1980), the structured approach stressed the fidelity of the designer's intentions and implementation, while the unstructured approach emphasised the interaction of the innovation within the educational context. These two approaches differ in emphasis on methodology in study design. The structured approach, with its significance on providing specific information, was more likely to emphasise a quantitative research design, while the unstructured approach tended to incorporate qualitative or multi-methods of data collection. According to the findings of Heck and Goldstein (1980), the CBAM contained elements of both approaches.

One of the major criticisms of the CBAM has been its implicit belief in science as a means to organise and control social and natural phenomena (Popkewitz, 1982).

Popkewitz (1982) queries the neutrality of the instruments and suggests they create their own taxonomies in order to manage schools and educational systems. Marsh (1990, p. 156) states: "Various writers have criticised the CBAM for ignoring the educational context and organisation norms and behaviours", but concludes, "the CBAM model has the potential for providing important information about implementation of curricula." Hook and Rosenhine (1979) discuss the implications of questionnaires used for data collection with teachers, and report, "considerable caution needs to be exercised" and that there is "need for multi-methodological approaches to data gathering and analysis." Research conducted after the development of the CBAM, by the CBAM team, lead them to conclude:

research techniques that combine several procedures as well as several perspectives is an effective method of capturing the events and actions that influence the implementation of an innovation (Goldstein and Rutherford , 1982).

Bethel and Hord (1981) provided an example of a study utilising the CBAM in a multi-methodological approach. The study was of an inservice programme in environmental education. The year-long study was designed to assess the utilisation of professional development activities to bring about change in teacher behaviour. Two instruments were selected to provide data, the SoCQ and the Environmental Education Questionnaire (EEQ). The test-retest study design incorporated three points of data collection from a sample treatment group and a control group. The study verified the effectiveness of a multi-method data

collection design, the effectiveness of the SoCQ to determine teacher concern, and provided information on the style and type of inservice to alleviate teacher concern.

The present study, after considering the limitations and criticisms of CBAM, in conjunction with innovation characteristics, constructed a multi-methodological approach to data collection. Qualitative methods of data collection, in the form of informal discussions and interviews, a demographic profile and open-ended statements of concern, were used to substantiate quantitative data collected by the SoCQ.

Summary

Environmental education presents a variety of philosophical and ideological conflicts with existing educational paradigms. The nature of these conflicts cause difficulties in curriculum development and understanding of the underlying principles and goals of environmental education teaching. Environmental education teaching is characterised by an interdisciplinary approach to curriculum development, and demands changes in teaching strategies and the role of the schooling system.

Environmental education is a soft innovation. The majority of teachers within Australia create documents from school-based plans or policies developed at the school-level. Because of the susceptibility of a soft innovation to interpretation and change by the implementing agent, it was advised that, when conducting research into the concerns of the implementing agents, a multi-methodological approach be taken. This approach allowed the researcher to

substantiate data obtained through the quantitative measure, with qualitative data. The following chapters will reveal the design and method of data collection and the interpretation of the data to accommodate the unique features presented when investigating environmental education implementation.

CHAPTER THREE: THEORETICAL FRAMEWORK

Introduction

The theoretical framework serves as a model, depicting the relationship of elements within a specified environment. Keeves (1985, p. 3388) states:

the value of the model lies in part in its abstractness, so that it can be given many interpretations [and] thereby reveal unexpected similarities.

The two models presented expose the theoretical environment in which environmental education is contained. The first model, the contextual model, poses a simplified interpretation of the environmental education context within the education system. The second model, the conceptual framework model, identifies the source of the study and identifies variable factors that influence the source within the context of the school environment. The two models presented an overall view of the context of the study and the source of factors that were examined through the research questions. Presentation of models to guide investigations can lead to oversimplification and exclusion of important aspects, hence the models have been created to include the most influential elements to the study, and exclude factors that have little or no significant impact.

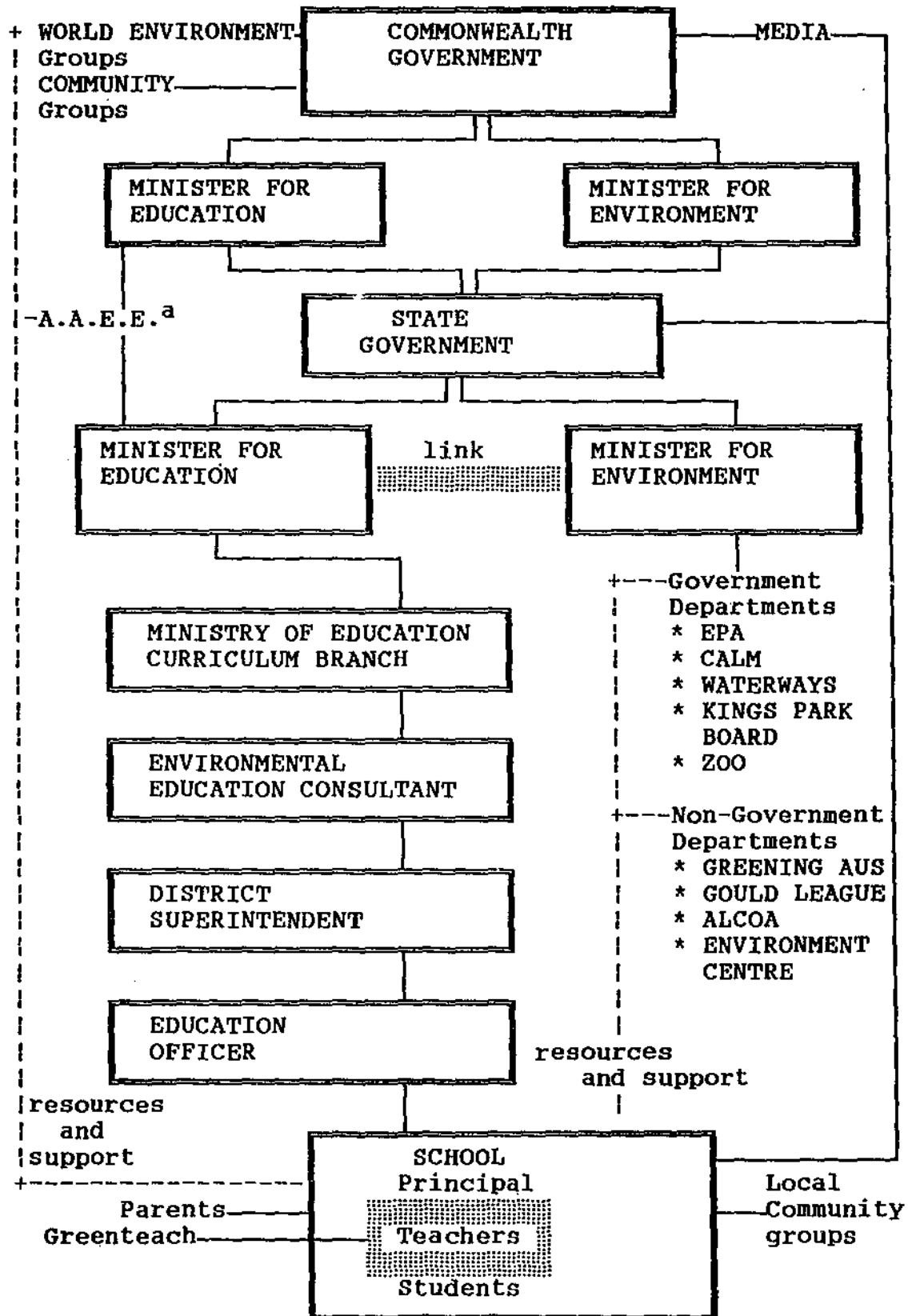


Figure 1. Contextual Model for Environmental Education.

Note. ^a Abbreviation for Australian Association of Environmental Education.

The Contextual Model

The contextual model (Figure 1) provides a background to the study by demonstrating the impact of community, government and non-government agencies on the implementation of environmental education in schools. Environmental education has links to concerns of broader society that are not so evident in other subjects presented for inclusion in the school curricula. The need to include environmental education into the schooling system has stemmed from world-wide concern for environmental sustainability. Therefore, the influences to implement environmental education are due to external pressures in conjunction with those exhibited by education bodies. The extent of community lobbying and government commitment to environmental education have impact on the degree of teacher involvement in the innovation. Personal attitudes and values are also considered an important element in teacher commitment to implement the innovation.

The focus for the present study was the teacher in the classroom situation, and therefore, these external factors although valid, have not been included. The conceptual framework for the study highlights the environment for teacher concern explored by the investigation.

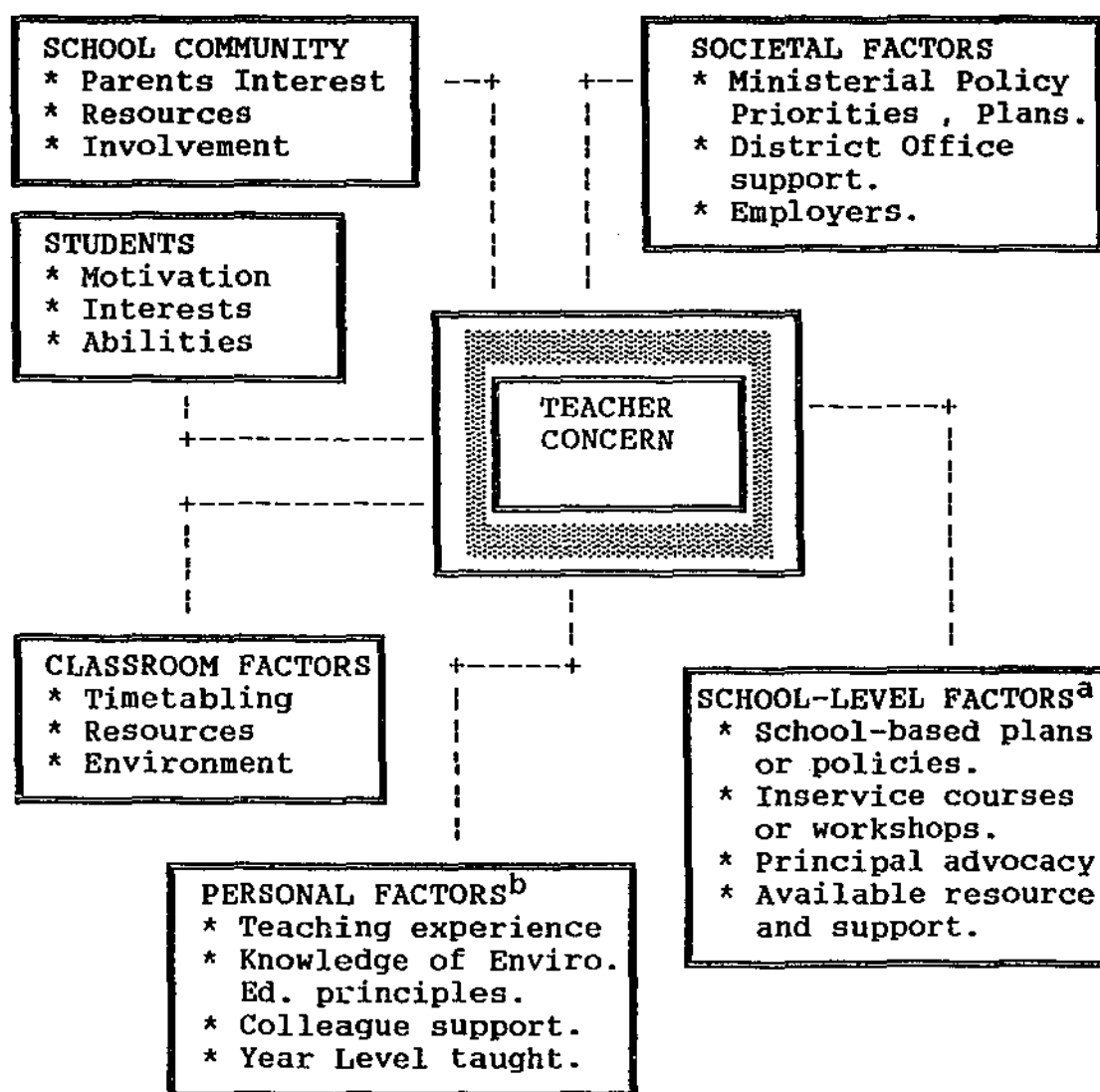


Figure 2. Conceptual Framework of Teacher Concern.

Note. The two factors investigated in the study were
^aSchool-level factors and ^bPersonal Factors.

The Conceptual Framework

The conceptual framework (Figure 2) guides the research question by providing a simplified context for the background of teacher concern. The study accepts that all factors included within the conceptual model will influence the teachers' concerns in varying degrees. The research study focused on factors that had the greatest influence on teacher concern, and accordingly, school-level and personal factors were isolated to guide the investigation. Ham and Sewing (1988), in their study on the barriers to environmental education implementation, in conjunction with other research on teacher change, conclude that lack of: knowledge, inservicing, colleague and principal support, resources, the availability of school based structures and teaching experience had the greatest influence on teacher resistance.

Conclusion

The two models presented in this chapter provided insight into the complexities of curriculum implementation within the present education system. The nature of the innovation intensifies these complexities through the affective influences by agencies external to the education system. The concepts selected for inclusion in the study design have been chosen with reference to previous studies in teacher concern and the resistance barriers identified by Ham and Sewing (1988).

The following chapter presents the research design and methodology incorporated into the study.

CHAPTER FOUR: METHOD OF INVESTIGATION.

Overview.

This chapter presents the research design and methodology used for the study. Following the research design characteristics, the chapter reveals the sample selection, a description of the research instrument, the method of data collection and limitations and restrictions of the instrument.

Research Design.

The research design used for the study was a 'Co-Relational Study' design. A co-relational study as described by Tuckman (1978, p. 48) involves:

The collection of two or more sets of data from a group of subjects with the attempt to determine the subsequent relationships between those sets of data.

This type of study can be diagrammed in the following way:

O_1 O_2

The purpose of such a design is to show that a relationship may exist between variables. The study only assumes to suggest possible bases for casual relationships and is based on the research conducted by Borkowski (cited Tuckman, 1978). Borkowski attempted to determine the relationship between music teachers' undergraduate training and teacher effectiveness. The current study plan measured personal and school level factors (O_1) against teachers' concerns (O_2). Correlations between all measures were obtained to determine whether a relationship existed.

Sample selection

The sample used was obtained from one ministerial metropolitan district of Perth, determined by the advocacy of the district to be involved in Environmental Education programmes. This fact was ascertained by the district having contributed to the Ministerial report 'The provision of Environmental Education in Schools' (Ministry of Education, 1990). From the district four schools were selected and three teachers from the schools invited by their Principal to participate in the study. Each teacher was from one of three year levels. These levels being, 1. Lower primary (L), grades one to three 2. Middle primary (M), grades four to five and 3. Upper primary (U), grades six to seven. The study sample is presented in Figure 3.

In addition to the twelve respondents invited to participate in the investigation, an extra respondent engaged in the study. The respondent, who will be referred to as Teacher 13, asked specifically to contribute to the research due to an interest in the area under investigation. Teacher 13 was an environmental education coordinator at School B who had organised the availability of teachers for the study. The teacher's inclusion was assessed as worthwhile due to the nature of the teacher's involvement and concern for implementing environmental education. The intensity of concern proved to be valuable, for comparative purposes, in the analysis stage of the study.

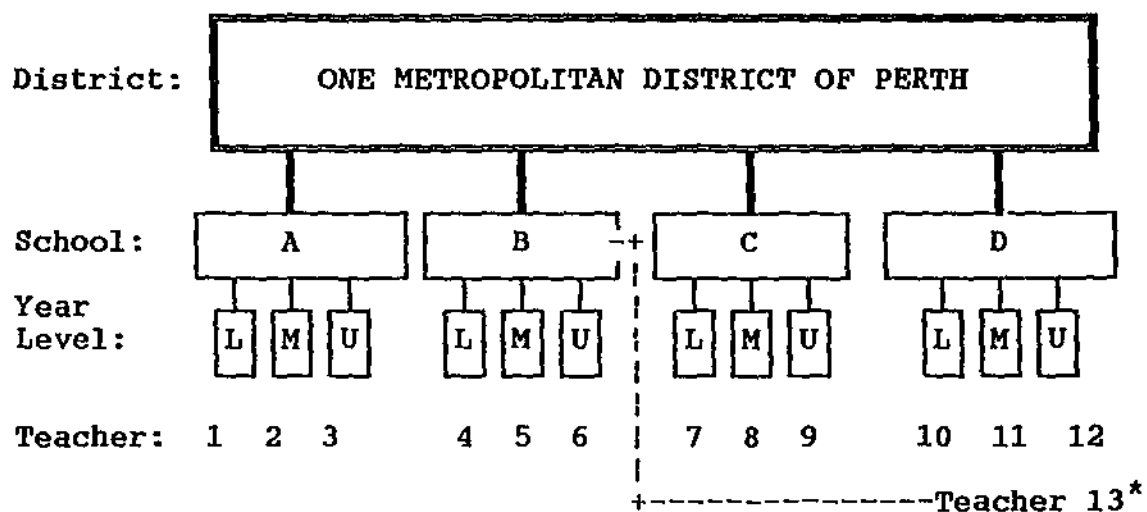


Figure 3. Study Sample for research study.

Note. * Teacher 13 was a additional respondent see text for explanation.

Description of the Instrument.

The instrument used in the study was the Concerns Based Adoption Model (CBAM). The CBAM contains two dimensions as explained earlier, and this study involved the use of the 'Stages of Concern' (SOC) dimension. The SOC has two types of data collecting agents 1. SoCQ: Stages of Concern Questionnaire and 2. Open-ended statement of concern. These two strategies for measuring stages of concern, can be used separately or together. The two strategies score a rating, or individual profile, for the participants on a scale of concern ranging from 0 to 7 (see Table 3 for details). The level of intensity of concern can also be obtained by analysing the relative intensity of percentile scores ranging from zero to one hundred. The Level of Concern (LOC) can be used to verify the anxiety of a participant with the innovation and also the degree of interaction with the innovation. A low intensity rating of percentile scores was regarded as the response of a non-interactive and unconcerned user. Individual responses, constantly in upper extremes of LOC, are suggested to be strong-minded or extremely anxious about the innovation.

The SOC was developed over a three year period, based on ten years of research carried out by Frances Fuller, and others, on teachers' concerns about teaching. The result was a thirty-five item inventory, with each item scaled on a Likert scale from 0, being Irrelevant, to 7, Very true of me now (see Appendix A). To substantiate quantitative data collected from the questionnaire,

informal discussions and observation were incorporated into the research method. The inclusion of qualitative data collection to accompany the findings of the questionnaire serve to alleviate criticisms of research studies reliant on one perspective or approach to data collection. The decision to accommodate two methods of data collection was decided after consultation and recommendations set forth by the CBAM team (see Limitations and Restrictions, item five).

Table 3

Stages of Concern about an Innovation.

(Hall, George and Rutherford, 1979, p. 7)

0 AWARENESS: Little concern about the innovation.

1 INFORMATIONAL: A general awareness of the innovation and interest in learning more detail.

2 PERSONAL: Individual is uncertain about the demands of the innovation, her/his inadequacy to meet those demands.

3 MANAGEMENT: Attention is focused on the processes and tasks of the best use of information and resources.

4 CONSEQUENCE: Attention focuses on impact of the innovation on students in her/his immediate sphere of influence.

5 COLLABORATION: The focus is on coordination and cooperation with others in use of innovation.

6 REFOCUSING: The focus is on the exploration of more universal benefits from the innovation.

Reliability

The questions for the SoCQ were the result of extensive testing for reliability by test-retest results that were correlated with an interview schedule classification by Judges (Hall et al., 1979). The responses to certain items were measured against other items measuring the same stage of concern to assure internal reliability. The testing was computed on a stratified sample of 830 teachers and coefficients of internal reliability tested by using a "generalised formula of the Kruder-Richardson Formula 20 for dichotomous items." (Hall et al., 1979, p. 11) As a result of testing, high internal reliability was assured (see Table 4).

Table 4
Coefficients of Internal Reliability for the Stages of Concern Questionnaire, N= 830.

Stage	0	1	2	3	4	5	6
Alphas	.64	.78	.83	.75	.76	.82	.71

Validity.

The validity of the questionnaire to measure defined Stages of Concern, was not as easily obtained due to non-existence of another comparative measure of concern. CBAM staff demonstrated that scores on the questionnaire related to each other and to other variables through a series of, "inter-correlation matrices, judgements based on interview

data, and conformation of expected group differences and changes over time" (Hall et al., 1979, p. 12). One of the most significant studies for validity was undertaken in August, 1976. The pilot study entailed participants being interviewed by CBAM staff and a concern rating assessed. The respondents were then exposed to the SoCQ. Analysis of the two findings showed ratings generally moderate to high. Ratings of 'highest' and 'also high' concerns showed group reliabilities between .42 and .85. Six of the seven were above .5 ($p < .01$). Only Stage 3 showed a non-significant reliability (.42, $p = .06$) (Hall et al., 1979, p. 16). Table 5 illustrates the reliability of ratings of stages of concern in the validity study.

Table 5
Reliability of Ratings of Stages of Concern in Validity
Study Analysis

Stage	Reliability	p
0	.59	<.01
1	.85	<.01
2	.60	<.01
3	.42	.06
4	.71	<.01
5	.73	<.01
6	.67	<.01

Data Collection

The data was collected from each of the four schools over a three-week period. Each participant completed the SoCQ, the Open-ended statement of Concern and a demographic profile (see Appendices A, B and C). The demographic profile was constructed from the guide given by Hall et al. (1979, p. 69) for both sample description and correlation purposes. A forty-minute time was prescribed for each contributing teacher and at this time they were relieved of teaching duties in order to complete the questionnaire. The personalised issuing and collection of the SoCQ reduced the likelihood of non-return and also maintained confidentiality of participants.

Limitations and Restrictions

The limitations and restrictions regarding the SoCQ have been outlined in full by Hall et al. (1979, p. 57-58). A summary of these were as follows:

1. The questionnaire is designed for, and intended to be used, for strictly diagnostic purposes for personnel involved in the adoption of a process or product innovation.
2. Personality assessment cannot be accomplished by the SoCQ and no attempt should be made to do so.

3. No modification can be made to instrument items, in doing so validity and reliability will be greatly altered.

4. The standardised sample consisted of teachers or administrators in education, and therefore, utilization with younger, or other occupational groups, is not warranted.

5. Interpretations should be treated as hypotheses and confirmed with the respondents rather than accepted as fact.

Conclusion

The research design and method of research were developed to allow the research question to be fully explored. A multi-dimensional approach to data collection was presented as an alternative to a totally quantitative approach to alleviate constraints of a small sample size and the characteristics of the innovation studied. To obtain a holistic approach to data interpretation, a multi-dimensional method of analysis was recommended by the CBAM developers. Through the use of open-ended statements of concern, informal observation and interview, the study design alleviated the risk of overgeneralisation and the genuineness of responses in relation to the classroom situation. A co-relational study design allowed for the inclusion of a variety of sources of data collection and was selected as the most appropriate design to fulfil the requirements of the research questions.

The personal and informal method of collection was utilised to ensure participants responded openly and truthfully to questionnaire items, and that the researcher was available to discuss and observe behaviours within the classroom context. All respondents were given the opportunity to expand on their personal concerns and the majority capitalised on the opportunity to engage in open discussion with the researcher and their colleagues on personal concerns regarding environmental education.

The data collection took a period of three weeks with interim visits to the schools to organise collection procedures. Post-data collection invitations were employed by the researcher to allow for validation of results and served to provide valuable resources of information in addition to those obtained earlier.

Interpretation of the data and an analytical study of results are contained in the following chapter. Implications of the results and recommendations of effective implementation strategies will be discussed in chapter six.

CHAPTER FIVE: DATA ANALYSIS

Overview

The following chapter will discuss the procedures employed to analyse the data collected in the Scarborough District of Perth, July 1992. The discussion will be presented in two stages. Firstly, the two methods of data analysis: the quick scoring device for the Stages of Concern Questionnaire; and the SAS statistics programme to determine factor relationships. Secondly, response patterns and factor analysis will be presented for three subgroups: the district, each school and individual teachers.

The Method of Analysis

The data was computed using the Quick Scoring device for the Stages of Concern Questionnaire. Each question on the 35 item questionnaire represents a statement from each of the seven stages of concern (see Appendix D). The raw score for each individual is the sum of the five responses. Once a raw score for each stage has been calculated it can be converted to a percentile score. "The percentile scores are based on the responses of 646 individuals who completed the questionnaire in the spring of 1975" (Hall, George and Rutherford, 1979, p. 26). The percentile scores obtained are then plotted to present a personal profile of concern for participants (see Appendix F). For general investigations of the entire sample, percentile scores from all participants were calculated and the mean found for each SOC. Interpretation of the profile responses, as

a combined group analysis or individual analysis, results in the determination of not only the highest peak stage of concern but the overall intensity of concerns. Intensity of concern can be interpreted by using the hypothesised development of stages graph (see Appendix E). Individuals progress from unawareness and nonuse of the innovation, indicated by intense concerns at stages 0, 1 and 2, to inexperienced use, high intensity at stages 3 and finally to experienced use, illustrated with high intensity of concerns in stages 4, 5 and 6. The progression of user development was a basis for the subsequent grouping of individuals in the latter part of the data analysis (Table 12). The intensity of overall concerns was also used to interpret the anxiety of the user in relation to the innovation. High intensity of concerns (scores which were consistently greater than 75) were interpreted as those of an anxious user. Individuals with scores consistently lower than 40, were regarded as unconcerned users with low anxiety towards the innovation.

The second stage of data analysis consisted of computing the results of the SoCQ with the demographic profile. The eight factors, four school-level and four personal, together with the individual percentile scores, were subjected to a SAS statistical analysis programme to derive mean scores and standard deviation for the group. Sample size precluded using more sophisticated analysis or analysis of school or individual responses. The computation allowed a general analysis of variables and their

relationship to stages of concern. These results were also plotted onto graphs for comparative analysis.

Definition of terms and symbols

Stage of concern (SOC)

The classification given from 0 to 7 of highest percentile score (see Table 3, for definition of stages).

Peak Score

The percentile score with the highest intensity of concern.

Level of concern (LOC)

The overall response to all stages. These will be presented as greater than (>) and less than (<) range of the scores. Scores below the 40th percentile are considered 'low' intensity concerns and above the 75th percentile 'high' intensity concerns (Hall et al., 1979). Scores between this range are deemed 'medium' intensity concerns.

Range

The measure of variance and degree of dispersion within the sample.

The District

General response patterns, derived from aggregate scores of the thirteen individuals within the Scarborough district, are shown on Figure 4. The group profile shows the peak score for stages of concern to be at the Informational stage (stage 1). The level of concern is

high in the first three stages, and medium in the last four stages. The frequency of peak scores within the group, illustrated in Table 6, reflected the aggregate group profile, with five of the thirteen participants at stage 1, and three at stage 0. The group profile can be interpreted as a classic nonuser profile. "The nonuser profile is normally highest on stages 0, 1 and 2 and lowest on stages 4, 5 and 6" (Hall et al., 1979, p. 36).

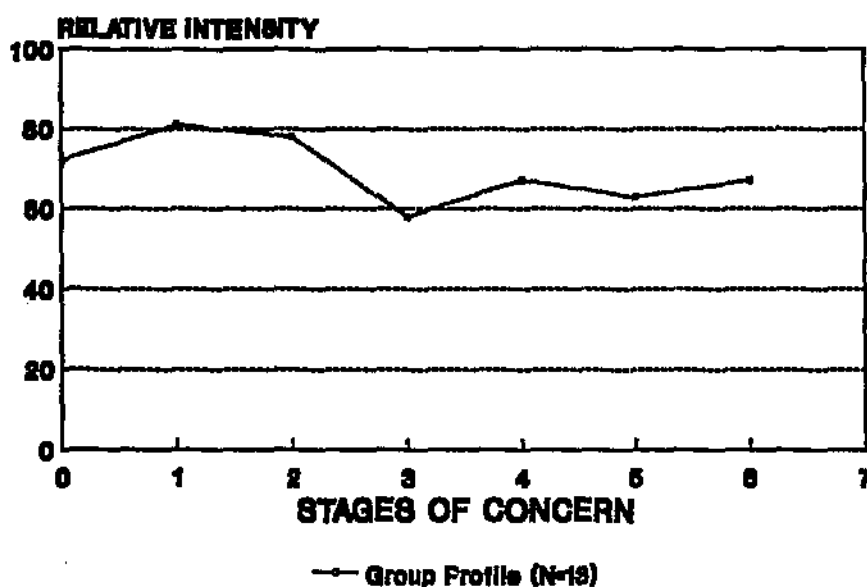


Figure 4. Aggregate school data.

Table 6

Frequency of Peak scores within the District (N=13)

	Highest Stage of Concern						
Stage of Concern	0	1	2	3	4	5	6
Number of Individuals	3	5	0	1	1	3	0

As a result of the SAS statistical analysis, five of the eight factors presented a higher association with SOC and LOC. These were :

1. School policy
2. Participation in workshops or inservices
3. Principal advocacy
4. Availability of resources
5. Knowledge of the principles of environmental education

The following is a summary and graphed representation of the SAS computed results of the five variables that inferred the greatest significance to stage and level of concern.

School Policy

Out of the thirteen participants, four noted the absence of a school policy, eight the presence of a policy, and one was uncertain. The mean scores were calculated for those who registered a positive or negative response. The peak mean score for the 'no' response was 94 for stage 0, and 89 for stage 2. The lowest score registered was 44 at stage 5. The positive response had a mean range from 63 in stage 1 to 76 in stage 2. Table 7 and Figure 5, show a summary of these calculations.

Table 7
School Policy SAS analysis with SOC

POLICY	<u>n</u> 12	SOC	Peak mean score	Range	LOC
No	4	1	94	50	> 43 < 95
Yes	8	2	76	13	> 62 < 77

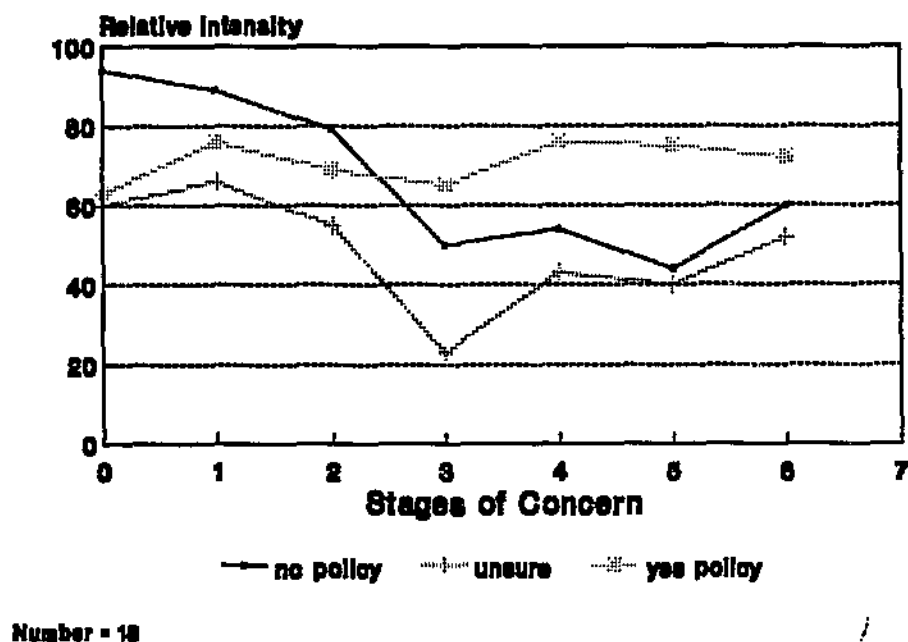


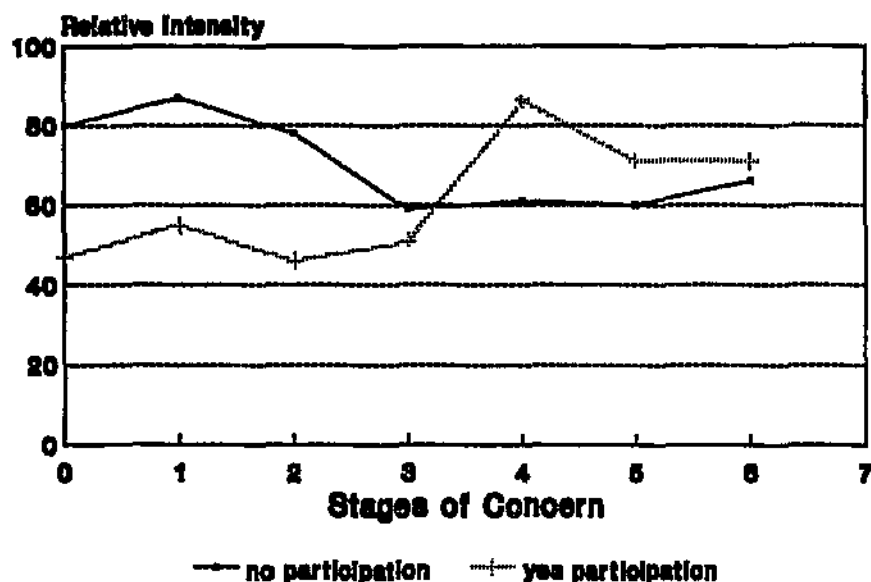
Figure 5. SAS analysis of school policy with SOC.

Teacher Participation in workshops and inservices

Response to the question 'Have you received formal training in environmental education?' showed that ten of the thirteen respondents had not received any formal training. The peak scores showed a high SOC (see Table 8 and Figure 6) at the nonawareness and informational stages, stage 0 and 1, (80 and 87 respectively). The three positive respondents recorded peak mean scores at stage 4. The LOC for non-inserviced participants was relatively intense with all scores higher than 58. Inserviced teachers registered lower levels of concern, with the first three stages below 55. The inserviced profile can be interpreted as that of the hypothesised experienced user. Non-inserviced teachers' profiles reflect the nonuser hypothesised SOC.

Table 8
Participation in workshops or inservices, SAS analysis with SOC.

INSERVICE	\bar{x} 13	SOC	Peak mean score	Range	LOC	
No	10	2	87	32	>58	< 88
Yes	3	4	86	40	>45	< 87



Number = 16

Figure 6. SAS analysis of Participation in inservices or workshops with SOC.

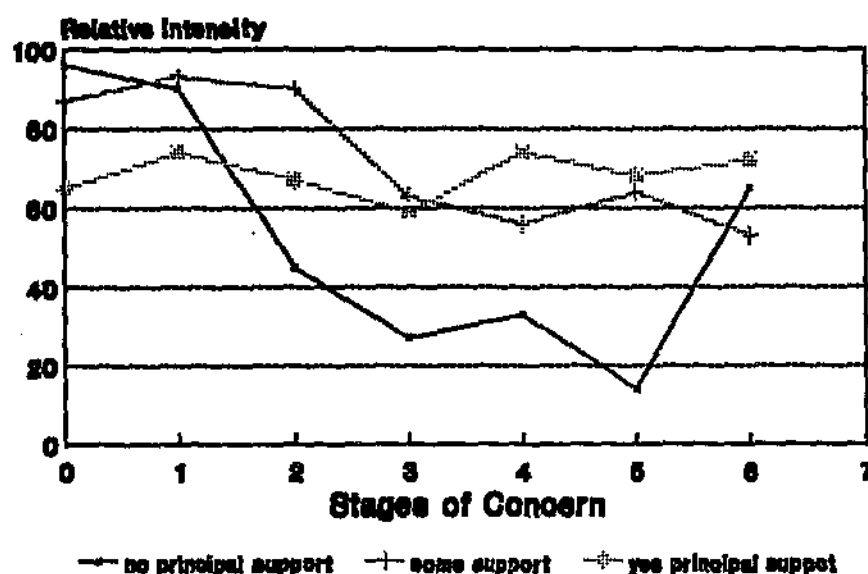
Principal Advocacy

Participants were asked to rate Principal advocacy in terms of 'no support,' 'some support' or 'yes supportive.' No principal support was represented by a high SOC in the non-awareness (stage 0) and informational (stage 1) stages (see Figure 7 and Table 9). These two stages had a high LOC and all other stages showed a low LOC. Those teachers who had some support from the Principal showed a high

concern in stages 2 and 3 (93, 90) and little concern in later stages of concern (range 10 all scores >52 and <64). Principal support was represented by a range of 15 with scores >58 and <75. Principal advocacy represented a lowering of SOC to medium intensity LOC, while some support could be regarded as more conducive to alleviating teacher concern than no support. The scores infer that some support from the principal did not alleviate need for more information about the innovation and knowledge of how implementing the innovation would affect the participants personally.

Table 9
Principal Advocacy, SAS analysis with SOC

PRINCIPAL ADVOCACY	<u>n</u> 13	SOC	Peak mean score	Range	LOC	
No	1	1	96	82	>13	<97
Some	3	2	93	40	>52	<94
Yes	9	2,4	74	19	>64	<75



Number = 18

Figure 7. SAS analysis of Principal Advocacy with SOC.

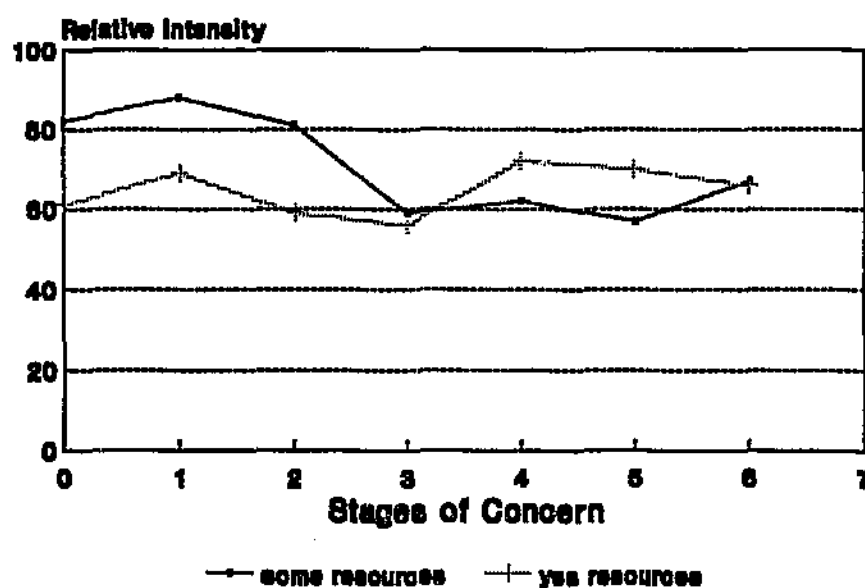
Availability of resources

Responses to 'Are there resources and support available to you to enhance your teaching of environmental education?' showed seven participants respond with 'some availability' and six 'yes available'. The mean scores, for teachers with some resources and support, peaked at stage two, with very high second and third peak scores in stages 0 and 3. Teachers who responded positively to the availability of resources had a peak score at stage 4. The teachers with some resources had high levels of concern in the first three stages and medium levels in the last four stages (stages 0-2 >80 and stages 3-6 >58 <68). Teachers with available resources had generally lower levels of concern, with all scores >55 and <78. The scores indicate

the availability of resources and support lowered LOC in SOC. Table 10 and Figure 8 summarise the interpretations.

Table 10
Availability of Resources and Support, SAS analysis with
SOC.

RESOURCES AND SUPPORT	n 13	SOC	Peak mean score	Range	LOC
some	7	2	88	31	>58 <89
yes	6	4	72	14	>55 <73



Number = 15

Figure 8. SAS analysis of Availability of Resources and Support with SOC.

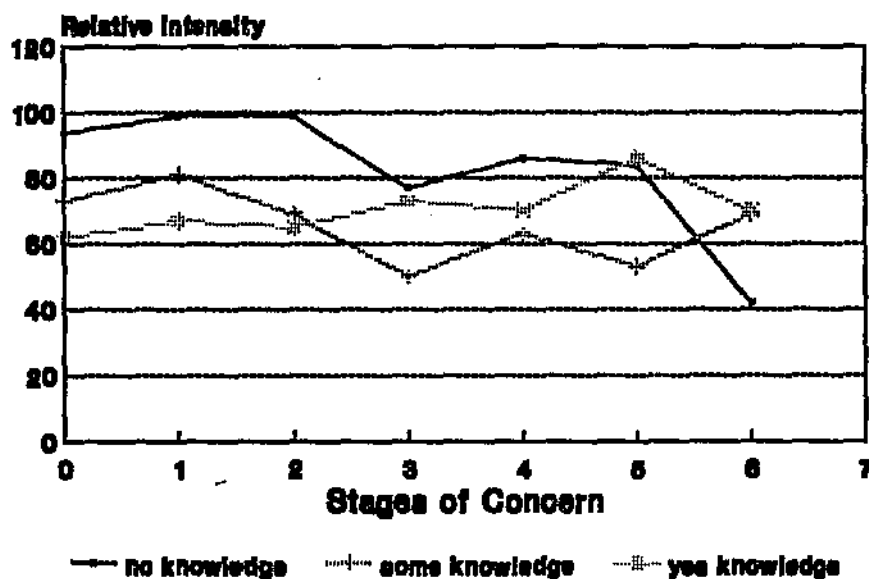
Knowledge of the principles of environmental education

Teachers responded to the question 'Do you consider yourself to have sound knowledge of the principles of environmental education?' with three alternatives. One teacher responded as having no knowledge, nine teachers to

some and three with full knowledge. The profile of respondents who answered 'no knowledge' and 'some knowledge', showed the same general pattern, with the LOC lower in the 'some knowledge' respondents (see Figure 9). Both groups had their three highest mean scores in the first three SOC. The teacher with no knowledge of the principles of environmental education scored extremely high peak scores with stages 1 and 2, registering mean scores of 99 (see Table 11). The main difference between the two groups was the LOC for stage 6, refocusing (refocusing is defined as exploring new ideas and improvement of the innovation). Positive respondents had a peak mean score at stage 5, collaboration, and an overall medium intensity LOC for all other stages (score range >61 and <74). Interpretation of all participants inferred that knowledge of the principles of environmental education lowered the variance of LOC. .

Table 11
Knowledge of the Principles of environmental education, SAS
analysis with SOC.

KNOWLEDGE PRINCIPLES	<u>n</u> 13	SOC	Peak mean score	Range	LOC
no	1	2,3	99	57	>41 <99
some	9	2	81	31	>49 <82
yes	3	5	86	24	>62 <86



Number = 18

Figure 9. SAS analysis of Knowledge of the Principles of Environmental Education with SOC.

Summary

Analysis of the data in the two stages confirmed the notion that the presence or absence of school-level or personal factors had an association to teachers' level and stage of concern. The general response pattern for the district was of a nonuser.

The Schools

The response patterns for each school will be summarised in this section of chapter five. All schools reside in a district that finds them within a fifteen kilometre radius of each other. Although within close proximity, all schools exhibited differing stages of concern when implementing environmental education programmes. Individual school aggregate scores were obtained by calculating the sum and the mean of percentile scores.

School A

The aggregate peak scores of school A presented low LOC when compared with schools B, C and D (see Figure 10). The highest SOC was at stage 1, and variance in distribution of scores was minimal (range = 22). Graphed representation of aggregate percentile scores (Figure 10) showed a consistent middle range of scores. According to Hall et al. (1979, p. 55), "those who consistently use middle range responses tend not to be forthright in their opinions" and when there are no clear peak stages "then the person has multiple stages of concern or no clear focused concerns." School A fitted into this analogy. Teachers' combined demographic data identified the principal as supportive and the presence of a school policy. Two teachers had not received formal training. One responded positively, but added the training was limited. Two teachers had some knowledge of the principles of environmental education, while one had

sound knowledge, and all rated themselves as inexperienced users.

School B

School B represented what Hall et al. (1979, p. 48) describe as an "Impact-Concerned User." The graphed profile (Figure 10) showed an increased LOC into advanced SOC. The peak score registered at stage five and decreased at stage six. The profile, classified in terms of the hypothesised development of stages (see Appendix F), is of an experienced user. The LOC is still relatively high at all stages with all scores >50, which showed concern for all aspects of implementing the innovation. Collaboration (stage 5) concerns focus on co-operation and collaboration with others. Observations made at the school site revealed the school had been implementing a whole school approach to environmental education for two years. Teachers made positive responses to the availability of resources and support and the presence of a school policy. Two of the teachers who had received formal training considered they had sound knowledge of the principles of environmental education and had principal support. All three teachers rated themselves as experienced users of the innovation.

School C

The profile of the third school (Figure 10) presents the most readily identifiable and commonly found concerns profile, that of the nonuser (see Appendix E). Hall et al. (1979, p. 36) state, "nonusers' concerns are normally

highest on Stages 0, 1 and 2, and lowest on Stages 4, 5, and 6." The peak SOC for school C was stage 1, with stage 2 closely following. The third peak score was stage 0, and all three stages had high LOC. The last four stages presented medium intensity LOC with a range of seven. No school policy, no inservice training, some available resources and support and no knowledge of the principles of environmental education were identified by all three teachers at school C.

School D

The final school profile (Figure 10) represented a nonuser profile with a 'tailing-up 6'. The 'tailing-up' of stage 6 on a nonuser profile provides information on the attitudes of respondents towards the innovation. Hall et al. (1979) describe this phenomenon as a potential warning that there is resistance to the innovation. They state, "tailing-up for nonusers: has ideas about how to do things differently and is likely to be negative toward the innovation" (Hall et al., 1979, p. 55). The peak score was at stage 1, and concerns decreased dramatically from that point. The high intensity LOC, for stages 0 and 1, showed a desire for information about the innovation, but there is little concern with other aspects of the innovation.

All teachers responded to having no formal training in environmental education. Two teachers stated there was no school policy, while one teacher was not sure. Two teachers responded to having some knowledge of the principles of environmental education and some available

resources. Two teachers rated themselves as inexperienced users. One teacher responded to being a nonuser.

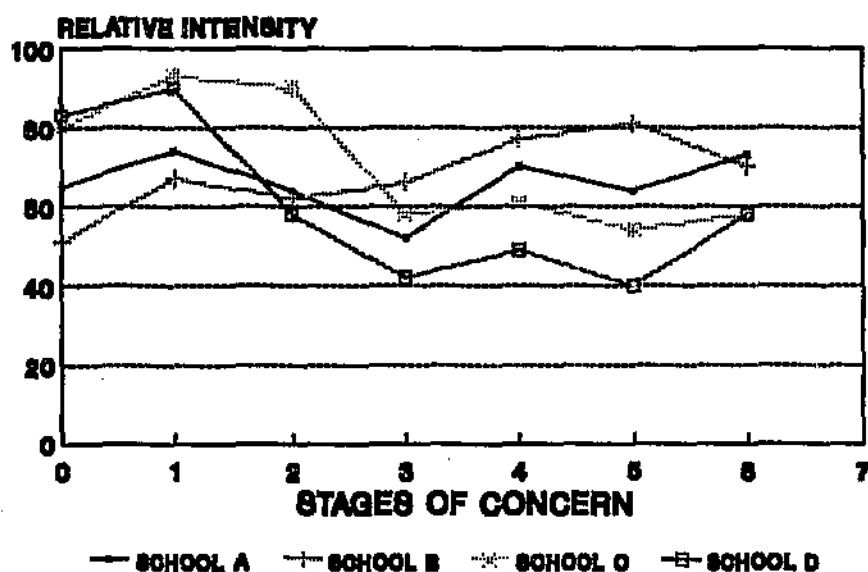


Figure 10. Individual School Peak SOC profile scores.

Summary

Each school profile was unique to the school setting and context. While responses to demographic information varied between teachers in each of the schools, the presence or absence of key factors did indicate a relationship between factors and SOC. School C and D indicated high levels of concern in stages 0 and 1, with school C also showing high concerns in the personal stages. Both these schools had no school policy and all teachers had not received any form of inservice training. School B had a profile consistent with experienced users, and concerns were concentrated on the final three stages of the

SOC model. School B had a school policy and two of the teachers had received inservice training, while all teachers felt they had sound knowledge of the principles of environmental education. The first school presented, school A, showed no consistent dominance by any SOC, and LOC was medium intensity for all stages. The unsorted responses were due to cancelling out of extreme LOC when calculating the mean. Analysis of individual teacher's peak SOC in school A found two teachers were at stage 2 and one at stage 4. Teachers in schools B, C and D reflected their colleagues responses, while one teacher in school A showed individual responses that did not coincide with those of colleagues. The next stage of analysis was to interpret response profiles of individual participants.

Individual Teacher Analysis

Personal profiles of individual teachers are contained in Appendix F. A sample of teachers' profiles were randomly selected for comment. Included for analysis was Teacher 13 who was eliminated from individual school analysis, due to the impact the responses from this teacher had on the school profile. Teacher 13, as explained in Chapter 4, was an addition to the initial sample but, for comparative purposes in district responses and individual responses, was included. Method of analysis consisted of: peak score SOC, intensity of LOC, correlation of statements of concern with SOC and factor analysis from demographic profiles. Teachers selected for analysis were Teacher 1, 6, 7, 11 and 13. A teacher from each school and each year level was represented in the sample for specific comment.

Teacher 13

The profile of Teacher 13, (see Figure 11) illustrated an 'extreme response tendency' (Hall et al., 1979). In an extreme response tendency profile, responses to all items are of high intensity (stages 1-6 range=6, LOC scores >90 <98). A profile of this type can be interpreted in two ways. Firstly, that the participant has not Q-sorted the items and, therefore, the results reflect confusion or lack of expertise in understanding the question items. Secondly, the profile may suggest a fairly strong minded or extremely anxious innovation user. With Teacher 13 it was beneficial to understand the background of the individual to differentiate which interpretation to make. Teacher 13

was the co-ordinator of environmental education at a model environmental school. Comments made by the teacher, in response to an open-ended statement of concern, illustrated high anxiety in all areas of implementation of the innovation. Examples of these comments would be, 'How will teachers be inserviced? Environmental education is in no man's land. What about principals who are not environmentally conscientious? How do you get teachers to practise what they teach? On whom can teachers call when they need help in implementing environmental education?' The scope of comments reflected a high concern in all areas of implementing environmental education programmes, but specifically from a broader perspective than the classroom. Correlating open-ended statements of concern and information contained on the demographic profile assists accurate interpretation of individual profile. Hall et al. (1979, p. 29) comment, "in some instances, the demographic data will help explain why certain concern stages are more or less intense." They suggest that using a variety of modes of data collection helps to substantiate interpretation of SoCQ data. Teacher 8 (see Appendix F) also showed an example of unfocused and extreme response tendencies. All SOC had high intensity, and variance between LOC was minimal (range=25, LOC >67 <94). The profile showed, as with Teacher 13, no clear peak but high LOC at every SOC. Comments made by the respondent are presented in question format, similar to Teacher 13, although not as detailed. The concerns covered a variety of areas and showed high anxiety on the part of the

respondent to outside influences beyond the scope of the classroom programme.

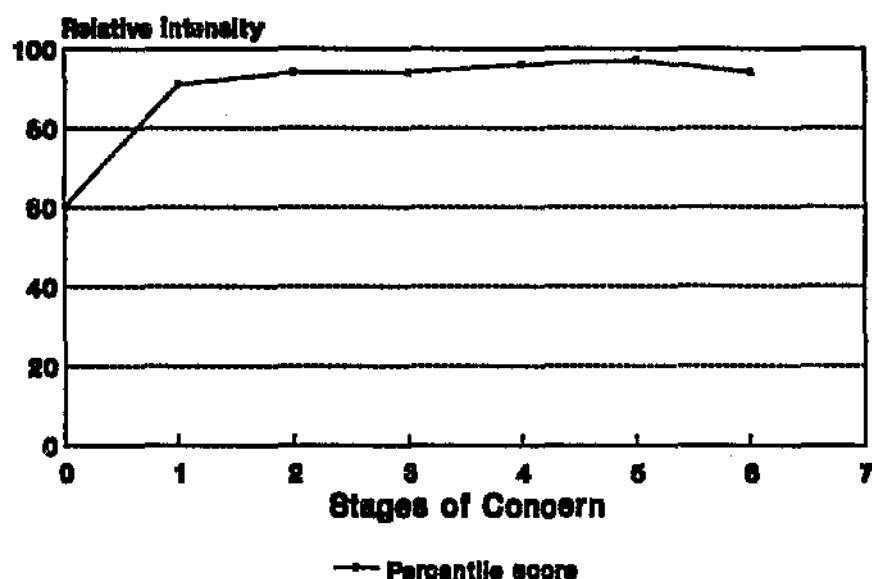


Figure 11. Teacher 13 SOC peak percentile SOC profile.

Teacher 1

The peak SOC score for Teacher 1 resided on stage 4, consequence. Figure 12 illustrates that the LOC for stages prior to stage 4 are low, and stage 4 peaks at a percentile score of 90. The profile could be interpreted as that of an innovator with high consequence concerns. The high consequence innovator has concerns with how the innovation affects, and is relevant to their students. The open-ended statements of concern reinforce the consequence and refocusing aspect of the profile, with statements such as, 'Having time to prepare lessons which are interesting and hands-on that will develop an increase in children's

skills, understandings and appreciation of the environment.' Demographic data reveals that the teacher has some knowledge of the innovation, principal support, available resources and support, a school policy and had received formal training in environmental education.

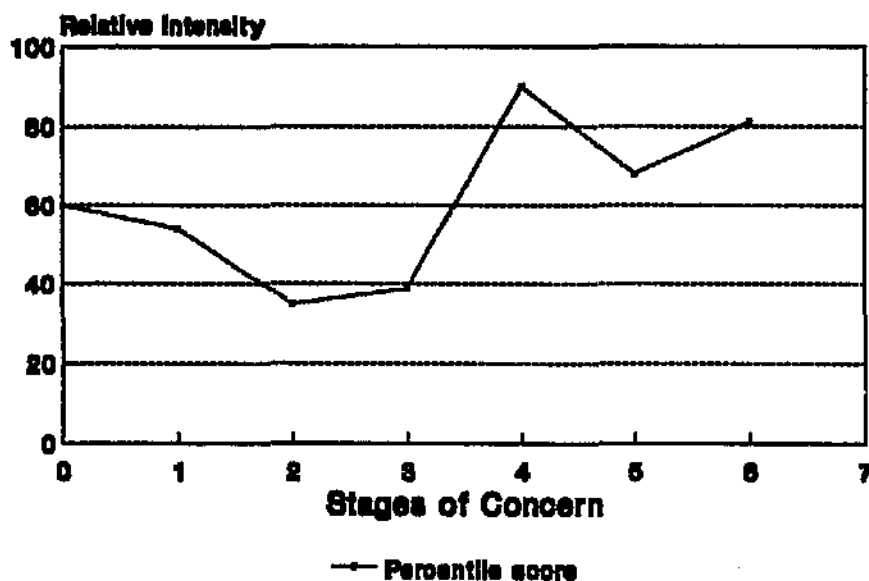


Figure 12. Teacher 1 peak percentile SOC profile.

Teacher 6

The profile of Teacher 6 (Figure 13) reflects high intensity LOC for all stages, with highest SOC score recorded at stage 5. The high stage 5 respondent was concerned with working with colleagues, or others, in coordinating use of the innovation. Teacher 6 works at a model school for environmental education and was involved in interactive activities between teachers internally and externally to the school. Teacher 5, (Appendix F) also from this school, showed a similar profile with a high stage 5 peak SOC score with low scores in earlier stages. Second highest SOC was at the informational stage, which reflects a desire to learn what others know and what they are doing. High concerns in stage 6 indicate ideas for improving the innovation. Comments made by Teacher 6 such as, 'Isolation in effort, (What are other teachers doing?)' and 'we need adequate and accurate information and resources', incorporate concerns from the informational stage, with particular emphasis on stage 5, collaboration. LOC was high, with all but two responses categorised as high intensity concerns. Teachers 3 and 4 also had high intensity profiles (see Appendix F). Both these teachers can be interpreted as having high anxiety due to the intensity of concerns. The peak SOC and analysis of other data revealed that, unlike Teacher 6, they were not experienced users but were characteristic of inexperienced users. Inexperienced users have highest concerns from stage 1-4 and are differentiated from the nonuser who has a high stage 0 and a consistent decrease in concern after stage 2.

Teachers 3 and 4 could be classified as inexperienced users with high anxiety.

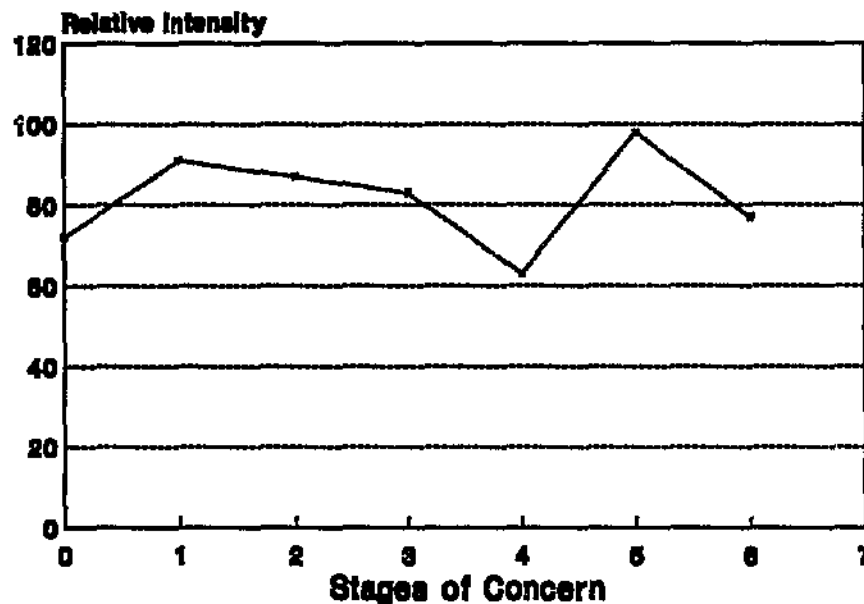


Figure 13. Teacher 6 peak percentile SOC profile.

Teacher 7

A typical nonuser profile shows high concerns in stages 0, 1 and 2. Figure 14, the profile of Teacher 7, is an example of the nonuser profile. The extremely high LOC at the first three stages (range=10, LOC >84 <96) and a dramatic decrease in intensity in later stages (stages 4-6 LOC >11 <43) is a typical nonuser trend. "A high score on stage 0 indicates that the individual has low concerns, knowledge, attention or interest regarding the innovation" (Hall et al., 1979, p. 46). Comments made by Teacher 7 such as, 'I'm not absolutely sure what environmental education is. What does it involve? Will we be given a specific document to work from?' reinforce the lack of

knowledge and awareness about the innovation, exhibited by a nonuser. Demographic data supports the notion of a nonuser, as the teacher reflected not having taught environmental education and was self-perceived as a nonuser. According to the teacher, the school had some resources and support, no school policy and some principal support. Teacher 7 had no formal training and only some knowledge of the principles of environmental education. Other nonuser profiles presented in the sample were for Teacher 9 and 10 (see Appendix F).

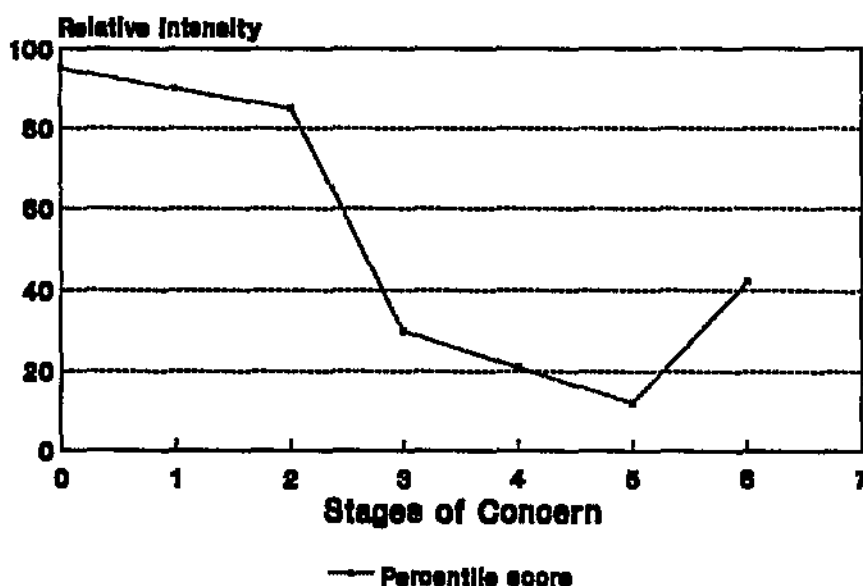


Figure 14. Teacher 7 peak percentile SOC profile.

Teacher 11

The final teacher also reflected a nonuser profile (Figure 15), although the intensity of concerns at all levels were medium to low (LOC >22 <68). On examination of individual responses to questions, the respondent answered 'somewhat true of me now' for 16 of the 35 items. The teacher showed a lack of commitment to the innovation. Comments made by the participant reflected ideas that could be utilised when implementing environmental education, but no specific concerns to actual use. Interpretation of the results, with the inclusion of demographic data, indicated the teacher was not engaged in implementing the innovation, but was still involved in obtaining information, defining the innovation and looking at ideas (expressed by increased LOC at stage 6). Low management concerns indicate the teacher was not concerned about how to implement, but what to implement. The response profile for Teacher 2 (see Appendix F) is similar to Teacher 11. Scores are in the medium to low LOC, with a distinct lack of concern at stage 3, presented as a dramatic decrease. Comments made by Teacher 2, as with Teacher 11, listed possible content areas of environmental education programmes but did not contain concerns relevant to actual use. Teacher 2 could be interpreted, as with Teacher 11, as an unconcerned nonuser.

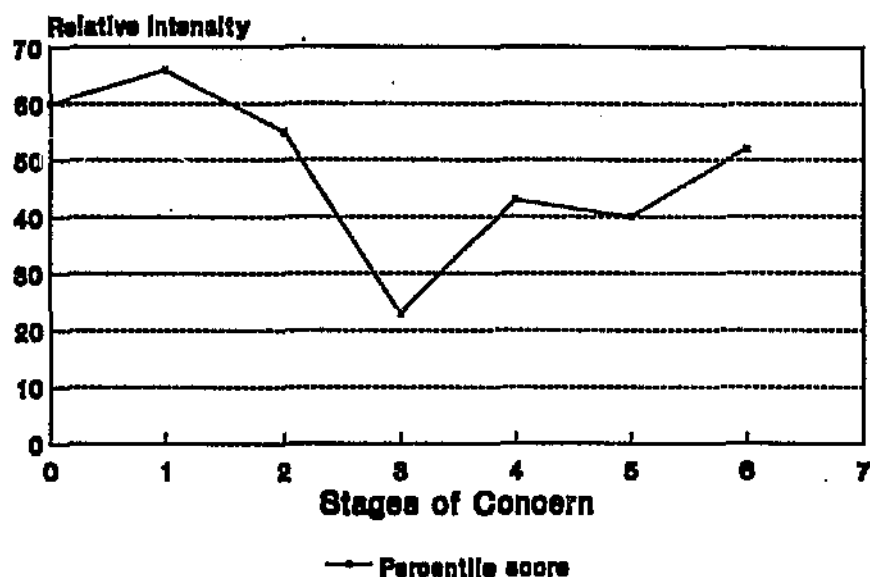


Figure 15. Teacher 11 peak percentile SOC profile.

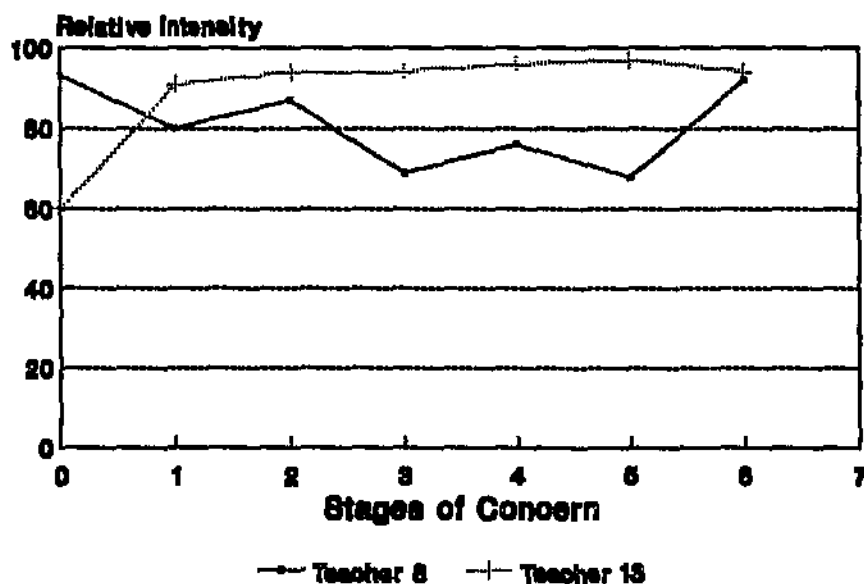
Summary

The teachers can be categorised into certain groups according to the response patterns interpreted in the SoCQ, demographic data and open-ended statements of concern (Table 12). The groups have been derived from the user categories presented by Hall et al. (1979, p. 35) in their hypothesised development of stages of concern graph (see Appendix E). In the following section, these groups have been explored, common characteristics described and a figure containing each of the participants SOC profile plotted.

Response groupings for participants

Group One

The highly anxious user expressed concerns in all areas of the implementation process. The SOC profile was analysed as an 'extreme response tendency' profile. Concerns were unfocused and LOC was high in intensity for all stages. Comments made by the individuals showed a broad spectrum of concerns, internal and external, to classroom environment. Figure 16 illustrates the profile of all participants in group one.

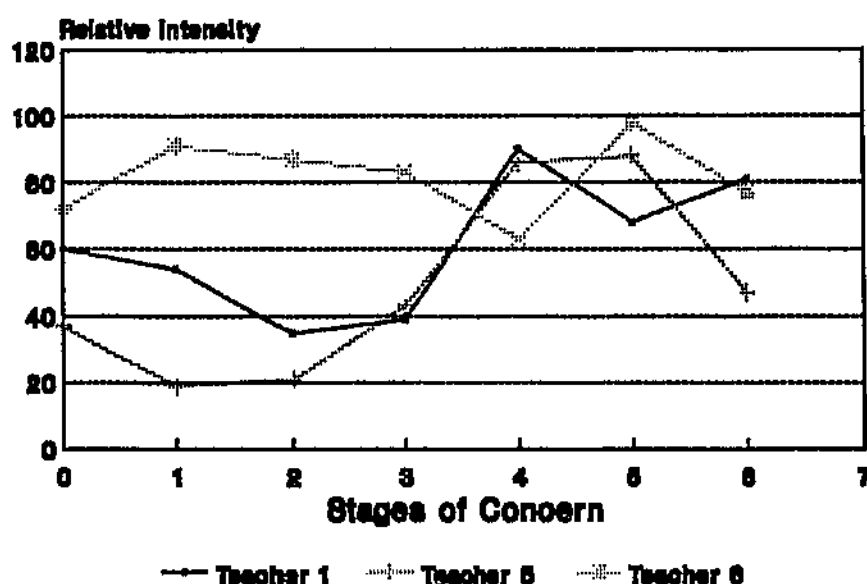


Number = 2

Figure 16. Group One: the highly anxious user, combined SOC profiles.

Group Two

The experienced user had SOC in stage five. The LOC was high in the later SOC with low LOC in earlier stages (0-3). Statements of concern were directed at the consequences of the innovation in relation to the students under their instruction. Although intensities of earlier stages are different for all members of this group (see Figure 17), all members show an intense concern between the stages of 4 to 6.

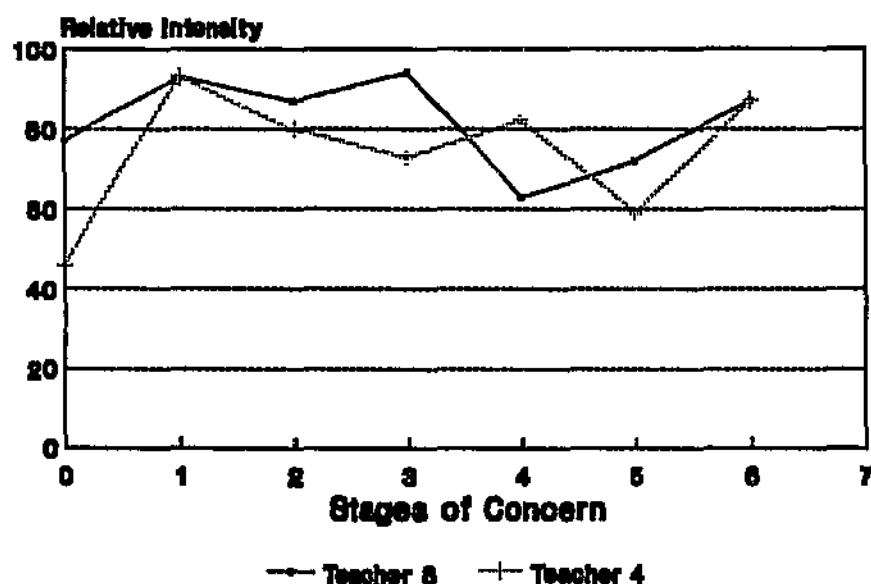


Number = 8

Figure 17. Group Two: the experienced user, combined SOC profiles.

Group Three

The anxious inexperienced users had highest SOC from stages 1 to 4. They had relatively high intensity at all stages. Individual responses and statements of concern indicated high anxiety due to lack of experience in implementation of the innovation. Figure 18 shows the profile of each of the members of group three. The profiles are similar to those in Figure 16, and through analysis of qualitative data the grouping for these individuals was assessed.

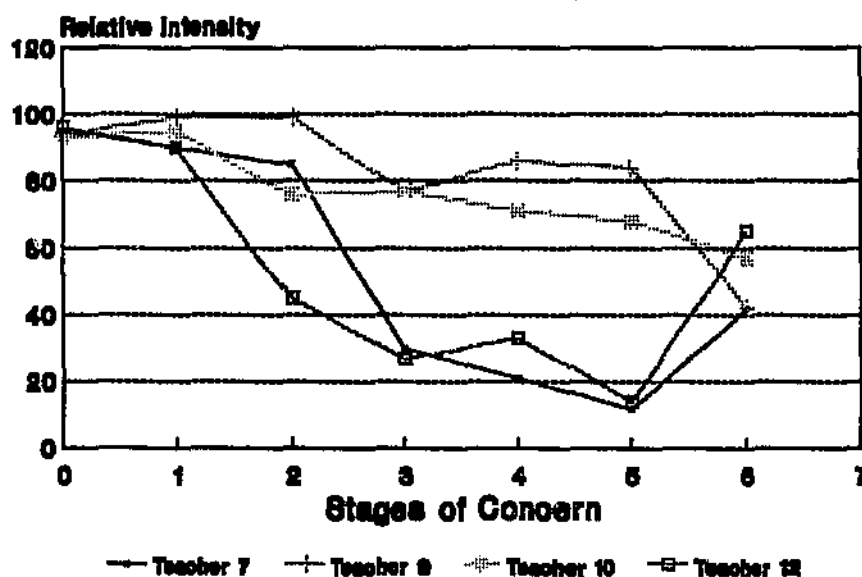


Number = 8

Figure 18. Group Three: the anxious inexperienced user, combined SOC profiles.

Group Four

Nonusers exhibited profiles with high intensity LOC in stages 0 to 2, differentiated from an anxious user by the dramatic decrease of intensity in later stages. Responses by individuals within this classification showed concerns centred on the linguistical and educational requirements presented by the innovation. Each individual, as shown on Figure 19, had different LOC, and the decline of intensity from stages 1 and 2 differed.

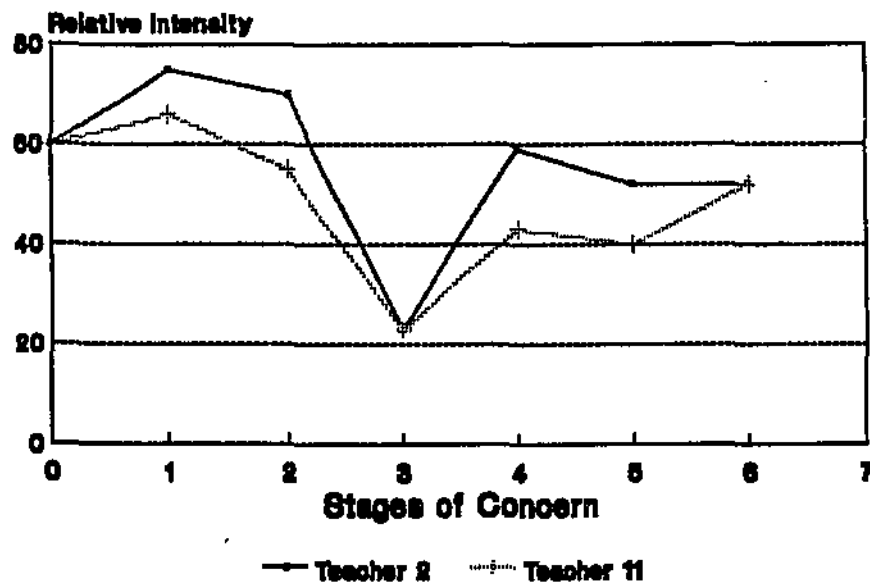


Number = 4

Figure 19. Group Four: the nonuser, combined SOC profiles.

Group Five

The unconcerned user was characterised by an extremely low LOC in all stages. The lowest levels were recorded at the later SOC. Responses highlighted a lack of commitment to the innovation and no immediate desire to obtain information, as detected in group four participants. Figure 20, represented by an axis of only eighty, details the similar pattern of response for the two members of group five.



Number = 2

Figure 10. Group Five: the unconcerned nonuser, combined SOC profiles.

Table 12

Response Groupings for Participants.

GROUP	DESCRIPTION	TEACHER
1	Highly Anxious User	8, 13
2	Experienced User	1, 6, 5
3	Anxious Inexperienced User	3, 4
4	Nonuser	7, 9, 10, 12
5	Unconcerned Nonuser	2, 11

The tabulation of the response groupings indicate that only three of the thirteen participants were experienced users with low anxiety. To determine the factors that attribute to the low anxiety, and the progressed development of use of the innovation, a second analysis was made. The results of the second analysis are recorded on Table 13.

Table 13

Crosstabulation of user grouping and factor response.

GROUP ^a	TEACHER	Response to factor ^b				
		1	2	3	4	5
1	8	no	no	yes	some	some
	13	yes	no	yes	some	some
2	1	yes	yes	yes	yes	some
	6	yes	no	some	yes	yes
	5	yes	yes	yes	yes	yes
3	3	yes	no	yes	some	yes
	4	yes	no	yes	some	yes
4	7	no	no	some	some	some
	9	no	no	some	some	no
	10	yes	no	yes	yes	some
	12	no	no	u/s ^c	some	some
5	2	yes	no	yes	some	some
	11	u/s ^c	no	yes	yes	some

Note. Definitions of group and factor numbers and abbreviations.

^aGroup

- 1 Highly Anxious User
- 2 Experienced User
- 3 Anxious Inexperienced User
- 4 Nonuser
- 5 Unconcerned Nonuser

^bFactor

- 1 School Policy
- 2 Participation in Workshops or Inservices
- 3 Principal Advocacy
- 4 Availability of Support and Resources
- 5 Knowledge of principles of Environmental Education

^cu/s means the participant was unsure of how to respond.

The table illustrates the interrelationship between response groups and the investigated factors. There were strong associations between all factors, with the exception of Principal advocacy. This view is supported by the

acknowledgement that Principal advocacy was present in varying degrees within all groups. It was assumed from this observation that Principal advocacy did not ensure use of the implementation. Characteristics of the experienced user group (see group 2, Table 13) imply that the presence of the other four factors increases the level of implementation and lowers participant anxiety. The most influential factors were indicated to be participation in workshops and available resources and support. The crosstabulation provides an informative understanding of the factors most likely to be effective in alleviating teacher concern.

Conclusion

The results from the data analysis indicate relationships are present between teacher concern and:

- a. the existence of a school policy;
 - b. participation in workshops and inservices;
 - c. the availability of resources and support structures;
 - and,
 - d. knowledge of the principles of environmental education.
- Primarily, these factors are related to the knowledge base from which teachers are implementing. Lack of knowledge and understanding of the innovation has been assessed as the most influential factor in teacher concern.

The implications of these findings and the relationship they have to alternative studies will be investigated in chapter six. Also included will be recommendations for effective implementation of environmental education programmes and areas for future research.

CHAPTER SIX: IMPLICATIONS, RECOMMENDATIONS AND RESEARCH DIRECTIONS

Introduction

The following chapter presents the implications of the results, recommendations to alleviate teacher concern and directions for further research.

Implications

The research on the implementation of environmental education through classroom programmes indicated direct relationships between teacher concern and the following factors:

1. the existence of a school policy;
2. participation in workshops or inservices;
3. availability of resources and support; and
4. knowledge of the principles of environmental education.

Prior research in teacher change has shown that the style and type of innovation influences success in implementation. The results of the data analysis, and the subsequent groupings of individuals, implied teachers were experiencing high anxiety. This anxiety was the product of lack of detailed knowledge and understanding of the unique characteristics of environmental education. The lack of professional development courses and the absence of up-to-date policies and guidelines on which teachers could base curriculum development, has led to teacher confusion and uncertainty. Without knowledge, inservices or workshops,

available resources and support, and a school policy, teachers have little guidance or understanding of what environmental education constitutes or what they should be achieving in this field. The overall classification of the district group profile as nonuser, illustrates this point, with high concerns in the informational stage (stage 1). The majority of teachers, although implementing various forms of environmental education curriculum, are still concerned with defining and obtaining information about how the innovation works and what is involved in its implementation. The need for additional information and expressions of high anxiety were not restricted to nonusers. Experienced users also showed high intensity of concern in stage 1. These findings imply that, even when teachers have had limited exposure to inservicing or workshops (as had the experienced users), they still felt unsure or confused about whether what they were doing was correct or compliant with the goals and aims of environmental education teaching.

The results of the study indicated that lack of knowledge was the primary factor in teacher resistance. In comparison, Ham and Sewing (1988) identified the primary barrier to teaching environmental education, in the Palouse district (Idaho), to be lack of time. Lack of knowledge was ranked fifth in importance according to their study. Nevertheless, although not a primary factor, they regarded this ranking as significant, and concluded that the purpose and content of environmental education workshops needed

investigation. They suggested that "workshops are not supplying teachers with what they feel is needed to teach environmental education at the elementary [primary] level" (Ham and Sewing, 1988, p. 21). The study recommended that inservices and workshops should include training in curriculum development, stressing methods and content.

Environmental education is a relatively new innovation based on classroom organisation, strategies and ideologies to which teachers have not been exposed in their preservice and inservice training. The pedagogical approaches, that teachers have adapted to their classroom teaching style and organisation, are contrary to those demanded by environmental education approaches. For teachers to successfully introduce environmental education curriculum into the classroom, they will need to be exposed to successful programmes which can be replicated. They also need clear directives and support from external bodies to reinforce the necessity for the innovation. As prior research on teacher change indicated, without clear directives or support for their efforts, teachers were very unlikely to persist with the new innovation. This is especially important for the implementation of innovations which are derived from philosophical orientations that are not the dominating view of society.

Recommendations

A list of recommendations have been proposed to alleviate teacher concern and for effective implementation of environmental education. These recommendations have been based on their applicability to the district studied. It is assumed that the proposals would be transferable to other Western Australian school districts which operate under the same system and conditions as the district investigated.

The recommendations are as follows:

1. The Ministry of Education in Western Australia should up-date the present policy on environmental education. The policy should include the definition, goals and aims of environmental education as a whole school approach, and give guidelines for effective implementation. This would incorporate a review of existing policy and guidelines from other States.
2. Professional development programmes which include the philosophical and political aspects of environmental education teaching need to be provided. They should include the characteristics of interdisciplinary curriculum development, classroom management and organisation, teaching strategies, the model of environmental education, values and political education.

3. Schools need to create a school policy and plan for environmental education curriculum development, and appoint an environmental education coordinator.
4. Information from existing successful environmental education programmes should be disseminated to all schools.
5. Environmental education should be incorporated into preservice institutions. This would include curriculum and content development within subject areas other than the traditional domain of science, by providing a holistic view of environmental education.
6. A forum should be created for teachers to be actively involved in evaluation and assessment of their environmental education programmes.
7. Further research needs to be conducted into the concerns and obstacles presented by the implementation of environmental education programmes.
8. Research be conducted into effective professional development courses at postgraduate level that emphasise action research.

Research Directions

Research in environmental education has not been well developed in the areas of teacher resistance, obstacles encountered, and the concerns of implementing agents. Hart (cited Robottom, 1990, p. 68) states,

The process problem remains in environmental education because environmental educators have not focused on the real life working conditions of teachers, their perceptions about change, and the support system needed to facilitate change in teaching method demanded by these new curriculum materials.

The continued success of environmental education, through its assimilation into existing education systems, is dependent on research into teacher concern and effective professional development.

Research into teacher concern should be undertaken at the school-level and be based on the real-life working conditions of the teacher. Robottom (1990) would argue that the most appropriate person for this task is the classroom teacher, taking on the role of the researcher and evaluating the effectiveness of his/her programme. He believes, since the ultimate choice of implementation is reliant on teachers' commitment and attitude toward the innovation, they should be involved in its development, implementation and evaluation. The style of research advocated by Robottom and others (cited Robottom, 1990), is action research. Action research involves the participants in self-reflective inquiries to improve, understand and define their educational practices.

According to Robottom (1992), professional development must be directed towards the development of action research skills. These skills would involve participants in critical analysis of the nature of environmental education, its role in the classroom domain and its practical improvement.

Future research in environmental education is dependent on defining the most effective and efficient means of evaluating the concerns of teachers and alleviating those concerns through professional development programmes. The present belief is that past research in teacher change, and the instruments incorporated into their research designs, will not adequately fulfil the requirements of environmental education research. The task for researchers within this field will involve the creation of design measures that complement the innovation.

Conclusion

Environmental education is a school-based initiative dependant on the commitment of a small number of individuals. The lack of inservice or preservice professional development in curriculum design has created an atmosphere of confusion and uncertainty about implementing environmental education programmes. The unique characteristics of environmental education pose theoretical and pedagogical restraints to its implementation, as they are contrary to existing school roles. The results of the data analysis determine that defining the innovation caused high anxiety and concern with teachers. Furthermore, those

teachers who had no structured support from either inside or outside the school were experiencing high levels of concern. Teachers on the whole were concerned with the linguistical aspects of implementation and were seeking guidance and assurance that what they were achieving was compliant with the goals of environmental education. The majority of teachers had been implementing environmental education programmes for at least two years but felt they had little or no understanding of the principles of environmental education. Teachers generally valued the incorporation of environmental education into their classroom programmes but, because of lack of support and direction, were reluctant to pursue controversial or radical forms of environmental education (education for the environment). Their reluctance was due to feelings of incompetence.

If environmental education is to become incorporated successfully into classroom practices, teacher concern needs to be addressed and effective measures taken to alleviate those concerns. The recommendations presented are a starting point for effective implementation. Ultimately, it is the commitment and the value placed on environmental education by teachers, institutions, education bodies and the general community which will determine its successful implementation.

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Appendix A

CODE NO : - - - -

STAGES OF CONCERN CONCERNS QUESTIONNAIRE

INTRODUCTORY PAGE

The purpose of this questionnaire is to determine the nature of the concern of teachers who are using or thinking about using an innovation.

Some of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time. For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have in varying degrees of intensity, and should be marked on the scale 1 to 7.

For example:

This statement is very true of me at this time.

0 1 2 3 4 5 6 (7)

This statement is somewhat true of me now.

0 1 2 3 (4) 5 6 7

This statement is not at all true of me at this time.

0 (1) 2 3 4 5 6 7

This statement seems irrelevant to me.

(0) 1 2 3 4 5 6 7

Please respond to the items in terms of your present concerns, and how you feel about your involvement or potential involvement with ENVIRONMENTAL EDUCATION. Please make a response to every item on this questionnaire by circling one digit only.

Thank you for taking part to complete this task.

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Procedures for Adopting Educational Innovations
CBAM Project R & D Centre for Teacher Education
The University of Texas at Austin.

STAGES OF CONCERN QUESTIONNAIRE
Environmental Education

1. I am concerned about students' attitudes towards environmental education.

0 1 2 3 4 5 6 7

2. I now know of some other approaches that might work better.

0 1 2 3 4 5 6 7

3. I don't even know what environmental education is.

0 1 2 3 4 5 6 7

4. I am concerned about not having enough time to organise myself everyday.

0 1 2 3 4 5 6 7

5. I would like to help other staff in their use of environmental education.

0 1 2 3 4 5 6 7

6. I have very limited knowledge about environmental education.

0 1 2 3 4 5 6 7

7. I would like to know the effect of reorganisation on my professional status.

0 1 2 3 4 5 6 7

8. I am concerned about conflict between my interests and my responsibilities.

0 1 2 3 4 5 6 7

9. I am concerned about revising my use of environmental education.

0 1 2 3 4 5 6 7

10. I would like to develop working relationships with both our staff and outside staff using environmental education.

0 1 2 3 4 5 6 7

11.I am concerned about how environmental education affects students.

0 1 2 3 4 5 6 7

12.I am concerned about environmental education.

0 1 2 3 4 5 6 7

13.I would like to know who will make the decisions in using environmental education.

0 1 2 3 4 5 6 7

14.I would like to discuss the possibility of using environmental education.

0 1 2 3 4 5 6 7

15.I would like to know what resources are available if we decide to adopt environmental education.

0 1 2 3 4 5 6 7

16.I am concerned about my inability to manage all that environmental education requires.

0 1 2 3 4 5 6 7

17.I would like to know how my teaching or administration is supposed to change.

0 1 2 3 4 5 6 7

18.I would like to familiarise other persons with the progress of environmental education.

0 1 2 3 4 5 6 7

19.I am concerned about evaluating my impact on students.

0 1 2 3 4 5 6 7

20.I would like to revise the instructional approach of environmental education.

0 1 2 3 4 5 6 7

21.I am completely occupied with other things.

0 1 2 3 4 5 6 7

22.I would like to modify our use of environmental education based on the experience of our students.

0 1 2 3 4 5 6 7

23. Although I don't know about environmental education, I am concerned about things in the area.

0 1 2 3 4 5 6 7

24. I would like to excite my students about their part in environmental education.

0 1 2 3 4 5 6 7

25. I am concerned about time spent working with non-academic problems related to environmental education.

0 1 2 3 4 5 6 7

26. I would like to know what the use of environmental education will require in the immediate future.

0 1 2 3 4 5 6 7

27. I would like to co-ordinate my effort with others to maximise the effect of environmental education.

0 1 2 3 4 5 6 7

28. I would like to have more information on time and energy commitments required by environmental education.

0 1 2 3 4 5 6 7

29. I would like to know what other staff are doing in this area.

0 1 2 3 4 5 6 7

30. At this time I am not interested in learning about environmental education.

0 1 2 3 4 5 6 7

31. I would like to determine how to supplement, enhance, or replace environmental education.

0 1 2 3 4 5 6 7

32. I would like to use feedback from students to change environmental education.

0 1 2 3 4 5 6 7

33. I would like to know how my role will change when I am using environmental education.

0 1 2 3 4 5 6 7

34.Co-ordination of tasks and people is taking too much time.

0 1 2 3 4 5 6 7

35.I would like to know how environmental education is better than what we had.

0 1 2 3 4 5 6 7

Appendix B

DEMOGRAPHIC PROFILE

Please complete the following:

1. Female ____ Male ____
2. Age: 20 - 29 ____ 30 - 39 ____ 40 + ____
3. Highest degree earned
Diploma ____ Bachelor ____ Masters ____ Doctorate ____
4. Total years teaching ____
5. Year Level teaching ____
6. How long have you been involved in teaching environmental education ?
never ____ 1 year ____ 2 years ____ 3 years ____ 4 years or more ____
7. Do you consider yourself to have sound knowledge of the principles of environmental education ?
no ____ some knowledge ____ yes ____
8. Do you have support from other teachers ?
no ____ some support ____ yes ____
9. Does the Principal support Environmental Education in the school ?
no ____ some support ____ yes ____
10. Have you received formal training in teaching environmental education (workshops, courses) ?
no ____ yes ____
11. Does the school have a policy on environmental education ?
no ____ not sure ____ yes ____
12. Are there resources and support available to you to enhance your teaching of environmental education ?
no ____ some ____ yes ____
13. In your use of environmental education, do you consider yourself to be a
nonuser ____ inexperienced user ____ experienced user ____

Appendix C**Open-ended statement of concern**

WHEN I THINK ABOUT TEACHING ENVIRONMENTAL EDUCATION IN MY CLASSROOM, WHAT AM I CONCERNED ABOUT ? (I am to write what concerns me now and not what I think concerns others).

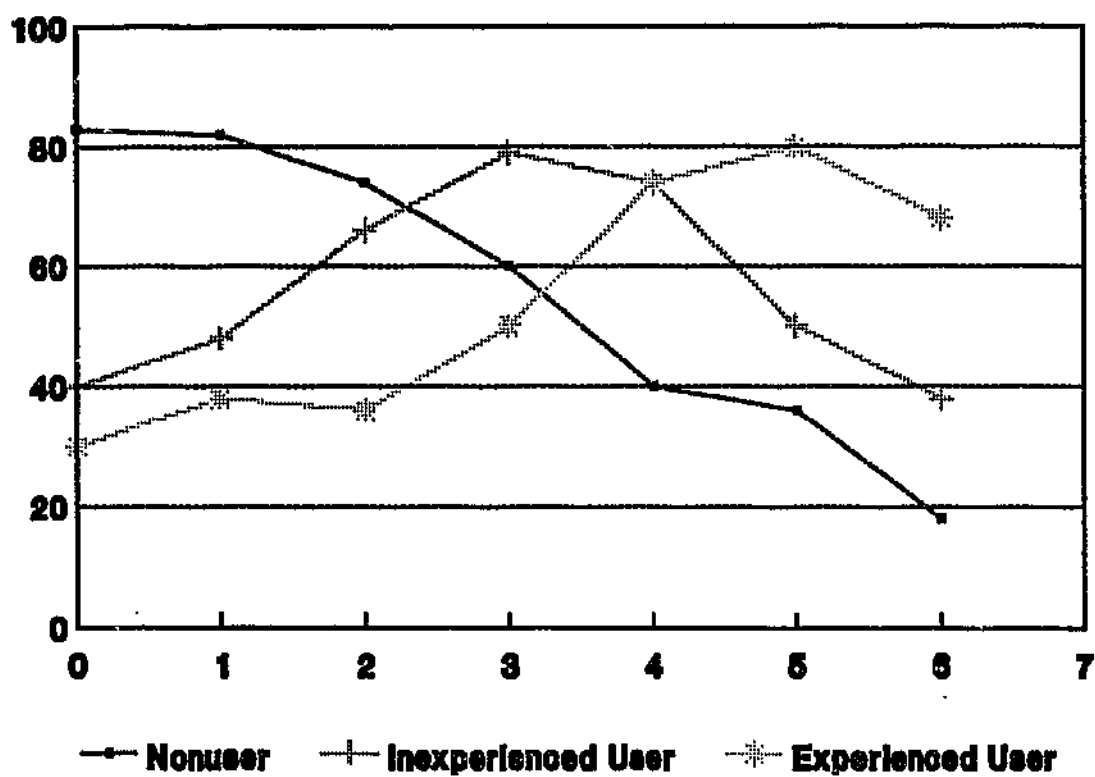
(Please be frank and respond in complete sentences).

Appendix D

SoCQ item numbers and Associated Stages of Concern

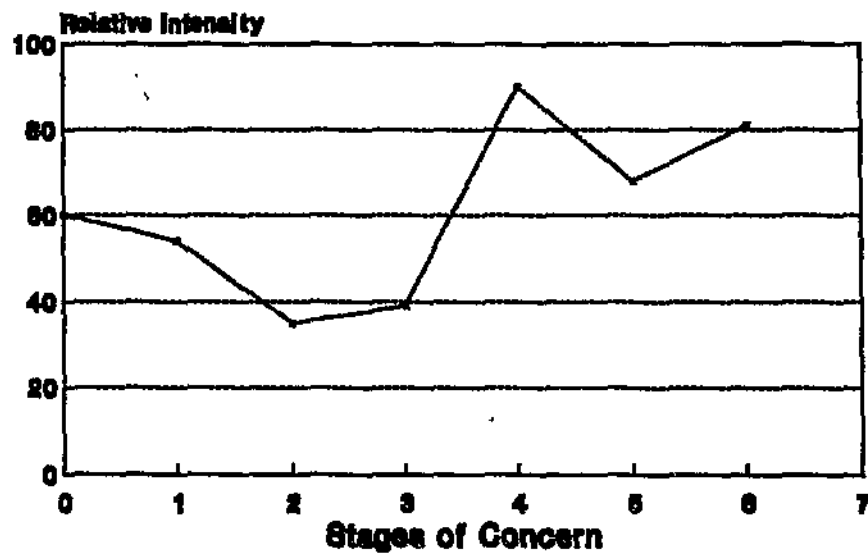
Item Number	Stage of Concern
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2	6
3	0
4	3
5	5
6	1
7	2
8	3
9	6
10	5
11	4
12	0
13	2
14	1
15	1
16	3
17	2
18	5
19	4
20	6
21	0
22	6
23	0
24	4
25	3
26	1
27	5
28	2
29	5
30	0
31	6
32	4
33	2
34	3
35	1

Appendix E
Hypothesised Development of Stages of Concern



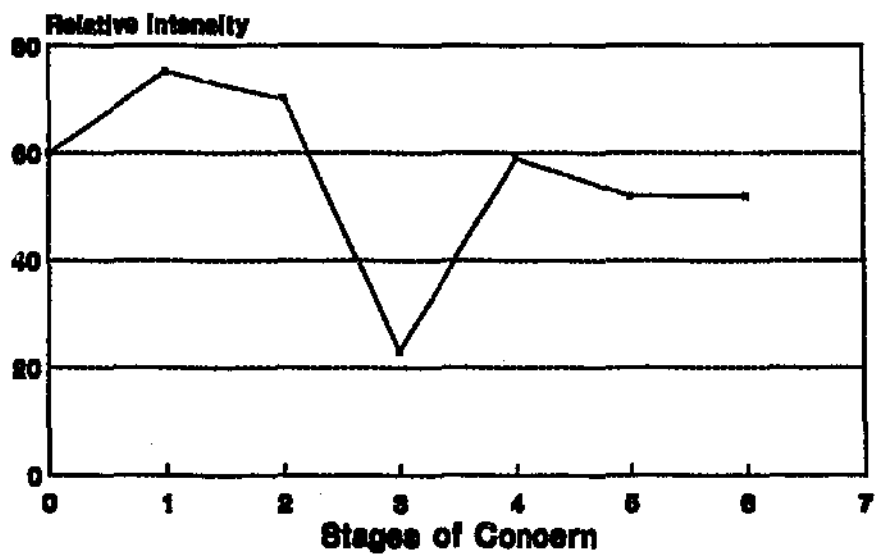
Appendix F
Individual Teacher Profiles
Numbers 1-13

TEACHER ONE
Individual Profile



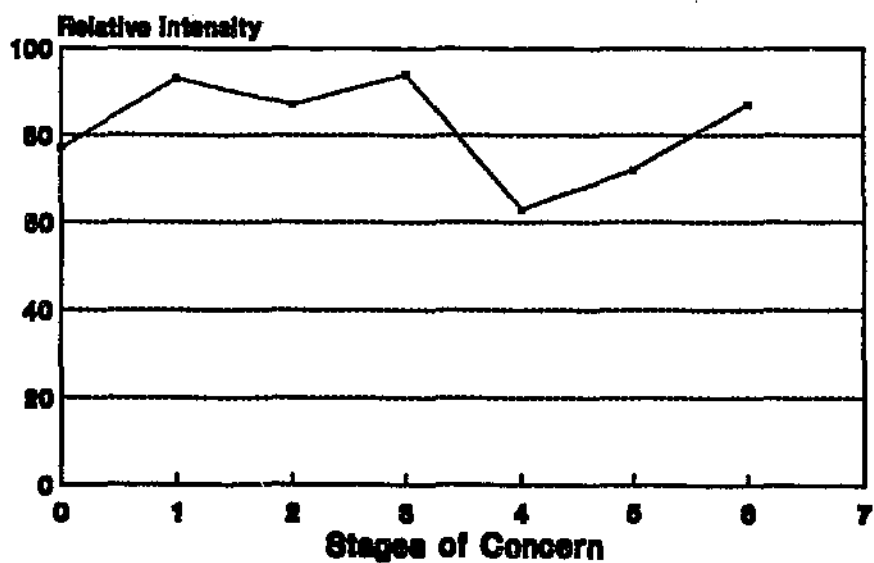
TEACHER TWO

Individual Profile

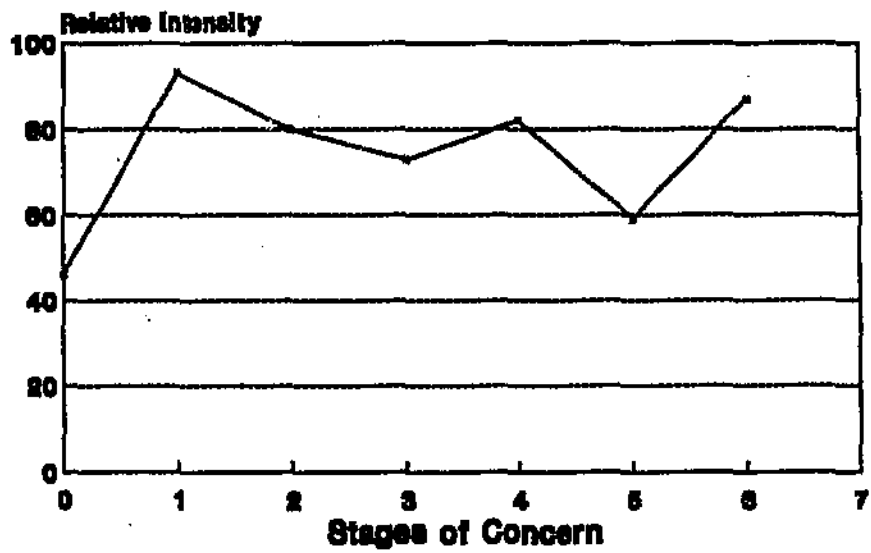


TEACHER THREE

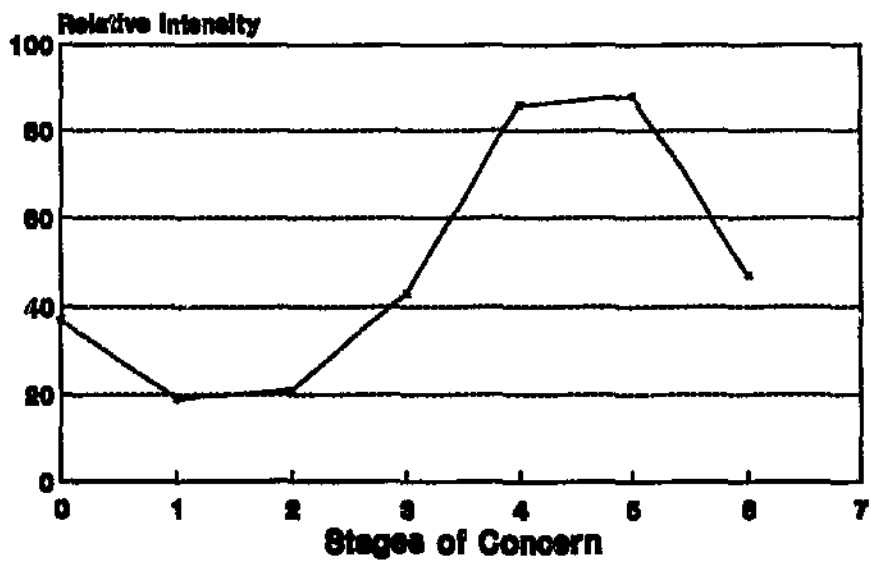
Individual Profile



TEACHER FOUR
Individual Profile

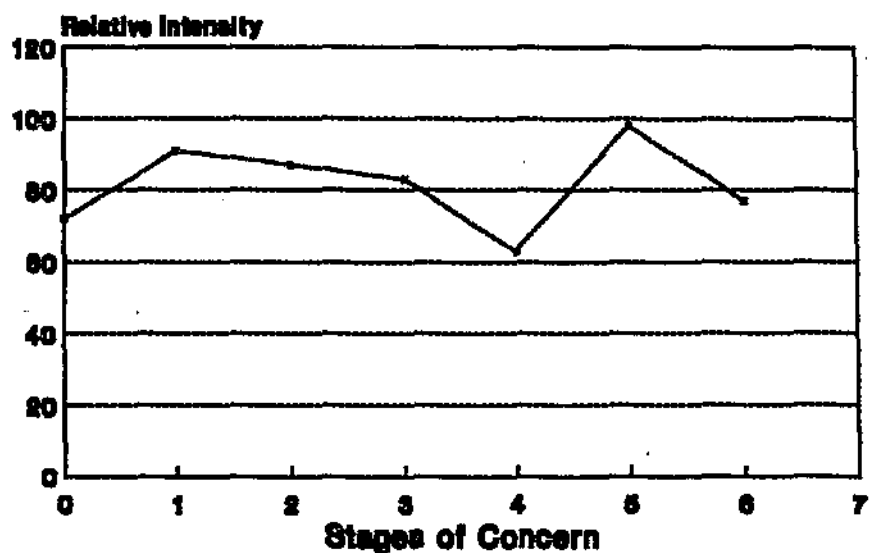


TEACHER FIVE
Individual Profile



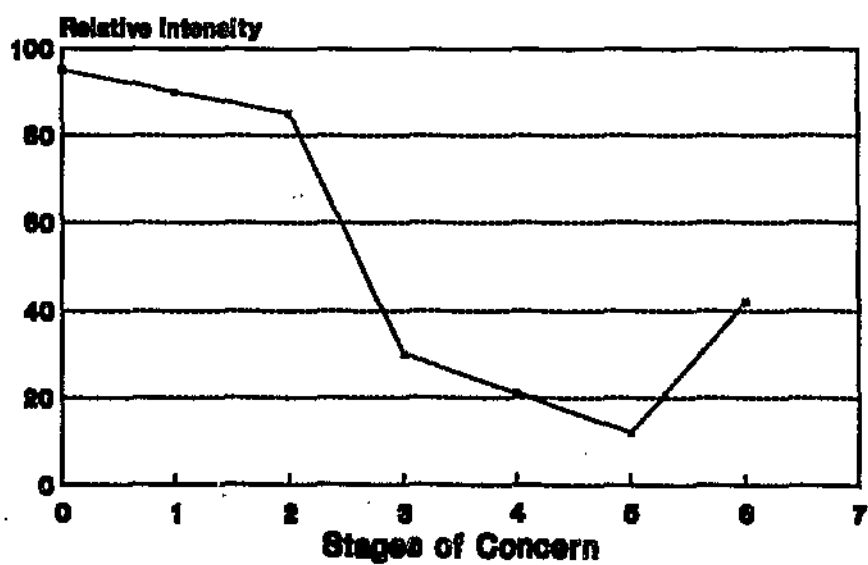
TEACHER SIX

Individual Profile



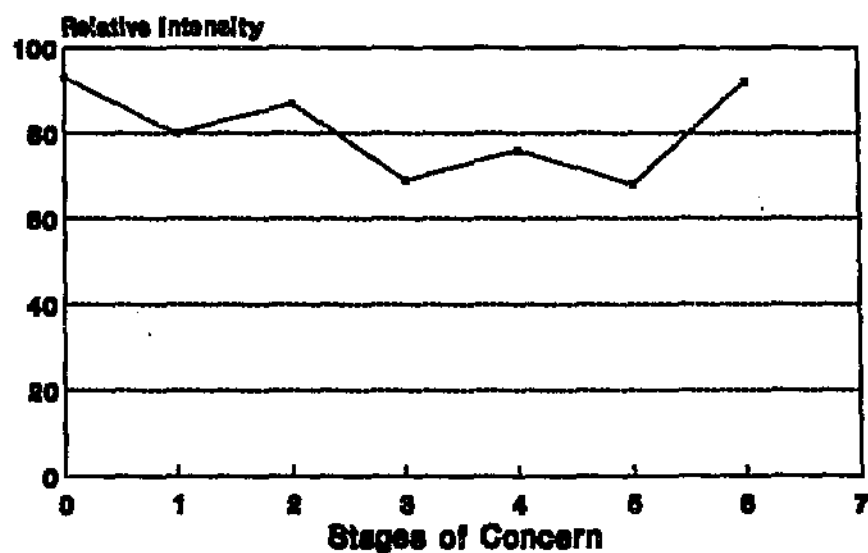
TEACHER SEVEN

Individual Profile



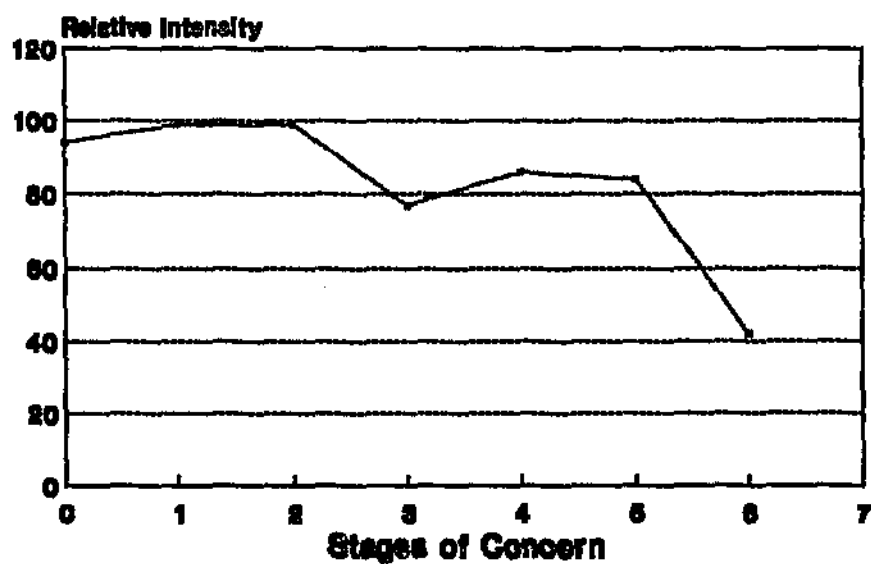
TEACHER EIGHT

Individual Profile



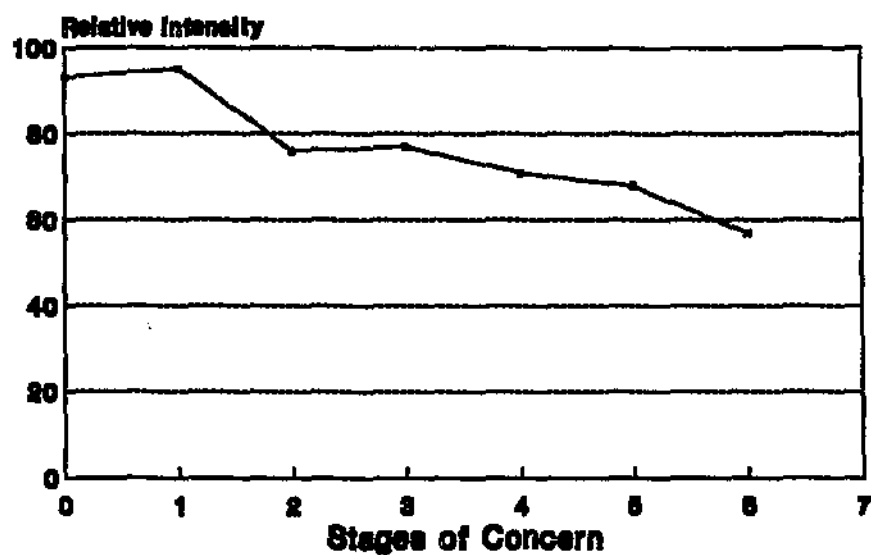
TEACHER NINE

Individual Profile



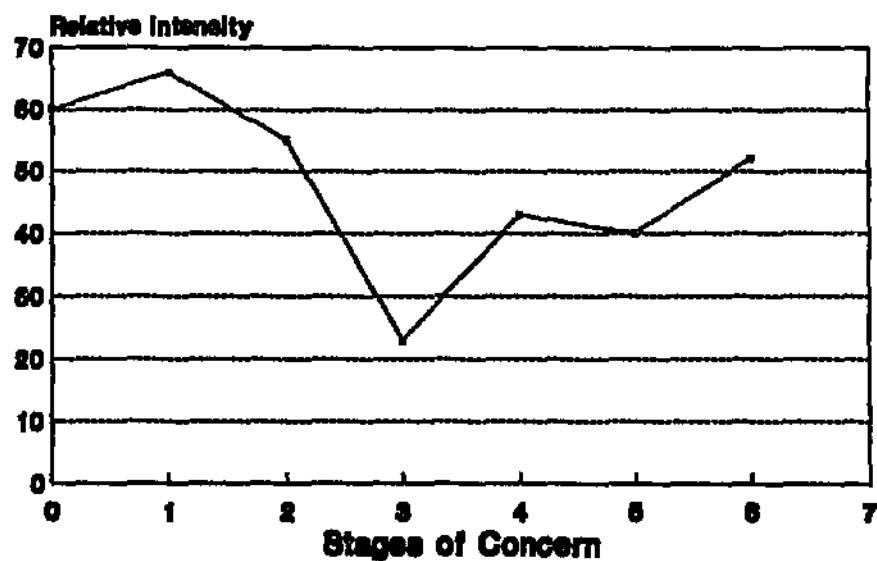
TEACHER TEN

Individual Profile



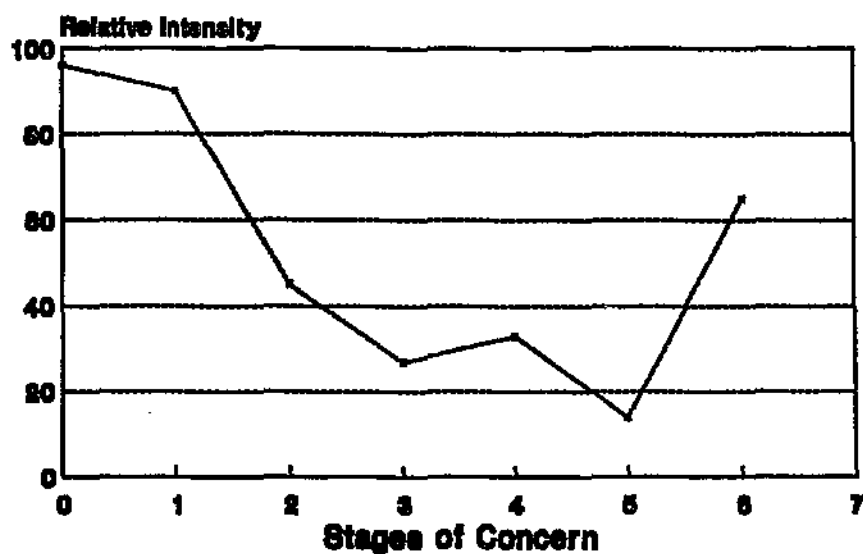
TEACHER ELEVEN

Individual Profile



TEACHER TWELVE

Individual Profile



TEACHER THIRTEEN

Individual Profile

