THE RELATIONSHIP OF PEDAGOGY AND STUDENTS' UNDERSTANDING OF ENVIRONMENT IN ENVIRONMENTAL EDUCATION

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CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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ABSTRACT

Environmental education is a relatively young area that can trace its roots back to the global environmental crises of the late 1960s and 1970s. Research in environmental education since this time has established the justification for its existence in the formal curriculum of schools. Less research has been conducted on the actual pedagogy of environmental education. This forms one part of the justification for this research study. The other justification for this research study is school students' objectification of the environment evidenced from the findings of a large survey of NSW school students. The objectification of the environment finding referred to students' responses that suggested that the environment was separate from them in contrast to a minority of students' responses that referred to a relational view (Loughland, Reid,Walker & Petocz, 2003). The two foci of pedagogy and students' understandings of the environment come together in the research question of this thesis, *what is the relation between pedagogy and representations of the environment in environmental education?*

A Bernsteinian model of pedagogy, the pedagogical device, underpins the theoretical analysis of the pedagogy of environmental education in this study (Bernstein, 1990). A particular aspect of this device, the pedagogic recontextualising field, is used as a framework of analysis for the exposition of the major influences on the development of pedagogy of environmental education in NSW. Another theory of pedagogy, the NSW Quality Teaching Framework, is used to offer a performative angle on pedagogy to provide theoretical triangulation for the study.

The pedagogy of environmental education was examined through a classroom ethnography with the researcher acting as a participant observer. The data were in the form of field notes, curriculum materials including children's literature, transcripts of classroom learning and products of students' learning. The analysis of the data was conducted using a variety of methods of analysis. The data were initially coded for themes that were the different representations of the environment in the pedagogy of this classroom. Further, the NSW Quality Teaching Framework (NSW DET 2003) was used as a theoretical framework of analysis in order to examine the data from the perspective of student performance in relation to current understandings of what constitutes good pedagogical practice. Next, Bernstein's model of the pedagogic device (1990) was used to analyse the data in the larger context of the social construction of knowledge in the school curriculum. This analysis incorporated Bernstein's original notions of pedagogical classification and framing (1971).

This study has two main findings. First, the pedagogy of environmental education has strong classification and framing (after Bernstein 1971) that supports the objectification of the environment. Second, there is also some weak framing of the pedagogy of environmental education that generally does not support the objectification of the environment. The implications for these findings for practice are that environmental educators should be aware of deterministic curriculum that seeks to impose one view of the environment onto students. This curriculum positions the environment as an object that needs to be saved through human intervention. Further research into the pedagogy of environmental education that explores the relation of students' understandings of the environment and their relation to the epistemological and theoretical bases of pedagogy is warranted as a result of this study.

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CHAPTER ONE: INTRODUCTION TO THE STUDY

The genesis of environmental education as a subject in the school curriculum is linked to the growing awareness of environmental problems that occurred in the western world during the 1960s. As such, it did not emerge as an offshoot from a traditional discipline such as science but developed instead as a solution to the problem of environmental degradation. This particular foundation has influenced the subsequent development of the pedagogy of environmental education. This influence is discussed in this chapter alongside the account of the emergence of this research study that examines the pedagogy of environmental education.

The catalyst for the emergence of a popular movement for the preservation of the environment is often traced to the publication of Rachel Carson's *Silent Spring* (Carson, 1962) that warned of the environmental dangers posed by the infiltration of chemicals such as DDT into biological food chains. A broad based concern towards the conservation of the natural environment was also fostered in the counter-cultural revolution of the late 1960s and 1970s, the so-called Age of Aquarius. The broad appeal of this movement set it apart from long established nature conservation movements such as the Sierra Club in the United States and the Australian Conservation Foundations. These two organisations were mainly concerned with the preservation of wilderness areas whereas the new movement was focused on environmental problems such as air and water pollution and deforestation. The new environmental movement is epitomised by the global environmental organisation, Greenpeace. Greenpeace was created in 1971 when three ecologists tried to save a bird colony on the remote Alaskan island of Amchitka from US nuclear testing (Greenpeace International, 2005). In the last 35 years, Greenpeace has become the

most recognisable global face of the environmental movement. Their clever use of electronic media and seeming willingness to risk life and limb for important environmental causes have been pivotal factors in its success. Greenpeace is just one of many environmental activist groups that have helped to build awareness of global environmental problems among the general population. This broadly based awareness of environmental problems led to global bodies such as UNESCO in search of solutions. For UNESCO, the solution has been in the form of global policy directions for environmental education.

UNESCO has been at the forefront of global policy initiatives in environmental education. The Belgrade Charter (UNESCO, 1975) and the Tbilisi declaration (UNESCO, 1977) represented the first official efforts to define the purpose of environmental education. Subsequent policy documents have framed the area of environmental education under the broader umbrella of sustainability. This was first evident in the Agenda 21 document that emerged from the Rio Earth Summit in 1992 (United Nations Sustainable Development, 1992). The latest UNESCO policy provides a blueprint for education for sustainable development that provides the foundation for a decade long focus on education to be completed by 2014 (UNESCO, 2005). It is evident, therefore that there are policy initiatives in place that support the development of environmental education. This impetus is supported by a substantial research base in environmental education.

A research base in environmental education has existed since the 1970s. This research was primarily reported in the US based *Journal of Environmental Education.* The publisher of the journal described its focus as “Based on recent research in the

sciences, social sciences, and humanities, the journal details how best to present environmental issues and how to evaluate programs already in place for primary through university level and adult students" (Heldref Publications, 2005).

The Journal of Environmental Education has published four issues every year since 1969. A survey of the articles published in the years 1994-2005 revealed that 37.69% of the articles were reviews of texts or resources focusing on environmental education. 14% of the articles focused on students' existing environmental knowledge whilst another 12% were on curriculum and 5.78% on outcomes of environmental education programs (see Appendix A). Although the crude categories that I have used are open to challenge, it is still significant to note that articles on the pedagogy of environmental education accounted for only 4% of the total. A generalisation that could be made from the survey would be that research in environmental education published in this journal has been focused on who they are teaching and what it is that they are teaching rather than how they might go about this.

Other professional journals have emerged in Environmental Education. One journal, *Environmental Education Research* (EER), from the UK is:

> an international refereed journal which publishes papers and reports on all aspects of environmental education. The purpose of the journal is to help advance understanding of environmental and sustainability education through a focus on papers reporting research and development activities (Routledge, 2005).

The journal has published 381 papers since its inception in 1995. In common with *The Journal of Environmental Education* the majority of the articles (22.31%) published during this time have been reviews of books and resources relating to environmental education (see Appendix B). As reviews are generally only one or two pages in length, it is not surprising that they represent a numerical majority. The analysis supports the claim that the journal covers "all aspects of environmental education" (Routledge, 2005). As in *The Journal of Environmental Education* (JEE), there has been a fair percentage of articles (9.71%) on students' existing environmental understandings as well as curriculum (15.22%). 16.27% of the articles published have focused on what I have termed the 'philosophy' of environmental education compared to 4.02% for JEE. This might indicate that EER has been a forum for debating the theoretical and philosophical foundations of environmental education as well as reporting the curriculum and outcomes of programs. There have also been a greater percentage of articles devoted to methodological issues in EER (7.35% as opposed to 4.02% for JEE). This statistic on methodology might also be attributable to the argument that EER is a forum for debate about the epistemologies of environmental education. Further evidence for this argument is the fact that 3.94% of the articles were devoted to one theoretical and methodological issue, that of the effect of significant life experiences on the development of pro-environmental dispositions. In common with JEE, there was a number of articles that focused on the role of the teacher in environmental education (5.78% for JEE and 7.35% for EER). Articles on pedagogy comprised 6.04% of the total articles in EER, a little higher than the 4.02% in JEE.

The survey of the two foremost journals in environmental education suggests that there is a strong research base in the area of environmental education curriculum. Whilst the boundary between curriculum and pedagogy is somewhat blurred in the educational literature, this is still an indication that there has been a greater research focus on what should be taught in environmental rather than how it should be taught. As well, it might also be argued from the statistics cited above that the philosophical and methodological foundations of environmental education have been the focus of much debate. It is important that this debate continues but it is also crucial that the pedagogy of environmental education is open to conjecture and critical examination as well. This then forms one part of the rationale for this research study as it seeks to examine the pedagogy of environmental education in action.

The paucity of the literature on the pedagogy of environmental education is matched by its insignificant place in the curriculum in New South Wales, Australia. In the years 2000-2004 only 0.003% of students completed either an environmental studies or environmental science subject in the higher school certificate (data obtained from NSW Board of Studies, 2005). It is more difficult to accurately measure participation in environmental education in the school years K-10 as there are no discreet environmental education subjects. Instead, environmental studies and environmental education are integrated as curriculum strands in the K-10 Science and Technology and Human Society and its Environment syllabus documents. The small participation rates in environmental education could be linked to the paucity of literature on the pedagogy of environmental education. There maybe simply not enough teaching of environmental education taking place to allow opportunity for sustained research of the kind that leads to published papers. This study therefore deliberately set out to

undertake classroom research that might lead to a greater understanding of the pedagogy of environmental education. Aligned with this focus on pedagogy was an equal concern with the objectification of the environment that emerged from research that immediately preceded this thesis. This research is outlined in the next section and critically analysed in the second chapter of this thesis.

Students' Understandings of the Environment

This study's focus on students' understandings of the environment emerged from the finding of a survey that constituted phase one of a larger research project in which this PhD research was designed as phase two. The PhD research was designed to complement the quantitative research of the survey through an in-depth qualitative study of any interesting findings that emerged. One such finding was the objectification of the environment evident in students' responses to one question in the survey. The objectification of the environment finding referred to students' responses that suggested that the environment was separate from them in contrast to a minority of students' responses that referred to a relational view (Loughland, Reid,Walker & Petocz, 2003). This study explored this objectification finding in relation to students' understandings of the environment and the pedagogy of environmental education.

The first phase of the original research project involved the construction of a research instrument that was used to conduct a large survey (n=2238) of the social and cultural influences on young people's environmental values, attitudes and knowledge in NSW. The research instrument was designed to measure the influence of demographic variables such as sex, age, SES, cultural background and regional location on the environmental understandings of school students (see Appendix C). My role in this

first phase was as the research manager of the project. I, along with three other project members, constructed the research instrument through a process that involved focus groups and pilot studies with the target age groups as well as reference and steering committee meetings with the industry partners.

Most of the independent demographic variables proved to be statistically insignificant correlates in the findings of the survey with the exception of age where it was found that high school children were found to be more pessimistic about the future state of the environment than primary school children (Walker, Loughland, & Brady, 2002). The lack of any correlation between the demographic variables and students' attitudes towards the environment might mean that young peoples' attitudes across NSW are more homogenous than diverse. It may also reflect a weakness in the construct validity of the survey. This study did not pursue either line of enquiry. Instead, it is important to note for the purposes of this study that the survey focused on students' existing knowledge and understandings about the environment. As noted earlier in this chapter, there is already a large body of research evidence in this area.

The argument that the survey was adding to an existing research evidence base is similar to the one argued by Gough (2001a) in his analysis of the research on significant life experiences that he developed into a wider argument concerning the purposes of environmental educational research. Drawing on the work of Wagner (1993) ,Gough (2001a) described the repetition and replication of the significant life experiences research as "a rather relentless (and perhaps even obsessive) filling in of blank spots" in environmental education research (p. 3). In Wagner's categorisation of educational research, blank spots are areas where "we know enough to question but

not to answer" (Wagner, 1993, p. 16) whereas blind spots are what we "don't know well enough to even ask about or care about" (Wagner, 1993, p. 16). The survey that was conducted in phase one was definitely focused on the filling in of blank spots in environmental educational research. As evidenced by the number of research articles published in the area of students' existing environmental knowledge (see Appendices A & B), there was already a significant evidence base in this area. All the survey could hope to achieve then was to claim to fill in the blank spots that existed in this evidence base for a representative sample of the student population in NSW, Australia. However, the results from the last question on the survey unintentionally opened up a potential 'blind spot' in environmental education research (Wagner, 1993).

The last question of the survey asked students to define the term environment. It was included because a member of the research team had an interest in phenomenographic research and thought that it might be worthwhile to map students' conceptions of the environment. The resulting phenomenographic analysis (see Loughland, Reid, Walker, & Petocz, 2003) of the responses produced some generative findings relating to the objectification of the environment that opened up a new way of thinking about environmental education for this particular researcher. This thinking was reflected in the two papers that were published by the research team (see Loughland et al., 2003) where there was speculation made of a possible link between students' experience of the environment in the school curriculum and their objectification of the environment. The epistemological origins of the objectification of the environment are examined in detail in chapter two but their significance to the foundations of this study needs to be argued here.

The objectification of the environment finding came from a written survey completed by students in classrooms. This has two important implications for this study. First, the phenomenographic mapping of the students' conceptions of the environment was developed from short written responses in a survey rather than interviews. Phenomenographic analysis is usually conducted on interview data (Bowden, 2000) so the research team could not make a strong claim for the construct validity of this research finding. This meant that further exploration of this finding using a qualitative method of data collection was warranted. Second, the fact that the survey was completed in school classrooms may have suggested that the students were drawing upon their school experiences when they wrote their definition of the environment. Therefore, some exploration of the curriculum of environmental education in schools was also warranted. This requirement for the research to focus on the environmental education curriculum, and by implication pedagogy, was also supported by the lack of research evidence that had been published on the actual pedagogy of environmental education that was noted earlier in this chapter.

The path that this research study took can also be better understood using a metaphor for educational research developed by Sara Delamont (2003). In this paper, Delamont uses the metaphor of the four gates of Damascus in James Elroy Flecker's poem of the same name to cleverly describe the different directions that educational research may take. In Flecker's poem, the Aleppo gate leads to trade and commerce, a metaphor for applied research and consultancy research for Delamont. The Mecca gate symbolises faith and pilgrimage and represents the type of blue sky research where the researcher works within the paradigm where they feel most comfortable.

The Lebanon gate represents exploration and the search for enlightenment. In Flecker's poem, the Lebanon gate leads to the sea: "the dragon-green, the luminous, the dark serpent-haunted sea,the snow-besprinkled wine of earth, the white-and-blue-flower foaming sea" (Delamont, 2003, p. 2).

However, as Delamont explains in her paper, "the sea is not the destination" (Delamont, 2003, p. 2). It is what is beyond the sea, "the strange lands full of giants, screaming rocks that spout waterfalls of blood, and vessels full of metal mariners" that is important to her metaphor for educational research (Delamont, 2003, p. 2). Delamont makes the argument through the metaphor that it is only when we leave the familiar territory of the land beyond the gates of Aleppo and Mecca that we take the more dangerous gate to the strange lands of discovery (Delamont, 2003). The Lebanon gate is another expression of Wagner's blind spots where educational research goes beyond the safe territory of just filling in the blank spots in our current knowledge (Wagner, 1993).

The final gate to complete the metaphor is the Baghdad gate, the gate that leads to despair and death in the desert. Delamont describes the thesis stage of doctoral research as being akin to leaving the Baghdad gate, "alone and isolated under the pitiless gaze of others" (Delamont, 2003, p. 3). I shall let that quote pass without comment for now and instead turn to what the metaphor means for this research.

This study started out as part of the larger research project alluded to earlier in this chapter. This research project was an Australian Research Council funded study that involved collaboration between academics and key stakeholders in environmental

education. So this research began its journey through the Aleppo gate as sponsored research designed to produce results that could be used by a diverse group of environmental education agencies in their programs. The survey did not produce any findings that could be immediately applied to practice. Indeed, the only finding that was developed in any way was the objectification of the environment. This finding resembled more a Mecca gate project rather than an Aleppo one. The phenomenographic analysis of the students' conceptions of the environment represented the favoured research paradigm of one member of the research team. The two papers that were published on this finding built on the established research methodology of phenomenography (Bowden, 2000; Marton, 1986). The Mecca gate could have been taken for this study if I had chosen to pursue the objectification finding in depth, establishing the reliability and validity of the survey finding through extensive interviewing of students. The pathway I chose in the end was more inspired by the Lebanon gate than any other, presumptuous as it is to claim such idealism for your own research (Delamont, 2003).

This research study was a voyage into the unknown, through "the dragon-green, the luminous, the dark serpent-haunted sea" (Delamont, 2003, p. 2), to explore the nature of the relationship between students' understandings of the environment and the pedagogy of environmental education. The object was to forsake the safe journey that would just lead to more evidence of students' existing views on the environment and instead explore the mysterious world of the pedagogy of environmental education. This odyssey is expressed in the research question formulated for this study:

What is the relation between pedagogy and students' understanding of the environment in environmental education?

This study is more than just a personal odyssey. The research question is important for the practice of environmental education as it examines the sociological construction of the pedagogy of environmental education. This examination is conducted in this study using two different theories of pedagogy, Bernsteinian theory and the NSW Quality Teaching Framework.

The Bernsteinian theoretical framework is arguably the most sophisticated, well-regarded and contemporary expression of several decades of research into the sociology of knowledge (Singh, 2002). It is important to this study for three reasons. First, it allows for the workings of the pedagogy of environmental education to be made transparent for the broader audience of environmental educators. Two, it constitutes a credible theoretical orientation that has been used by qualitative researchers conducting studies of classroom pedagogy (Singh, 2002). Three, it emphasises that knowledge is a cultural construct (after Gough, 1999). This is in accord with the epistemological orientation of this study that regards pedagogy as playing an active role in the realisation, in contrast to the transmission, of knowledge in the classroom.

The NSW Quality Teaching Framework (NSW Department of Educating and Training, 2003a) represents a development on the theory of Authentic Pedagogy developed by the Center of Organization and Restructuring of Schools at the University of Wisconsin-Madison. The focus of the authentic pedagogy movement was to improve classroom pedagogies so as to enhance the schooling experiences and outcomes of educationally disadvantaged groups (Newmann, King, & Secada, 1996).

This theory of pedagogy focuses on student performance as a key indicator of the quality of pedagogy. It might be described as being a sociological theory because of its concern with equity but it is also a performative framework that can be used to describe the ontology of classroom practice.

The two theories of pedagogy approach their topic from different points of the pedagogical process. Bernsteinian theory focuses on the sociological construction of pedagogy and its relation to power in society. The NSW Quality Teaching Framework (2003), with its antecedence in the theory of authentic pedagogy, examines pedagogy as performance. The two theories of pedagogy used together have the capacity to generate a holistic and nuanced interpretation of the pedagogy of environmental education in this study.

The Conduct of this Research Study

The method chosen to answer the research question was a classroom ethnography of a class engaging in different aspects of the environmental education curriculum over a year. This ethnography did not simply seek to identify factors in the pedagogy of environmental education that might contribute to students' understandings of the environment. Instead, the ethnography constituted a wider exploration of the pedagogy of environmental education in order to understand how students might develop some of their views about the environment as well as to understand how the environment was culturally constructed in the pedagogy of primary classrooms.

As the focus of the study was on the pedagogy of environmental education, I needed to employ purposive sampling to find a classroom where environmental education was being taught. As noted earlier in this chapter, environmental education in the K-6

curriculum in NSW is not a subject in its own right but integrated into particular units in the K-6 Science and Technology and K-6 Human Society and its Environment syllabi. In this endeavour, I was fortunate to have as my colleague in the faculty at the university where I was employed, a teacher on secondment from a local primary school. During my first year at this university, I had conversations with Vicki, the teacher, about my research study. She mentioned that environmental education was a strong part of her Year 6 curriculum and that I was welcome to conduct research in her classroom when she returned to the school in the following year. The established professional relationship with Vicki ensured that there was sufficient trust developed for the team teaching and close observation of the classroom that was an integral aspect of the ethnography.

The classroom was also an accessible site for this research study as the school was close to the university where I was employed as a full-time staff member. This meant that I was able to travel to the research site in ten minutes in my weekly visits to the school.

A Guide to Reading This Thesis

This thesis is presented in seven chapters. This first chapter has presented an introduction to the study and outlined the purpose of the study. Chapter two reviews the theoretical foundations of this study through the analysis of two different theories of pedagogy before examining the concept of objectification in education. Chapter three presents the methodology and methods employed in this study. These first three chapters represent an account of what is already known about pedagogy and objectification in environmental education as well as the justification for the chosen methodology that is grounded in established and validated research practices.

The next five chapters present the findings of this study. Chapter four describes the community, school and classroom contexts of the study. Chapter five gives a detailed account of the data generated from the classroom ethnography. Chapters six and seven analyse these data using the two pedagogical frameworks that were introduced in chapter two. Finally, chapter eight summarises the findings of the study and engages in some broad considerations for these findings before offering some implications and recommendations for the theory and practice of environmental education.

CHAPTER 2: A REVIEW OF PEDAGOGY AND OBJECTIFICATION IN ENVIRONMENTAL EDUCATION

In this chapter a review is undertaken of what is already known about pedagogy and objectification in environmental education. An integral aspect of this review is the explication of the two theories of pedagogy that inform this study. The first, that of Bernsteinian theory is drawn from broader field of the sociology of knowledge. The justification for the use of this theory to establish a Bernsteinian view of pedagogy is made. Specifically, the Bernsteinian model of the pedagogic device is examined in order to establish a theoretical grounding for the fine-grained exploration of the pedagogy of environmental education that is the focus of this study. A particular aspect of the pedagogic device, the pedagogic recontextualising field, is examined closely for its explanatory utility for an analysis of classroom pedagogy.

The Bernsteinian model of the pedagogic device is then used to conduct an analysis of the specific pedagogy of environmental education is conducted. This analysis includes an examination of the different approaches to environmental education that are evident in the literature of environmental education.

The second theory of pedagogy employed in this study, the NSW Quality Teaching Framework, is then examined. In the final part of the chapter, a review of the literature that focuses on the objectification of the environment is presented. This review includes the presentation of the findings from the large survey that was conducted prior to this study.

Schooling as Social and Cultural Reproduction

The Bernsteinian theory of pedagogy that informs this study is drawn from a larger body of literature that focuses on the sociology of knowledge. This literature has drawn attention to the role that schooling plays in the reproduction of the social and cultural structures of society. Reproduction theories, such as correspondence theory espoused by Bowles and Gintis (1976), challenged the progressive view of schooling as a meritocracy that rewarded students with ability regardless of their socio-economic status. The proponents of correspondence theory argued that there was a direct correspondence between labour relations in the workplace and the social relations of the classroom (Bowles & Gintis, 1976). Although correspondence theory has since been described as an "overly simplistic account that posited the education system as producing docile and subservient workers" (Germov, 2001, p.238), its role at the time of establishing a theoretical base for the investigation of the sociology of knowledge in education was important. Bernstein's contribution to this literature has been the difficult task of attempting to explain how the reproduction occurs in the pedagogical discourses of formal schooling (Singh, 2002). Bernstein's theory along with the other theories of the sociology of knowledge can trace their antecedence to Marxist theory. Although Marx did not specifically focus on the role of schooling in producing the stratification of society, he provided a philosophical framework for these theories to build on.

Marx established his class theory in the midst of the Industrial Revolution. In the transformation of feudal society to an industrial society, Marx could see the power of capital as a determinant of social stratification (Marx, 1978). In feudal society, power was inherited as a birth right or attained through warfare. The Industrial Revolution

marked the emergence of a new class, described by Marx as the bourgeoisie, who used their financial capital to attain power in society. Those without the means of capital were condemned to a life of drudgery in the proletariat, or working class. In the Marxist theory of social class, a person's position in society is governed by their relationship to the means of production. Furthermore, the processes of capitalism support the perpetuation of this stratified society and social change can only be achieved through revolution. The Marxian contribution to the sociology of knowledge goes beyond the recognition of the rigid nature of a class society. The Marxian connection between power and production is easily reinterpreted in the sociology of knowledge as knowledge equals power. Power in an information society is then dependent on the possession of certain knowledges. There are several theories that attempt to explain this relationship between knowledge and power.

Bourdieu's concept of cultural capital is one theory that attempts to explain how the reproduction of power through knowledge is transferred through the generations (Bourdieu, 1977). Bourdieu's use of the term capital is a clever extension of Marx's thesis. However, Bourdieu is referring to cultural rather than economic capital in his theory (Bourdieu, 1977). The theory of cultural capital refers to the cultural experiences that the more affluent middle classes have access to such as overseas holidays, museum visits and literary experiences. These experiences on their own do not guarantee the reproduction of the status quo in society, but it is the close relationship between this type of culture and the culture valued in formal schooling that gives middle class children an advantage over the children without cultural capital (Bourdieu, 1977). Bourdieu's theory of cultural capital, in common with other social reproduction theories, questions the validity of the claim that schooling is a

simple meritocracy that rewards children with high IQs who make a concerted effort with their studies. Bourdieu does not argue that the ruling middle class are participating in a deliberate conspiracy to suppress the working class. Cultural capital is implicitly recognised in school curriculum that favours a certain type of student background over others (Bourdieu, 1977). The invisible nature of this discrimination has led to socio-cultural theorists of education supporting moves to favour explicit pedagogies that open up these hitherto invisible processes for the children without cultural capital. The genre approach to teaching language is one example of a program that seeks to overcome the varying amounts of cultural capital in the form of literary experiences that children bring to the classroom (Cope & Kalantzis, 1995).

Theories of social reproduction have focused on the role of schooling as a broker of important knowledge for society. In the reproduction thesis, schools become agents that support the status quo in society. Apple (1982) extended the reproduction thesis in describing schools as sites of cultural production that favour the interests of the ruling class. Apple used the concept of an ideological hegemony to describe the complete domination of the interests of the ruling class in deciding what counts as valid curriculum knowledge in education (Apple, 1982). Apple's work, along with that of other theorists of social reproduction and resistance and more recently critical pedagogies, have produced a "plethora of studies on the relations of disadvantaged groups to official school knowledge" (Singh, 2002, p. 572). However, Singh (2002) argues that this research did not elaborate the features of this process of disadvantage. The so called "new sociology of education" that emerged from the UK in the early 1970s was one group that "took as its focus the problematic nature of knowledge and the manner of its transmission, acquisition, and evaluation in schools" (Bernstein,

1990, p. 116). However, only Bernstein of this group conducted a sustained theoretical project that attempted to explain the processes of the stratification of knowledge in our systems of schooling (Singh, 2002).

The Relationship of the Bernsteinian Project to this Study

The Bernsteinian theoretical project is important to this study as it represents a theory of pedagogy that has potentially the most explanatory power to unpack the relation of pedagogy to students' understanding of the environment that is the purpose of this thesis. The potential of a Bernsteinian approach lies in both the macro and micro analyses of pedagogic discourse that this theory allows. The macro analysis posits pedagogy as the realisation of culturally valued knowledge whilst the micro analysis explains how this realisation takes place.

What I have labelled as Bernstein's macro analysis of pedagogy offers a theoretical model that explains the production and distribution of specialised knowledges in society. For this thesis, the specialised knowledge is the representation of environment that is produced as part of the pedagogical discourse of environmental education. Bernstein's model, that he called the pedagogic device (Bernstein, 1990), is a hierarchical model that explains how specialised knowledges that are produced in institutions such as universities filter selectively through society. This reflected Bernstein's concern with the power of knowledge and its role in the perpetuation of social inequality. In the Bernsteinian model of pedagogic relations, this filtering or pedagogising of specialised knowledges occurs throughout societal institutions, including those that conduct formal schooling. In education, Singh (2002) has described the pedagogic device as "the ensemble of rules or procedures via which

knowledge is converted into classroom talk, curricula and online communication" (p. 571).

Bernstein developed the model of the pedagogic device in response to his belief that the theories of cultural reproduction did not explain the actual processes whereby the reproduction was enacted in society (Bernstein, 1990). He described the theories of cultural reproduction as "essentially theories of communication without a theory of communication" (Bernstein, 1990, p. 170). Bernstein argued that his pedagogic device constituted a theory of pedagogic communication. I argue here that the micro analysis of pedagogy enabled by the modelling of the pedagogic device allows this study to describe the relationship of the pedagogy and students' understanding of the environment in environmental education.

The Principles of the Pedagogic Device

The pedagogical device is a hierarchical model that involves distributive, recontextualising and evaluative rules (Singh, 2002). It is hierarchical because the "recontextualising rules are derived from the distributive rules and the evaluative rules are derived from the recontextualising rules" (Singh, 2002, p. 573). The distributive rules relate to the production or creation of knowledge that occurs in the academy. In a global knowledge society, vast amounts of knowledge are produced. This knowledge then needs to be recontextualised by "agencies of recontextualisation" such as state curriculum authorities (Singh, 2002, p. 574). Finally, this knowledge is then reproduced as pedagogic practices that realise what counts as the valid acquisition of knowledge (Singh, 2002).

The pedagogic device is not a linear model that prescribes a simplistic transmission of knowledge and power. Bernstein emphasised the contestation and negotiation that occurs between the different fields of recontextualisation that he identified as the official recontextualising field and the pedagogic recontextualising field (Bernstein, 1990; Singh, 2002).

As Bernstein developed the pedagogic device as an explanatory model for the pedagogising of knowledge throughout society and not just the institution of schooling, a further elaboration of the model is required to describe the recontextualising of knowledge that takes place within the classroom. Therefore, in education there is a three-step process for the recontextualisation of the original knowledge that is produced in the academy. The first step is the recontextualisation of knowledge into curriculum documents by the official pedagogic field that is represented by state curriculum authorities. A further recontextualisation involves the translation of these outcomes by the pedagogic recontextualising field which is represented by curriculum designers, academics and sometimes teachers themselves (Bernstein, 2000). This is an area of great contestation as diverse groups compete to impose their particular approach on the teaching of their curriculum area. There is a final step that involves the reproduction of the recontextualised knowledge that occurs in the classroom by students and teachers (Bernstein, 2000).

Classification and Framing

The theoretical model of the pedagogic device built on Bernstein's earlier work on classification and framing. Bernstein (1990) argued that the main activity of the recontextualising fields is "constituting the "what" and "how" of pedagogic discourse. The "what" refers to the categories, contents, and relationships to be transmitted, that

is their *classification,* and the "how" refers to the manner of their transmission, essentially to their *framing"* (p. 190, italics in original).

Bernsteinian theory focuses on the strength of boundaries that exist between the different classifications of knowledge in disciplines as well as the strength of boundaries between the framing of this knowledge as pedagogy (Bernstein, 1971). Strong boundaries create strong classifications and strong framing whilst the reverse is true for weak boundaries (Bernstein, 1971). Typically, schooling systems have had strong classification of the curriculum into discipline areas. This strong classification is a part of the uniformity of education principles and practices among Western European states and their offshoots that Bernstein (1990) identified, regardless of the dominant political ideology of the state. Whereas the boundaries between subject areas are generally strong, the framing of the subject areas into pedagogy is generally weak. This places the classroom in the crucial position of the interpretation and translation of curricular knowledge. This reality of the social construction of pedagogy has important implications for this study as it emphasises the influence that pedagogy has on the realisation of cultural knowledges.

Vertical and Horizontal Discourses

Bernstein's concepts of vertical and horizontal discourses were influenced by Durkheim's conception of the sacred (the unthinkable) and the profane (the thinkable) (Muller, 2001). The profane is everyday commonsense knowledge that is tied to context. Sacred knowledge is the abstract, esoteric knowledge produced in the academy. Bernstein (1999) elaborated these concepts to describe the vertical and horizontal discourses of knowledge in society. The horizontal discourses of everyday interactions are accessible to all levels in society (Bernstein, 1999). However, the

vertical discourses are hierarchical and require the acquisition of formal knowledge codes for successful access (Bernstein, 1999). In Bernstein's theory of the pedagogic device, the recontextualising fields of formal schooling regulate access to culturally valued vertical discourses. Bernstein's conception of everyday and formal discourses is one possible path for an analysis of the pedagogical discourse of environmental education that is explored further in the last section of this chapter that focuses on the objectification of the environment.

Bernstein's theoretical model of the pedagogic device has been criticised for its esoteric episteme (Singh, 2002). This may have arisen as a result of his move towards more socio-linguistic accounts of the semiotic mediation of pedagogy that moved his theory away from the traditional realms of the sociology of knowledge. The socio-linguistic field of systemic functional linguistics, with its focus on the fine-grained analysis of classroom discourse, has extended Bernstein's work to the limits of micro analysis (Halliday, 2003). Academics in the field of systemic functional linguistics have developed a grammar of the vertical discourses of disciplines (e.g. Christie, 2000; Halliday, 2003). Other areas of pedagogical theory have taken up Bernstein's project and adapted it to the performative language of contemporary schooling. One such area is the Quality Teaching Framework in New South Wales that emanates from the broader theoretical body of authentic pedagogy from the US.

The Pedagogic Discourse of Environmental Education

This chapter now turns to a discussion of the pedagogic discourse of environmental education using Bernstein's model of the pedagogic device (Bernstein, 1990). It is important to use Bernstein's model as it gives an overall view of the structure of the pedagogic discourse of environmental education. An analytical approach that began

with an examination of the approaches to the teaching of environmental education might overlook the theoretical foundations of these approaches. Bernstein's model is an appropriate analytical framework to use here because this thesis is using a theory of pedagogy that emphasises its social and cultural construction.

The social and cultural construction of environmental education is embedded in the knowledge produced by environmental scientists who have been measuring and forecasting global environmental degradation. This knowledge has been recontextualised as the rationale for environmental education by the official recontextualising field of global institutions such as UNESCO. The pedagogical recontextualising field of environmental education established by academics in universities debates the merit of different approaches to the teaching of environmental education based on their research. Finally, the pedagogical reproduction of the classroom finally determines what knowledge is realised in the name of environmental education. The role of the first three fields, which is the official knowledge of environmental scientists and the recontextualisation of this knowledge by UNESCO and the academy in the realisation of environmental education, is examined here. The last field, the reproduction of this knowledge in the classroom will be the focus of the empirical work of this study.

The Origins of Environmental Education in Environmental Science

The production of the knowledge for environmental education occurs across the environmental sciences. Environmental scientists have been producing data that support the theory of global warming and environmental degradation over the past two decades (Firor, 1990; Houghton, 2004; Union of Concerned Scientists, 2003; Suzuki, 1993). However, it was a book entitled *Silent Spring* by a little known marine

biologist Rachel Carson, that is credited with inspiring the modern environmental movement (Lakewood Public Library, 2005). Carson (1962) warned of the dangers that chemicals such as DDT posed to natural ecosystems of which humans are a part. Using Bernsteinian terminology, Carson was pedagogising the specialist knowledge of environmental science so that it was understandable to a lay person (Singh, 2002). Environmental scientists and activists have attempted to undertake the same task with the message of global warming (Firor, 1990; Houghton, 2004; Union of Concerned Scientists, 2003; Suzuki, 1993). As was the case with Carson's message, however, there are opposing voices that contest the global warming thesis (Gore, 1994). In effect, they are part of the contestation and dispute that Bernstein (1990) describes is an essential feature of the pedagogic recontextualising field.

In the example of global warming, some of the contestation has focused around the energy targets set by the Kyoto protocols. The opposition to Kyoto has been particularly well organised in the US (Moore, 1998; Global Climate Coalition, 2005). The global climate coalition was so successful in its aims that it made itself redundant:

> The Global Climate Coalition has been deactivated. The industry voice on climate change has served its purpose by contributing to a new national approach to global warming. The Bush administration will soon announce a climate policy that is expected to rely on the development of new technologies to reduce greenhouse emissions, a concept strongly supported by the GCC (Global Climate Coalition, 2005).

The official recontextualising field of environmental education operates at the second level of the production of knowledge concerning the environment. The field of environmental education comes down on the side of the environmental scientists predicting global ecological catastrophe. The discipline was actually created as a solution to the environmental problems identified by scientists (Van Weelie & Wals, 2003). Environmental education then is an official and pedagogic recontextualising field of a body of knowledge that has already been recontextualised by the environmental movement. Its role then is to define, contest and debate what is to be taught in the name of environmental education. The task of defining the parameters of the discipline has been taken up by global institutions such as UNESCO. The debate on the appropriate pedagogical models for environmental education has been engaged by academics working in the field of environmental education at universities.

The Official Recontextualising Field of Environmental Education

The official recontextualising field of environmental education has focused its attention on developing international charters and treaties to guide the emerging area of environmental education. The Tbilisi declaration refined the Belgrade Charter (UNESCO, 1975) to produce a broad description of the parameters of environmental education:

> Environmental education, properly understood, should constitute a comprehensive lifelong education, one responsive to changes in a rapidly changing world. It should prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values (UNESCO, 1977, p. 24)

This broad description was broken down into five main objectives for environmental education. The five objectives were awareness, knowledge, skills, attitudes and participation (UNESCO, 1977). The Tbilisi declaration also provided an extensive list of criteria to guide environmental education (UNESCO, 1997). The objectives and criteria were used as an initial framework for official policies in environmental education (Henderson & Tilbury, 2004).

The next milestone in environmental education was the recommendation contained within chapter 36 of Agenda 21, a charter developed at the Earth Summit in Rio in 1992 to promote sustainability around the globe (United Nations Sustainable Development, 1992). Agenda 21 promoted multi-disciplinary responses to issues of environmental sustainability (United Nations Sustainable Development, 1992). Agenda 21 called for a reorientation of education towards sustainable development (United Nations Sustainable Development, 1992). The Thessaloniki declaration of 1997 reaffirmed UNESCO's commitment to education for sustainable development (UNESCO, 1997). Education for sustainable development remains a key priority for UNESCO, with the years 2005-2014 declared the decade of education for sustainable development (UNESCO, 2005).

The significance of the sustainable development principle for environmental education is that sustainability no longer refers solely to natural ecosystems. UNESCO (2005) lists a diverse range of key themes for its decade of education for sustainable development. These include themes as seemingly disparate as media and information and communication technologies to HIV/Aids, human rights and the

environment (UNESCO, 2005). It seems that the inclusion of environmental education under the broad conceptual umbrella of sustainability has gained the discipline more official recognition. However, the association of environmental education with sustainable development has attracted some criticism from the academy of environmental education. Foster (2001) argues that it is deterministic to argue that education should be for anything, whether for sustainability or any other position. Instead it is the role of education to actually determine what sustainability is (Foster, 2001).

Another critique of education for sustainable development focuses on the "self-validating" nature of the official push for sustainable development that tends to create a cliché of the term sustainability in the absence of any real critique (Jickling, 2001, p. 176). These critiques are important as they demonstrate the role that the pedagogic recontextualising field of the academy has in the area of environmental education. However, the main point to emerge from this section has been the emphasis that the official recontextualising field has increasingly placed on the relationship between environmental education and sustainable development. The next section of this chapter analyses how the academy has interpreted this official agenda of sustainability.

The Pedagogic Recontextualising Field of Environmental Education

Environmental education academics in universities produce knowledge in common with their academic counterparts in environmental science. However, their area of specialised knowledge is research into what should be taught in the name of environmental education and how it should be taught. Their role in the model of the

pedagogic device, therefore, focuses on the classification and framing of the pedagogic discourse in environmental education. Their theoretical orientation will influence what they recognise as being important knowledge for the pedagogic discourse of their discipline (Bernstein, 1990).

A review of the pedagogic discourse of environmental education could be undertaken using the existing typology that delineates three separate kinds of environmental education (Lucas, 1979). These are education *about, in* and *for* the environment (Lucas, 1979). In this typology, education about the environment is associated with developing scientific knowledge about the environment (Davis, 2003). Education in the environment involves students spending time in the natural environment whilst education for the environment aims to promote pro-environment views in students (Davis, 2003). The validity of these crude categories has been questioned by Jickling and Spork (1998) who argue that they have become limiting frameworks that have come to be accepted uncritically by the discipline. The categories are also limiting in that they do not represent all of the theoretical orientations of environmental education. Education *in* the environment has been associated with interpretivism, *about* the environment with positivism and *for* the environment with critical theory (Scott & Oulton, 2000). Hart and Nolan (1999) identified four paradigms of environmental education; positivism, constructivism, critical theory and postmodernism. Therefore, the in/about/for typography excludes the constructivist and post-modernist paradigms. Payne (1999, p. 5) alludes to this exclusion when he discusses the theoretical orientation of "for being for the environment" as a postmodernist position that sits outside the in/about/for categories. It is important to note here that Hart and Nolan use the term, post-modernist, to refer to a specific

paradigm of environmental education research and practice. I adapt their use of the term to describe the *post-modernist* influences on environmental education to avoid invoking the much broader field of post-modernist critique and philosophy that is beyond the scope of this study.

This literature review uses Hart and Nolan's (1999) four paradigms of environmental education as an organising framework for an analysis of the pedagogic recontextualising field for three reasons. The first is the argument outlined above that other typologies are not adequate for the task. Second, the paradigms identified by Hart and Nolan were the result of an extensive review of the literature by two experienced researchers in the field. Finally, the link between the theory and practice of environmental education that is implied by the expliction of underlying theoretical paradigms is fundamental to the theory of pedagogy that is employed in this study. Pedagogic recontextualisation is tied to underlying codes of knowledge that determine the classification (what) and framing (how) of environmental education (Bernstein, 1990). The underlying codes of knowledge in the pedagogic recontextualisation of environmental education are the dominant theoretical paradigms.

The following section of this chapter examines the role of the four paradigms of environmental education in the classification and framing of environmental education in the field of pedagogic recontextualisation. As these paradigms emerge from the academy, they constitute a body of research that focuses on what should be taught in environmental education and how it should be taught. Therefore, the analysis of each paradigm focuses on the classification and framing of the pedagogic discourse in this area as well as offering a critique of these positions.

The Positivist Paradigm of Environmental Education

The positivist paradigm in environmental education is based on the knowledge-attitude-behaviour model of environmental education (Gough, 1997). In this model, the aim is to provide students with knowledge about environmental issues so that there is a subsequent measurable change in their attitudes and behaviours towards the environment (Bradley, Waliczek, & Zajicek, 1999). There is strong support for the importance of environmental knowledge to young people from the advocates of environmental education (Gigliotti, 1992; Gambro & Switzky, 1996; Bradley et al., 1999). Ballantyne and Packer (1996) caution that a lack of basic ecological knowledge among young people may cause them to make environmental decisions based on ecological myths rather than facts.

The classification or defining what is to be taught in environmental education has been the main endeavour of the positivist paradigm judging by the research accounts reported in the journals (see Appendices A & B). Researchers in this paradigm use causal, comparative research designs to examine the existing knowledge and attitudes of students so that appropriate educational interventions may be developed. As acknowledged in chapter one, there is a substantial evidence base that focuses on the existing understandings of students. A sample of this evidence base is described in the following paragraphs.

A survey of 1800 high school students (age 17-18) reported that male students had greater knowledge of environmental issues than female students (Gambro & Switsky, 1999). Another study of younger children also found that boys had more knowledge of environmental issues (Chawla, 1998). However, the findings of an Australian study

(Connell, Fien, Sykes, & Yencken, 1998) that female students had greater conceptual knowledge of environmental issues seems to contradict the previous evidence. Rickinson (2001) suggests that this contradiction may be explained by a difference in the respective methodologies. The USA study claimed to be measuring factual knowledge rather than conceptual knowledge as measured by Connell and colleagues (1998).

In another survey conducted across New South Wales, there was no significant difference in knowledge scores between males and females in a sample of 2 238 students between the ages of 8-17 from a diverse cross section of the population of NSW, Australia (Walker et al., 2002).This survey used the same approach as the USA study mentioned above; it measured factual knowledge of salient environmental issues. Other research suggests that young people formulate their own views on environmental issues based on their environmental knowledge and attitudes (Lyons & Breakwell, 1994) and that there is a positive correlation between scientific environmental knowledge and increased awareness of environmental problems as well as solutions (Lyons & Breakwell, 1994). An extension of the research into the existing understandings of students is the inquiry into prominent sources of these knowledges.

It has been found that television is an important source of information about the environment for young people (Brothers, Fortner, & Mayer, 1991; Cheong & Treagust, 2001; Huckle, 1995; Keliher, 1997; Palmer & Suggate, 1996). Television is by far the most important media source for young people compared to web sites, newspapers, magazines and radio (Rickinson, 2001). News programs and nature

programmes have been identified as the most important source of information among television programs (Bonnett & Williams, 1998). Another branch of the evidence base into the existing understandings of students focuses on students' rating of the relative importance of environmental issues.

There is not a consistent theme emerging from the research that clearly shows that young people rate certain environmental issues above others. Some studies have found that ozone depletion is of greatest concern (Connell et al., 1998; Ivy, Lee, & Chuan, 1998; Morris, 1996) whilst two other studies found young people more concerned with pollution, acid rain and global warming (Foreid & Filho, 1997; Riechard & Peterson, 1998). Other studies have found differences in environmental concerns are related to scale i.e., young people are more concerned with environmental problems at the global level than at the local or national (Morris, 1996).

A survey of the environmental concerns of 2 238 young people found that young people are more concerned with environmental problems at the local level, specifically litter, than with global issues such as global warming (Walker et al., 2002). However, this study asked students to rate their environmental concerns alongside social issues such as crime, war and poverty. Litter was the only local environmental concern to rate among the top three for all age groups surveyed in the aforementioned study (7-8yr olds, 11-12, 14-15, 16-17). Indeed, when Walker, Brady and Young (1999) described the focus group research that preceded the survey, they noted that young people often emphasised pollution, in particular litter, when talking about the environment.

The pedagogy employed in this paradigm is a direct expression of the knowledge-attitude-behaviour model. Educational interventions are designed that meet the gaps in environmental knowledge identified through research. For example, if research identifies the fact that students confuse ozone depletion with global warming then programs are developed that seek to clarify conceptual development in this area. The positivist paradigm, therefore, is stronger on the classification of pedagogy than it is for its framing. Many existing environmental science programs in the science curriculum of high schools demonstrate this strong focus on the classification of pedagogy (Davis, 2003). They aim to give students accurate scientific knowledge of environmental phenomena (Fien, 1993) so that they will make informed decisions on environmental issues in the future. The theory of pedagogy and learning that is implicit in the positivist pedagogy of environmental education is simple. It is the teacher's role to transmit the required knowledge to the students so that they may learn it. There is little guidance or theory on how, or the framing, of this transmission. This approach to pedagogy has been the source of some criticism in the literature.

The positivist pedagogy of environmental education has been criticised for its determinism. It has been argued that the positivist paradigm is deterministic because it seeks to predict and control attitudes and behaviours (Robottom & Hart, 1995). This determinism contradicts one of the aims of liberal education to promote critical, independent thinking (Robottom & Hart, 1995).

The lack of any theory of learning in the positivist pedagogy has been identified as a common weakness across theoretical paradigms in environmental education (Dillon,

2003). The strong focus of research conducted in this paradigm on the outcomes of environmental education has led to less discussion about the processes required to achieve these outcomes. This lack of pedagogical complexity has been linked to the fact that the environmental justification for environmental education has historically had prominence over the pedagogical justification (Van Weelie & Wals, 2003). In summary, it could be argued that the positivist paradigm of environmental education research has been very effective in identifying the critical gaps in the environmental knowledge, behaviours and attitudes of its research subjects. However, positivist theory does not easily transfer to a theory of learning or pedagogy that might be used to address some of these deficits. The next paradigm examined in this chapter is almost apposite in this regard in that it is a theory of learning that has been applied to research and practice in environmental education.

The Constructivist Paradigm

Constructivist theory in environmental education recognizes that children create their own meaning of environmental phenomena and this construction is heavily influenced by what they already know and bring to the learning experience (Novak, 1987). So research and practice informed by the constructivist paradigm seeks to find out what children already know and develop pedagogies that build on or challenge these existing conceptions.

The constructivist paradigm in environmental education is an emerging paradigm. Robertson in 1994 lamented that he could only find five studies that used constructivist theory in the previous five years (1989-1994). Despite this scarcity of evidence, Robertson (1994) speculated that constructivist theory had great potential as a research framework in environmental education because it could help researchers

understand the social construction of environmental knowledge as well as allowing theorizing about learning to occur. Five years later, Hart and Nolan (1999) argued that constructivist/ interpretive methodologies, in particular narrative enquiry, held great promise for environmental education research. Hart and Nolan (1999) identified a specific area of this type of enquiry is research that explores teacher's thinking and children's ideas. They believe that this is "promising because it connects school practices based on teacher thinking with moral sensibilities, not with a knowledge base in the traditional sense" (Hart & Nolan, 1999, p. 38).

The research methods employed in the constructivist paradigm are designed to uncover the existing environmental understandings of students. The particular method employed is dependent on the purpose of the study. For example, questionnaires have been used to find out students' existing conceptions and misconceptions in regards to environmental phenomena. Narrative and biographical accounts have been employed to give a more complete understanding of the life world of the subjects of education. Finally, ethnography has been used effectively to examine some of the influences on children's perceptions of nature and the environment.

The main body of research relating to students' misconceptions emerged from the Environmental Education Research Unit at the University of Liverpool (Boyes & Stanisstreet, 1993). Boyes and Stanisstreet developed a questionnaire aimed at exploring learners' existing conceptions of the Greenhouse Effect. This questionnaire, and modified versions of it, has been used in many studies in the US and UK (Groves & Pugh, 1996; Dove, 1996). Students' misconceptions are now more commonly referred to as *alternative, existing or pre-conceptions* in recognition of the

constructivist view of learning that acknowledges that learners already have their own ideas about concepts that are introduced by teachers in formal school settings (Skamp, 2000).

A body of evidence has been gathered of common misconceptions students have about environmental phenomena. One of the more prevalent misconceptions identified is the conflation of the ozone layer and global warming among primary children (Rye, Rubba, & Weisenmayer, 1997) , secondary students (Clarke, 1996) trainee teachers (Dove, 1996) and adults (EPA, 1994). The most common misconception in this area is that the holes in the ozone layer let more sunlight in which then, in turn, heats up the earth. Another study attempted to draw implications from this conflation (Stannistreet & Boyes, 1996). They found older students believed that by using unleaded fuel they were reducing the impact of cars on the environment. Whilst this is correct, the researchers suspected that the student believed that unleaded fuels reduce both global warming and damage to the ozone layer. The researchers speculated that these students may then do little to reduce unnecessary car usage based on this erroneous conception (Stanisstreet & Boyes, 1996).

Other studies have looked at students' conceptions of the term environment. A research study showed that the meaning of environment is not clear to young people, that "it can be immediate, local, international, global, animate, inanimate, natural or constructed, physical or social" (Stanisstreet & Boyes, 1996, p. 47). In addition, Cullingford (1996) claims that young people do not regard the environment as an issue in the same way as adults might. Instead, they conceive of the environment as

how it affects them. For example, they will think of the environment in terms of pollution if that is part of their personal experience.

The research into significant life experiences of adult environmentalists used narrative and biographical accounts of the formative experiences of adult environmentalists as data(Palmer, Suggate, Robottom, & Hart, 1999; Chawla, 1999; Chawla, 1998). There are many findings from this body of research that indicate that early experiences of nature, whether in a home garden or in the wild, are a common foundational experience for environmentalists (Palmer et al., 1999; Chawla, 1999; Chawla, 1998). Positive family role models were also found in two studies to be an important factor in developing responsible environmental behaviours as adults (Palmer et al., 1999; Chawla, 1999). As well, there was a strong link found between early positive experiences with nature and positive adult role models (Chawla, 1998).

Ethnographic studies like the one undertaken by Wals in the USA in the early 1990s (1994b) on young adolescents' perceptions of the environment was explicitly constructivist in its foci. Wals (1994b) described himself as an active participant in his three year phenomenological study of adolescents across socio-economic settings in Detroit. Wals (1994b) gathered data through classroom interactions, journal entries and interviews with young people. As part of the interview process, Wals (1994b, p. 23) asked the young people to respond to four different colour pictures of different environmental landscapes such as "a picture of a factory with smokestacks situated in a park-like landscape".

In Wals' study, the inner city students identified nature as a threatening place, possibly as a result of their existence in a dangerous world infested with crime, violence and death whereas the students from the suburbs spoke of nature as a challenging place (Wals, 1994a). Wals (1994b) could only speculate from the qualitative evidence that socio-economic context is an influence on young people's perceptions of nature and did state that the students across Detroit "had more in common with each other's thinking about the environmental issues than I anticipated" (Wals, 1994b, p. 73).

The type of research evidence that has been generated by studies informed by constructivist principles has been used to guide the classification and framing of environmental education. The research on conceptions and misconceptions assists in the classification as it reveals what concepts need to be clarified for students. The constructivist theory of learning also constitutes a strong framework for how this concept clarification might occur in classrooms. An example of this constructivist framing of pedagogy is embodied in one branch of elementary or primary science education that focuses on identifying the existing conceptions students hold in regards to scientific phenomena (Skamp, 2004; Bernstein, 1990). This science education pedagogy impacts on environmental education in New South Wales as environmental science is subsumed in the discipline of science in the years K-10 where there is no discrete environmental science subject. These science educators then propose that certain pedagogical models can be employed in the classroom to help students build onto or challenge their existing conceptions (Skamp, 2004).

One pedagogical model that exemplifies a constructivist framing of pedagogy is the interactive teaching model developed out of the Learning in Science Project at the University of Waikato in the 1980s (Faire & Cosgrove, 1988). The interactive teacher model involves a clear sequence of activities that begin with children's questions and ideas on the concept that is the focus of the unit (Cosgrove, 1996). The teacher then designs activities that help children explore these questions. Integral to this exploration is the grounding of the concept in cultural relevant milieu (Faire & Cosgrove, 1988). For example, toasters and kettles are cultural artefacts that can be used to explore simple electrical circuits (Cosgrove, 1996). This cultural grounding is particularly important for environmental education that can sometimes be focused on the exploration of abstract global issues that are beyond the comprehension of elementary schoolchildren (Sobel, 1996). The interactive teaching model is constructivist as it recognises that children bring their existing conceptions to any learning experience. The interactive teaching model builds on these existing conceptions but only in the direction of the accepted western scientific conception. This conceptual change pedagogy has attracted some critique.

This critique is based on the fact that the objective of the pedagogy is to have students accept the western scientific conception over other cultural viewpoints. This privileging does not problematise the cultural construction of scientific knowledge (Gough, 1999). The conceptual change pedagogy used might then impose upon students a scientifically acceptable explanation that silences any other perspective, like that of indigenous folklore, of an environmental issue. This is particularly important in environmental education where spiritual links to the land are often a valid argument for conservation of natural areas. The second critique of constructivist

pedagogy is that there are few uncontested concepts in environmental education that might be usefully employed as target outcomes for conceptual change pedagogy in environmental education (Gough, 1999). An example of a strongly contested concept is that of environmental sustainability where the threshold of sustainability oscillates according to the environmental atttiudes of the various advocates.

In summary, constructivist pedagogy in environmental education is a useful strategy that can be used to alert educators to the existing conceptual frameworks held by their students. Furthermore, there are ample models of pedagogy available that assist teachers to build onto these existing frameworks. However, constructivist pedagogy manifest in a conceptual change pedagogy that privileges western scientific views has been criticised on the grounds that it encourages cultural assimilation.

Critical Theory in Environmental Education

The third paradigm in environmental education to be examined in this chapter is critical theory. The critical theorist paradigm in environmental education is part of a larger body of critical theory in the sociology of education. In common with work of the critical theorists in other disciplines of education, the aim of critical theorists in environmental education and research is to counter the hegemony of the dominant economic paradigm and create a socially transformative educational agenda (Walker, 1997).

Critical theorists such as Huckle (1991) explain that the crisis of economy and ecology requires a solution and education is part of that solution. Huckle (1991) claims that environmental education is failing to provide a solution and, instead, is part of the problem. He further claims that current practice fails to reveal the true

causes of environmental problems and fails to educate students in a manner that will allow them to realise sustainable development.

The main research and teaching method employed by critical theorists, apart from extensive critique of existing theories and practices, is action research. The researcher's role is clear in the methodological paradigm of action research. They need to "create conditions for participants, whether children, teachers, or informal educators, to individually and collectively improve their learning and working conditions in environmental education" (Hart & Nolan, 1999, p.11). Action research constitutes the method for both the classification and framing of pedagogic discourse influenced by critical theory in environmental education. In fact, it almost suggests a merging of classification and framing as the research both identifies the issue of focus and provides a framework for how this issue is to be explored.

In Australia, critical theory was the dominant influence in environmental educational pedagogy through most of the 1980s and 1990s (Jickling & Spork, 1998). This pedagogy is oriented towards developing students who will understand the broader political and social issues underlying exploitation of the natural environment (Robottom & Hart, 1995). The pedagogy of critical action research involves students in a collective problem based learning task. The aim of the task is to build students' critical awareness of the environmental problems that exist in their own community (Wals, 1992). This critical awareness should lead to the students intervening in some way to ameliorate the environmental problem (Wals, 1992).

An example of one action research pedagogy in environmental education is the Streamwatch program in New South Wales (Menczel & Elliott, 1991). Streamwatch, as the name implies, is an education program focusing on waterway ecology. However, the program moves beyond the boundaries of science into political action. Students monitor the water quality of a local waterway, publicise their findings and initiate action to improve it (Menczel & Elliott, 1991). In some areas of New South Wales this action research has been successful in restoring the quality of water in local creeks and lagoons (Menczel & Elliott, 1991).

More recently, critical action research has been remodelled as participatory action research (PAR) pedagogy, mainly in the United States. One example of PAR pedagogy has been the Project Grow initiative that has been established at a "New York City alternative public high school" (Lewis, 2004, p.89). Teachers, community based mentors and students have combined to change a barren concrete schoolyard into a "continually evolving outdoor green learnscape" (Lewis, 2004, p.89).

The activist component of the pedagogy of environmental education informed by critical theory can be problematic for some educators (Jickling & Spork, 1998). The language of activism that is sometimes deterministic and prescriptive runs counter to the ideology of educators who are loath to dictate to students what they should think and learn (Jickling & Spork, 1998). Pedagogy informed by critical theory runs counter to the constructivist view that the learner is the point of departure for the education process and not the societal context as dictated by the teacher (Wals, 1992). A research study for a PhD provided evidence that action research is not always an appropriate pedagogy for all practitioners (Walker, 1997). This research clearly

pointed out the mismatch between critical theory and the pedagogical theories of practitioners (Walker, 1997). In this study it was argued that environmental education programs developed by critical theorists could not be successfully translated by practitioners who did not identify with their progressive social agenda (Walker, 1997).

Post-Modernist Influences on Environmental Education

The diverse range of scholarly critique of environmental education that is influenced by post-modernist ideas cannot be called a coherent paradigm of theory and practice in environmental education. Instead, theorists have adopted some post-modernist notions and applied them to environmental education. In this way, the concept of multiple narratives and the philosophical process of deconstruction have worked their way into the discourse of environmental education research.

The post-modernist acceptance of multiple narratives has allowed some theorists to look past the grand narrative of environmental education as a scientific and technical solution to environmental problems created by humans. This has led to a quest to understand the complex and myriad discourses of the environment that include many stories from previously silenced or marginalised groups such as women and indigenous cultures (Gough, 1997). One pedagogy of environmental education that embodies the notion of multiple narratives is Aikenhead's (2001) notion of pedagogy as border crossing.

Border crossing is the term applied from Aronowitz and Giroux (1985) by Aikenhead (2000) to describe the pedagogy of science as an explicit process that clearly defines for students the boundaries of the paradigm. In this process, Aikenhead (2000)

suggests that teachers act as travel agents who assist in the students' crossing of the border that separates common sense interpretations of scientific phenomena with the western scientific explanation. Aikenhead's primary concern was to embrace cultural diversity in science education and to move beyond the assimilation implied in the enculturation of conceptual change pedagogies. Aikenhead's advocacy of acculturation in science pedagogy allows students to move between different scientific stories of which the western scientific explanation is but one of these accounts.

Deconstruction is the other expression of post-modernist influences in environmental education. Part of this deconstruction involves examining the inherent biases in the educational and research traditions that educators draw upon. Gough urges educators to make problematic the andocentric and eurocentric biases of the western science traditions that they are a part of (Gough, 2002). Gough also critiques environmental education programs that rely on simple, reductionist and context-free models such as the concept of ecosystems and dynamic equilibrium (Gough, 2002). The systems view of ecology is no longer the orthodoxy in mainstream science yet is still taught in schools (Gough, 2002).

Gough (1992) has also argued that the deconstruction of science concepts and the process of science itself could be enhanced through the use of the narratives of science fiction one part of a pedagogy of science in general and environmental education in particular. Science fiction is a useful curriculum resource for environmental education because of its narrative complexity and its attention to the ways in which science is constructed (Gough, 1992). In contrast, the textbook

caricatures and ritual classroom activities of science represent an ordered Newtonian universe that in no way resembles contemporary scientific theoretical consensus. In fact, the textbook with its neatly ordered sets of accepted scientific 'facts' is apposite to the intuitive, chaotic and metaphorical construction of science in action (Gough, 2001b). The novel with its narrative complexity has been offered by Gough as a more profound vehicle for the exploration of scientific ideas "in a world in which dissipative structures, non-linear dynamics, indeterminacy and unpredictability appear to be the most powerful explanatory concepts we have.." (Gough, 1992, p.10). Gough (2001b, p.7) describes science fiction texts as a "laboratory of ideas" where students can experiment with the meanings of scientific texts rather than materials.

Science fiction is also a useful lens with which to view science as it deconstructs the often opaque processes of science for students. Within science fiction are the transparent characters (scientists) and processes (methods) that create the meaning of science in the text. This is in complete contrast to the unproblematic and uncontested objective representations of scientific 'facts' in school textbooks. Gough (2001b, p.5) argues that science fiction has the potential to "trouble the conventions and categories assumed by standard textbooks and ritual classroom activities".

Another expression of the influence of deconstruction is Payne's (1999) argument that greater attention to be paid to the ontological reality of children's experiences in the environment. He believes that the current academic and teacher-driven curriculum theories do not take into account the ontology of children (Payne, 1999). This is especially important in the world of children today whose ontology is not tied down by the constraints of time and place. Payne (1998, p.136) suggests that students'

ontology is influenced by a "variety of discourses and images that are abstract, cultural and global in focus and intent". Payne's concern with student experiences might also be interpreted as constructivist but it differs from that theory in that his purpose is the understanding of students' ontology rather than concept clarification and modification. In a sense, Payne's deconstruction is of the purposes of environmental education and its relation to the complex reality of students experiences of 'environment'.

The influence of post-modernist ideas in environmental education is evident in critique that involves the deconstruction of the purposes and pedagogies of environmental education. The concept of multiple narratives has also influenced the pedagogy of environmental education. This chapter now moves on to examine another theory of pedagogy, the NSW Quality Teaching Framework.

The NSW Quality Teaching Framework

The NSW Quality Teaching Framework was the product of a joint venture of the NSW Department of Education and Training and a team of researchers from various universities around the world (NSW Department of Education and Training, 2003a). It is included as an analytical framework in this thesis because of its strong focus on the framing of pedagogic discourse. It is different from Bernstein's pedagogic device as it goes beyond the modelling of pedagogy to actually describing what quality teaching, or framing, looks like in the classroom. The grounded nature of the framework offers a counterpoint to the more abstract nature of Bernstein's model.

This section of the chapter discusses the origins of the Quality Teaching Framework in similar projects in the US and Australia that involved co-operation between state

departments of education and academics in universities. It then elaborates in detail the structure of the Quality Teaching Framework and its link to research into the framing of pedagogic discourse.

The Quality Teaching Framework was developed by a team of researchers who elaborated earlier work on pedagogy in the US and Australia. This corpus of empirical research includes Newmann and colleagues' research into higher order thinking and authentic pedagogy through the Center of Organization and Restructuring of Schools (CORS) at the University of Wisconsin-Madison (NSW Department of Education and Training, 2003a). The CORS theoretical project was extended through research conducted into authentic intellectual quality in Chicago schools; authentic pedagogy and special education students; intellectual quality and students with low prior achievement (NSW Department of Education and Training, 2003a). In Australia, the Queensland School Reform Longitudinal Study (QSRLS) built on the work of the CORS team to create a framework that they called productive pedagogies (NSW Department of Education and Training, 2003a). All of these research projects have in common is that, like the NSW Quality teaching project, involved collaboration between a state department of education and researchers from faculties of education. The aim of their efforts in pedagogic recontextualisation was the improvement of classroom pedagogy to enhance student outcomes, particularly for educationally disadvantaged groups. In this respect they share Bernstein's concerns for the equitable structuring of pedagogic relations across society. The CORS work, in particular, has established an empirical base for Bernstein's argument that the middle class are favoured by the invisible pedagogies of the formal school system (Bernstein, 1990). The authentic pedagogy research conducted by CORS has

demonstrated that students from lower SES backgrounds benefit considerably from high quality, explicit pedagogy that focuses on high quality intellectual achievement for all students (Newmann, King, & Secada, 1996).

The method of the authentic pedagogy movement to achieve their goal of quality outcomes for all students regardless of background was to help to restructure schools to focus on high quality intellectual achievement (Newmann, 1996a). High quality intellectual achievement, or authentic achievement, was defined by three main criteria: "construction of knowledge, disciplined inquiry, and value of learning beyond school" (Wehlage, Newmann, & Secada, 1996, p.22). A major contribution of the authentic pedagogy movement to pedagogical theory was its explicit linking of student performance to discussions of pedagogy. In fact, Newmann (1996a) defined pedagogy as being made up of two parts, teachers' lessons and student achievement. This moved the theoretical discussion of teaching from just teacher methods and techniques to methods and techniques that produced authentic intellectual achievement (Newmann, 1996b).

The NSW Quality Teaching Framework (QTF) shows evidence of its origins in all of the earlier work on pedagogy cited above. The framework is built around three main criteria in common with the authentic pedagogy model. However, the NSW framework has subsumed the three criteria of the authentic pedagogy model into one criterion of intellectual quality. The other two main criteria are significance beyond the classroom and a supportive classroom environment. The significance beyond the classroom criterion is an elaboration of the 'value of learning beyond the school' criterion of Newmann's model (Wehlage et al., 1996; Newmann, 1996b). The

supportive classroom environment criterion was developed from the productive pedagogy research construct from the Queensland School Reform Longitudinal Study (Queensland School Reform Longitudinal Study, 2001).

Each of the three main criteria in the NSW framework is comprised of six further criteria. The framework has been used as a teaching evaluation tool as well as a planning guide (Reid & Loughland, 2003). The framework was not designed as a checklist for quality assurance but more as a common language for teachers to discuss their pedagogy (NSW Department of Education and Training, 2003b). It is used here in the same spirit, as a catalyst for a discussion on the framing of pedagogic discourse in this study.

Intellectual Quality

The criteria used to define intellectual quality are deep knowledge, deep understanding, problematic knowledge, higher order thinking, metalanguage and substantive communication (NSW Department of Education and Training, 2003b). Deep knowledge is the presentation of concepts in depth by the teacher (NSW Department of Education and Training, 2003b). Deep understanding is the requirement that students demonstrate deep understanding of the concepts that have been taught (NSW Department of Education and Training, 2003b).

The other criterion of intellectual quality is that of higher order thinking. The inclusion of higher order thinking recognizes the influence of Bloom's taxonomy of learning that he created in the 1950s (Bloom, 1956) and Newmann's elaboration of this in his research on higher order thinking and the teaching of social studies (Newmann, 1991). Bloom identified higher order thinking as belonging to the more

intellectually demanding tasks of analysis, synthesis and evaluation (Bloom, 1956). Lower order thinking was associated with knowledge acquisition and comprehension learning tasks. In some respects, Bloom's higher end of the taxonomy is close to the criterion of deep understanding mentioned in the previous paragraph. However, the quality pedagogy framework in NSW moves beyond the scope of Bloom's taxonomy to include other criteria that broaden the definition of intellectual quality. These criteria are problematic knowledge, substantive communication and metalanguage (NSW Department of Education and Training, 2003b).

The criteria of problematic knowledge stems from the work of Berlak and Berlak (1981). Their concern was with helping students to critique information on the basis of its source (1981). Their work is especially pertinent given that schools now operate in a global knowledge society that is characterised by the intensity of knowledge production and creation (Castells, 2000).

The substantive adjective in the criterion of substantive communication highlighted the value that the authors placed on forms of student-teacher communication that go beyond administrative and managerial discourses (NSW Department of Education and Training, 2003b). The final criterion of intellectual quality is that the teacher inducts their students in the metalanguage of their discipline (NSW Department of Education and Training, 2003b). For some disciplines such as English where the focus has been on the process of language, the metalanguage has always been an explicit feature of the pedagogy (Cope & Kalantzis, 1995). Indeed, the work of Australian educational socio-linguists underpins this criterion in the QTF (NSW Department of Education and Training, 2003a).

Supportive Learning Environment

The second tenet of the quality pedagogy framework focuses on the creation of a supportive learning environment. The criteria of a supportive learning environment are explicit quality criteria, engagement, high expectations, social support, self-regulation and student direction (NSW Department of Education and Training, 2003b; Cope & Kalantzis, 1995).

The first criterion of explicit quality criteria reflects the Bernsteinian concern for visible or explicit pedagogies (Bernstein, 1990). Bernstein's concern was taken up by literacy educators in Australia (Cope & Kalantzis, 1995) , who successfully challenged the implicit pedagogies of the whole language literacy movement in Australia and lobbied successfully for an explicit, genre based approach for the teaching of English K-12 to be the basis of English curriculum documents.

Explicit quality criteria is often manifest as assessment rubrics in the classroom. The quality pedagogy framework makes a distinction between rubrics that contain procedural and technical criteria and those that have quality statements that explicate the standard required for each criterion (NSW Department of Education and Training, 2003b). Rubrics can also be used to assist students to self-regulate their own learning by using the quality statements as gauges of progress. If the learning task involves options and allows for different modalities of expression then the criterion of student direction can also be met (NSW Department of Education and Training, 2003b). Furthermore, if these tasks are conducted in collaborative groups that require the full cooperation of every member to achieve the outcome the criterion of social support is satisfied (NSW Department of Education and Training, 2003b).

The remaining two criteria that define a supportive learning environment according to the NSW Quality Teaching Framework are high expectations and engagement (NSW Department of Education and Training, 2003b). The authors of the Quality Teaching Framework argue for the inclusion of high expectations because it names "what was assumed in many of the instruments of prior research" (NSW Department of Education and Training, 2003a, p.16). The assumption was the importance of high expectations as a characteristic of student support. Although the authors of the framework argue that a static imposition of high expectations to all students regardless of their current ability is not their intention, they draw attention to the sociological implications of the differentiation of expectations (NSW Department of Education and Training, 2003a). In common with Bernstein (1990), they share a concern that the more disadvantaged students receive a different type of schooling due to the low expectations of their teachers (NSW Department of Education and Training, 2003a).

The criterion of student engagement is included in the dimension of the quality learning environment partly due to Newmann's earlier work on the links between student engagement and motivation (Newmann, 1989). It also recognises the prominent position student engagement has had in debates on school effectiveness. An OECD study that involved the surveying of 15 year olds across 43 countries identified that there were school factors that contributed to student engagement (Willms, 2000). Importantly for the purposes of the Quality Teaching Framework, it found that student engagement could be achieved without affecting intellectual performance (Willms, 2000).

Significance Beyond The Classroom

The last tenet of the quality pedagogy framework is linked to a long history of a quest for culturally relevant and meaningful pedagogy that began with Dewey (1956). It is also a response to the constructivist theory of learning that asks teachers to consider the background knowledge and experiences of their students. Finally, it asserts the right of other cultural knowledges than the dominant one to be represented in pedagogy.

The quest for meaningful and culturally relevant curriculum is recognised in this area of the quality pedagogy framework by the criteria of knowledge integration, connectedness and narrative (NSW Department of Education and Training, 2003b). Knowledge integration is the teacher's ability to link different subject areas under relevant themes that is classic Deweyism (Dewey, 1956). Connectedness as the name suggests is the links made between the classroom and the outside world (NSW Department of Education and Training, 2003b). The authors suggest that this might be achieved by engaging students in the solving of real life problems in their local communities (Cope & Kalantzis, 1995; NSW Department of Education and Training, 2003b). Connectedness also relates to the sharing of school work with outside audiences beyond the school. Narrative is presented as a strategy to enhance the significance of tasks as well as to enrich students' understanding (NSW Department of Education and Training, 2003b).

The criteria of inclusivity and cultural knowledges represent an effort by the quality pedagogy framework to redesign pedagogy that represents the experiences of cultural groups that have hitherto been marginalised in the school curriculum. This endeavour

would see diverse cultural knowledges informing what is taught and ensuring that all students feel included in the work of the classroom (NSW Department of Education and Training, 2003b).

Finally, background knowledge represents the efforts of teachers to build upon what students bring to the classroom (NSW Department of Education and Training, 2003b). In line with a Brunerian theory of learning, teachers can then make links from the known to the new a feature of their pedagogy (Bruner, 1977). Bruner's notion has been taken up by constructivist theorists who argue the importance of recognising what students bring to the learning experience (Robertson, 1993; Skamp, 2004).

The Objectification of Environment

The objectification of environment was outlined as one part of the foundation of this study in chapter one. The outline was based on a finding from a survey conducted by the author as part of a team of researchers (Loughland, Reid, & Petocz, 2002).The objectification of environment was evident in students' responses to the item in the survey that asked them to define what they mean by the term environment. Two papers were published in *Environmental Educational Research* that analysed this issue (Loughland et al., 2002; Loughland et al., 2003). The first paper examined the phenomenographic analysis that was used to analyse the responses whilst the second paper examined some of the demographic factors that seemed to influence this objectification of environment in students' responses.

The analysis that was conducted in these two papers will be now positioned in the broader context of the literature that focuses on objectification in education. The

method and findings of the two papers are outlined before the objectification of environment is examined using the sociology of knowledge literature.

The first paper outlined the phenomenographic method that was used to identify the objectification of the environment in students' responses (Loughland et al., 2002). The phenomenographic analysis of the students' written responses in the survey showed six qualitatively different conceptions of the environment (Loughland et al., 2002). These conceptions could be divided into two larger categories of environment as object focus or environment as relation focus:

> **Object Focus**
>
> Conception 1**.** The environment is a place.
>
> Conception 2**.** The environment is a place that contains living things.
>
> Conception 3**.** The environment is a place that contains living things and people.
>
> **Relational Focus**
>
> Conception 4**.** The environment does something for people.
>
> Conception 5**.** People are part of the environment and are responsible for it.
>
> Conception 6**.** People and the environment are in a mutually sustaining relationship. (Loughland, Reid & Petocz, 2002, p.192)

The second paper examined the outcome of applying the phenomenographic categories to the survey data (Loughland et al., 2003). As well, the paper identified demographic factors that seemed to influence the different conceptions of environment. The strongest influence was the age of the students (Loughland et al.,

2003). High school children were more likely to see the environment as an object rather than express a relationship to it as 12% of primary school children did (Loughland et al., 2003). The age difference in this response was significant but not as significant as the fact that most young people of all ages regarded environment as an object (Loughland et al., 2003).

It was argued in the second paper that the objectification of the environment by school students had important implications for environmental education (Loughland et al., 2003). The majority of young people surveyed regarded the environment as something separated from them rather than from a relational point of view (Loughland et al., 2003). It was argued that the relational point of view implied that students believed that the environment was an essential part of their own existence and something that required their care (Loughland et al., 2003). It was claimed that if only one in eight children held this relational view then the area of environmental education might need to rethink its purpose (Loughland et al., 2003). These arguments were speculative only; the only conclusion that could be sustained from the data was that the actual categories existed. However, the survey that was the first part of the larger research design of the project had achieved at least one of its aims of identifying a possible focus area for exploration in this PhD study.

The 2 238 students completed the written survey question whilst in a school classroom (Loughland et al., 2002). The school context and the formality of the academic written response might suggest that students' responses were influenced by the environment that they were in. Furthermore, the positive correlation of age with the objectification of environment points to a possible school effect in students'

conception of environment (Loughland et al., 2003). In the absence of any methodological claim to causality, these claims are only speculative and need to be further examined both empirically and philosophically. The empirical aspect will be undertaken as the purpose of this study. The philosophical analysis will occur now in this chapter.

The Objectification of the Environment in Pedagogy

The objectification of the environment by students that was identified in the survey is not surprising given the recognition that formal education systems reinforce a Cartesian subject-object distinction (Veel, 1998). As well, Pepper (1984) argues that traditional science positions the human relation with the environment in particular ways. This relation is described by Sauve and Berryman (2003) as "a relation to a material environment and its biophysical and ecological processes, often reduced to the status of resources, of which our actual social use creates a crisis"(p. 6).

The presence of this orientation to the environment might be explained by the role that science played in the establishment of the subject of environmental education (Greenall Gough, 2004). The scientific abstraction of the environment is one manifestation of the general objectivism of knowledge inherent in traditional epistemology and analytic philosophy (Esland, 1971). Esland (1971) argues that objectivity is autonomised in the everyday consciousness of individuals who recognise "objects as being 'out there', as coercive, external realities" (p. 75). He further argues that "objectivism has been firmly embedded in the norms of academic culture and its transmission"(Esland, 1971, p. 75). It is this last argument of Esland that objectivism is an integral part of academic transmission that is particularly pertinent to the focus on pedagogy in this thesis. Esland does not accept that this

transmission is an inevitable process. He argues that a different conception of pedagogy as the active construction of experience presents a clear challenge to the static conception of knowledge as an entity that needs to be passed on (Esland, 1971). Esland described this alternate view of teaching and learning as being the "intersubjective construction of reality"(Esland, 1971, p.78).

Esland's conception of pedagogy as the active realisation of knowledge provides a fruitful pathway for the exploration of the research question of this thesis. An acceptance of the theoretical view of pedagogy as the unproblematic transmission of knowledge would have not progressed this thesis past the correlation arguments presented in the earlier paper published on the results of the survey (Loughland et al., 2003). This argument might have led to the conclusion that students' objectification of the environment is a direct result of the strong classification of environment as an object in the curriculum. However, this would have overlooked the classification and framing of environmental education pedagogy that was argued to be an integral part of the Bernsteinian conception of pedagogy presented in the first part of this chapter. Furthermore, it would not have satisfied the objective of this research to undertake a fine-grained exploration of the processes that constitute the pedagogy of environmental education. The Bernsteinian concept of vertical and horizontal discourses is examined again in the next part of this chapter for its potential explanatory power in understanding the processes that might underpin the objectification of the environment in the pedagogy of environmental education.

Bernstein's vertical and horizontal discourses, as reviewed in the first section of this chapter, refer to the separation of everyday commonsense knowledge of horizontal

discourses and the abstraction of knowledge in the vertical discourse of specialised knowledge in society (Bernstein, 1999). According to Bernstein, schools induct students into the vertical discourses of the disciplines with varying degrees of success depending on the social class of the student (Bernstein, 1975). This study does not want to explore Bernstein's social class thesis but instead explore the potential of the concept for an analysis of the construction of objectification in students' understanding of the environment in environmental education.

In Bernstein's earlier work on restricted and elaborated codes of languages he drew attention to the abstraction of knowledge inherent in the elaborated language code that middle class children brought to the classroom (Bernstein, 1975). In contrast, the working class children had a restricted code of language that was more personalised (Bernstein, 1975). For example, this meant that the park they visited would not be conceived under the broader classification of parks in the local area but be described as the park that they played football in of an afternoon. Bernstein (1975) argued that the lack of exposure of the working class children to the abstract knowledge code placed them at a disadvantage when they engaged with the elaborated codes of classroom discourse. Bernstein later elaborated these concepts to develop the idea of horizontal and vertical discourses (Bernstein, 1999).

The concept of vertical and horizontal discourses can be applied to the object and relation finding from the earlier study conducted by the author and colleagues (Loughland et al., 2003). The objectified responses of the students can be interpreted as the adoption of the vertical discourse of abstraction that they adopted for the school setting in which the survey was conducted. In contrast, the 12% of the students who

expressed a relational view of the environment were operating in the horizontal discourse of their everyday relationship with the environment. This re-interpretation of the object-relation finding does not represent a refutation of the philosophical warrant of this study but instead reinforces the view of pedagogy as the active realisation of knowledge. This active realisation of knowledge which has been described as the pedagogic recontextualising field of environmental education warrants further investigation of its relationship with students' understanding of the environment in environmental education.

Summary

This chapter has presented the two theories of pedagogy that this study has employed in its examination of the pedagogy of environmental education. Bernstein's theory of the pedagogic device emerges from a larger body of theory pertaining to the sociology of knowledge. Bernstein's theory is used in this study because, in contrast to the other theories of social reproduction, it attempts to explain the actual pedagogical processes involved in the realisation of knowledge in the classroom. Particularly useful to this study is Bernstein's notion of the pedagogic recontextualising field that was used in this chapter to examine the disparate influences that constitute and define the area of environmental education.

The second theory of pedagogy examined in this chapter was the NSW Quality Teaching Framework, a theory belonging to the paradigm of authentic pedagogies. This theory focuses on student performance as evidence of quality pedagogy. This focus on performance is almost opposite to the Bernsteinian examination of the sociological construction of pedagogy. In effect, the use of the two contrasting theories of pedagogy allows this study to examine the pedagogy of environmental

education from different perspectives. This is important for one of the aims of the study to conduct a fine-grained exploration of this pedagogy.

The last part of the chapter focused on the objectification of the environment finding that was presented as part of the justification for this study in chapter one. The objectification finding was reinterpreted using Esland's ideas on objectivity as well as Bernstein's conception of vertical and horizontal discourses. This re-examination of the objectification finding involved positioning pedagogy as being the active realisation of knowledge rather than as a transmissive device for a static body of knowledge. It also repositioned the role of the objectification finding for this study as being part of the broader question of students' understanding of the environment rather than a discrete finding that needed to be explored in its own right.

CHAPTER 3: METHODOLOGY

This chapter presents the justification for the methodology employed in order to examine the pedagogy of environmental education in year six at 'Dry Creek' (not the real name). First, it justifies the choice of classroom ethnography as a research method and the selection of one particular classroom as a research site. Second, it describes the steps taken to generate and analyse the data. Third, it outlines the measures taken to establish the trustworthiness of the data. Fourth, it summarises the delimitations, limitations and assumptions of this study. Finally, it describes the ethical safeguards employed in the research process.

Classroom Ethnography

The choice of focusing on one classroom for this research study was governed by the research question that required a fine-grained analysis of the relation between pedagogy and students' understanding of the environment in environmental education. An intensive study of one classroom represented the best chance of generating this fine-grained account. The objective of the ethnography was 'understanding', what Altheide and Johnson (1994) have described as being the "classic ethic of ethnography" (p. 490). The corollary assumption that accompanies this ethic is that this understanding will ultimately be useful in some sense (Altheide & Johnson, 1994). As this study is focused on the pedagogy of environmental education it is hoped that the new knowledge gained will be immediately useful to practitioners and researchers in environmental education.

The criteria for the choice of one classroom for the ethnographic study are detailed in the next section. Following that, the rationale for the choice of the particular research

method of participant observation within the broader paradigm of classroom ethnography is explicated.

Criteria for Selection of One Classroom as the Research Site

This study chose one particular classroom as the most suitable site for an examination of environmental education pedagogy based on the following three selection criteria. One, I needed to find a classroom where environmental education was being taught. Two, there needed to be a bond of professional trust established between the classroom teacher and myself. Three, the classroom needed to be in a location in close proximity to the university where I was employed as a full time lecturer.

The exploration of the relation between the pedagogy and students' understanding of the environment in environmental education needed to take place where environmental education was being taught in depth and on a regular basis so that there was enough actual classroom practice to observe. This entailed a form of purposive sampling on my part whereby I chose a classroom where I knew a substantial amount of environmental education would be taught in 2002.

The selection of one particular classroom at Dry Creek Public School also occurred because I had already established a relationship of professional trust with Vicki, the classroom teacher. Vicki had worked in 2001 as my colleague on the university faculty of which I was a member. I began at the campus in 2001 when Vicki was in her second year of a two-year secondment from the Department of Education and Training. During 2001, Vicki and I had discussed the possibility of conducting some research in environmental education when she returned to her classroom position in 2002.

The third reason for the selection of this classroom as the research site for this study was its close proximity to the university where I was employed as a full time lecturer. This meant that I could travel between the class and my place of employment in ten minutes.

This classroom ethnography of environmental education employed participant observation as a method that was suitable for conducting research with children in primary schools. Participant observation is a common ethnographic method used in classroom research. Some of the participation in the classroom involved me teaching the class using the pedagogy of philosophical inquiry.

Participant Observation as Research Method

The choice of participant observation as a research method for this study was influenced by two reasons. These were the suitability of the method for an experienced teacher and the existing critique of the feasibility of non-participant observation in active classrooms. The limitations of participant observation as a research method are also outlined in this section.

My position as an experienced teacher conducting research in another teacher's classroom directly influenced my choice of participant observation as a research method. I was readily accepted into the school by the staff because of my working relationship with Vicki, the classroom teacher, as well as for my commitment to ongoing classroom experience as a teacher educator. The students in Vicki's class also quickly recognised my position as a teacher in their class. This role was established during my first session in the class when I had to remind one student of

the correct behaviour required when using the school computer. It is this aspect of authority that makes research with children different from research with adults (Fine & Sandstrom, 1988). There was no chance of me ever becoming 'one of them' as an ethnographer might aspire to in sustained fieldwork. However, acting in the role of teacher can have advantages. It has been argued that assuming a legitimate role in the school can lead to quicker acceptance from the students who might be more inclined to act as they would normally in the classroom (Foster, 1996). Supporting this assertion was the fact that the children did not engage in the usual interrogation of me in this context as they have in professional visits to other classrooms where I was acting as a student teacher supervisor or researcher.

There is a critique of the feasibility of acting as a non-participant observer in a classroom. This critique questions the ability of a classroom ethnographer to remain invisible at a practical as well as the philosophical level. At the philosophical level, Ball (1990) argues that any presence of a researcher in a classroom, no matter how inconspicuous, will influence the data that is generated. The important thing for the researcher in Ball's view is not for the ethnographer to pretend to be a "fly on the wall" but to be reflexive enough to acknowledge their "influence on the actor's perception of their role" (Ball, 1990, p. 160). Ball describes this process as a "self conscious engagement that links data collection with data analysis" (Ball, 1990, p. 157). This inherent reflexivity of the participant observer is well described by Jorgenson (1989)"the methodology of participant observation involves a flexible, open-ended opportunistic process and logic of inquiry through which what is studied constantly is subject to redefinition based on field experience and observation"(p. 23).

The disadvantages of acting in the role of participant observer need to be taken into account in the generation, analysis and presentation of the research data. One of these disadvantages is that there is no time to write down observations as they occur (Foster, 1996). The participatory nature of the role demands that the researcher relies less on field notes as data than other sources (Foster, 1996) . In this study, the field notes were written as a research journal after each day in the classroom. The products of the children's activities, the activities themselves and other documents, such as literature texts, constitute the bulk of the data generated in this study. In the form of research discussed here, some of the activities that produce the data are initiated by me, and the selection of data and form of perspective on it is also initiated by my activities as a researcher. In this form of research, the issue of trustworthiness and warrant is different from a survey. It relates to steps that I take to try to ensure 'fairness' in the treatment and selection of data; and an ongoing reflexivity about my constructing role, and the need to examine that (Ball, 1990). The researcher's role as curriculum developer and teacher is clearly spelt out. Indeed, the role of the researcher is regarded as just another spoke in a larger hub of data that contribute to the gestalt of understanding. This larger hub, or network, is important as it is crucial in the process of analysis of the data.

Some of my participant observation in this classroom involved more than just participation in curriculum prepared and taught by the classroom teacher. During part of the data collection, I acted as a teacher researcher in a series of philosophical inquiry lessons designed to get another view of the environmental education pedagogy in this class. I used philosophical inquiry as a research method for three reasons. First, I wanted to open up the concept of environmental education pedagogy

through the introduction of children's literature and cartoons. Second, philosophical inquiry lessons are a more informal, naturalistic method of working with primary aged children. Third, philosophical inquiry is a pedagogy that is engaging and enjoyable for children.

As part of my participant observation of this classroom and in line with my ethical commitment to add something to the classroom, I decided to teach a series of lessons using philosophical inquiry as pedagogy for environmental education. I borrowed this idea from another classroom study that used philosophical inquiry as a way of understanding children's ideas about nature and the environment (Payne, 1998). As these type of lessons are mainly student directed, I argue that these lessons allowed the students to investigate issues and themes that were apparent in the texts and cartoons used as lesson stimuli. This student direction is in contrast to lessons where I might have helped the students unpack the themes from a text. In short, I did not wish to examine the efficacy of my own teaching of the lessons but instead wished to explore the pedagogy of philosophical inquiry as another way of teaching environmental education.

Philosophical inquiry is a pedagogical method that is as old as the history of western philosophy. Socrates used to confound his Athenian audiences by answering a question with another more penetrating question of his own. Socratic dialogue is recognised as a teaching strategy in the typography of teacher methods. The specific field of philosophical inquiry lessons for primary aged children was refined in Australia by Phillip Cam (Cam, 1995). Cam's philosophical inquiry lessons use

stimuli such as children's stories, poetry and cartoons to provoke children to ask questions that become the agenda for the ensuing lesson (Cam, 1995).

Another reason for the choice of philosophical inquiry as a teaching approach was because it has been described in the literature as a naturalistic and more informal method for research involving younger children. Payne (1998) found it an effective method to get primary school aged children to talk about their conceptions of nature and the environment. A part of Payne's rationale for the use of philosophical inquiry was his belief that formal research methods such as interviews are not effective with young children. Bronwyn Davies (1989) used children's stories to elicit children's ideas in her study of preschool children's conceptions of gender. She read stories whose characters challenged traditional gender constructions in society and then talked with the children about what they found interesting about the book. In this way she was able to get at children's understanding of quite complex ideas using the familiar structures of a narrative.

The final reason for choosing philosophical inquiry is that it is an engaging pedagogy to use with children. It is engaging as the stimulus materials are interesting, some of the lessons involve the use of narrative and there is a large amount of student direction in the lessons. The choice of philosophical inquiry was part of my belief that research involving children needs to be interesting, enjoyable and motivating. This ensures that the children gain an educational benefit from their involvement in the research project. This ethical point of making a positive contribution is sometimes lost in a defensive, do no harm ethical position in research.

The stimulus materials used in the philosophical inquiry lessons were cartoons and children's texts. Both of these were enjoyable and intellectually stimulating for the children. Narrative is recognised as a great vehicle for philosophical inquiry with some proponents going to the extent of constructing purpose-written narratives to explore certain ideas (Cam 1995).

Philosophical inquiry also gives children the opportunity to take more direction over the lesson. Children pose the questions that become the focus for the classroom discussion. The teacher acts as a discussion coach to help the flow of the discussion but does not influence its direction. The process of formulating, refining and discussing their own questions has been described by Payne as giving children "the opportunity to pursue some individual and social wisdom through personal reflection, discussion with peers, and re-engagement with initial reflections" (Payne, 1998, p.21).

Data Generation

I generated the data for this study as a participant observer in a year six classroom for one day a week for the first three school terms in 2002. In each of these school terms, I observed and participated in environmental education curriculum in the classroom. The role of participant observer allowed me to generate a wide range of data from the year six classroom at Dry Creek. This diversity was reflected in the forms of representations of this data. I had transcripts of lessons, field notes, a research journal, curriculum materials, literature texts, students' web pages and students' presentations. During this year, I analysed the data as they were generated in order to build on the insights generated in the research process. The following section explains in chronological order what data were generated from each curriculum activity in terms one to three.

During term one, I assisted the students in their design of a website presenting a country they had created as part of a Social Studies unit. The students created a fictitious country using a framework that assisted them in their creation of a country that had landforms, a currency, religions and history. The webpage was designed to allow the children to synthesise their creative work into the production of a website. I saved the students' websites onto a CD-Rom as the content on the sites related closely to environmental education. I was then able to examine the students' websites when I was back in my office at the university.

During term one, I was busy assisting the students in their construction of their websites so I was unable to take field notes. Instead, I wrote in a research diary as soon as I had returned to my office from the afternoon at school. In this research diary, I recorded my recollections of the students working on their websites, reflections on my role as a teacher and a researcher and any comments made by the teacher about the lessons.

During term two of 2002 I taught six philosophical inquiry lessons, observed the students learning with the Murder Under The Microscope webquest and designed a small webquest for the students to work through that was based on their local river. I recorded audio transcripts of six philosophical inquiry lessons conducted by me.

The philosophical inquiry lessons used two Leunig cartoons and two texts as discussion starters. The cartoons and texts were used to generate children's questions that were then used as a framework for a discussion. The texts used were *Rabbits*

(Marsden & Tan, 1998) and *The Lorax* (Seuss, 1972). There was also some student responses in the form of text and drawings collected in two of these lessons. I listened to the transcripts of each lesson before I taught the next. I transcribed these lessons after I had completed the entire series of lessons. Once again, throughout this process I kept a research diary that recorded both reflections on the research process itself as well as recording any data that I considered pertinent.

Also during term two, I observed students interact with the Murder Under the Microscope (MUTM) webquest. The data generated here was my field notes from my observations of the students interacting with the quest as well as the content of the quest itself. The student interaction involved working on the computers as well as small group desk work and whole group discussions. I was also able to examine the products of the small group desk work in the form of student summaries as they were displayed in a section of the room dedicated to this curriculum activity. As I was not familiar with MUTM, I analysed the previous quests that were archived on the MUTM website. I also kept up to date with the current quest independently of my observation of the students' interactions.

Another form of data generated in term two was PowerPoint presentations created by the students in response to a Macquarie River webquest created by me. The webquest was designed so that students could apply the concepts of river ecology they learnt from the Murder under the Microscope program to their own river, the Macquarie. I saved the students' presentations onto a CD-Rom for future analysis.

During term three, students created junk sculptures to represent their view of the Dry Creek environment. I took digital photos of the children making their sculptures to aid me in the recollection of the lessons that I entered into my research diary. These photos were taken in lieu of field notes which were not possible as I was assisting the children in the construction of their sculptures. The notes that I made in my research diary focused on the sculptures as products of these student's thinking on the environment. As this was my third term of visits to the classroom, my interpretations were significantly influenced by the preliminary analyses I had conducted on the data already generated in terms one and two. This process of simultaneous data generation and analysis is described further in the next section of this chapter.

Data Analysis

The data analysis in this study was an iterative process. The first stage was the preliminary analyses of the data alluded to in the previous section. The next stage involved the coding of the data before a theoretical examination of the data was undertaken using two different theories of pedagogy. The writing process was the thread that drew these different aspects of the analyses together as well as creating a product that could be critiqued and reviewed by my peers.

Preliminary analysis of the data occurred simultaneously as they were generated. This involved analysing the various forms of data that were collected in order to get a sense of how the students were thinking about the environment in the pedagogy of environmental education. I began to make summaries of the data during the second term of the data generation. This engagement with the data enhanced the ongoing data generation. Ball (1990, p. 168) describes this ongoing review of the data as

"theoretical sampling of the data" that leads the researcher to approach ensuing data collection and analysis with different intent.

At the end of the process of data generation, I had separated the data into discrete categories of student work and responses, curriculum documents and researcher's field notes and research diary. However, this made it more difficult to examine the pedagogy as a whole as was the purpose of the study. At this early stage of analysis, I could see that there were common themes appearing across all of the data and a better sense of these themes might be achieved by reading all the data as one transcript, coding for prominent themes across all sources.

The coding process I undertook conformed to Glesne and Peshkins' (1992) guidelines for coding of qualitative data. That is, I developed many provisional codes from my initial reading of the transcripts that were then refined into key categories that involved the aggregation of these initial codes (Glesne & Peshkin, 1992). These categories were tested by re-examining their validity within the complete data to prevent the reductionism that might occur when working with isolated quotes (Bowden, 2000). In the coding process I used the Nvivo computer software as an alternative to the manual cut and pasting process of coding data. I was left with sheets of printed paper roughly grouped under provisional categories that required further analysis. This thematic analysis occurred through the writing process.

The usefulness of the preliminary codes that I had established was tested when it came to giving a written account of the data. I presented two papers at conferences during this time in an attempt to explicate the warrants I had for the assertions I had

made about the data. The rigorous feedback I gained from this public airing proved very useful in sharpening the focus of the analysis. Van Maanen (1988) described this process of writing as the textualisation (after Ricoeur) that is necessary to yield the data to analysis.

The feedback that I received from my initial writing drafts led me in search of more substantive theoretical frameworks on which I could base my analysis. The identification of major categories in the data would not have been sufficient evidence to answer the research question. Explaining the relation of pedagogy and students' understanding of the environment required a solid theoretical explanation that went beyond the scope of basic coding of the data. The majority of the data that I had collected were student responses to the curriculum so I chose a theory of pedagogy, the NSW Quality Teaching Framework that was suited to the analysis of pedagogy from the perspective of student performance. This analysis involved returning to the original transcript and setting aside the initial codes I had developed. The product of the analysis using the NSW Quality Teaching Framework was a good understanding of the quality of the pedagogy that was occurring in the classroom. However, it did not allow me to see how this pedagogy related to students' understanding of the environment. This was when I turned to Bernstein's theory of the pedagogic device to conduct further analyses of the data.

Once again I returned to the primary data to examine how Bernstein's theory of the pedagogic device as well as his concepts of classification and framing might apply to the pedagogy of environmental education. The concepts of classification and framing were immediately useful in discriminating between pedagogy that was constructed

outside of the classroom and the pedagogy that was created in the classroom by the teachers and students. Benrstein's pedagogic device was instrumental in helping to provide an explanation of how students' understanding of the environment is linked to the social construction of curriculum knowledge.

The process of theoretical analysis was important as I needed to constantly return to the original data for verification and validation of my existing ideas. This process of disciplining the analysis by returning to the original data is an important aspect of all qualitative analyses regardless of the particular qualitative paradigm one is working in. The inductive/deductive process of developing categories from the data then validating these deductively through rigorous checking is at the heart of grounded theory (Strauss & Corbin, 1990). Bowden also describes the importance of examining the whole transcript when developing categories of conceptions in phenomenographic analysis (Bowden, 2000). Essentially, the process of the validation of emergent ideas and categories with the complete data is insurance against weak theorising that might result from over reduction of the data.

Measures Taken to Establish Trustworthiness of the Data

The ongoing spiral of data generation, data analysis and writing detailed above was one step I took to establish the trustworthiness of the data. The product of this process of analyses is the three data chapters that follow this chapter. Chapter four uses thick description as a measure to establish trustworthiness of the data. Thick description in ethnography is the presentation of the data alongside the contexts in which these events occurred. This description also 'states the intentions and meanings that organised the experience, and reveals the experience as a process' (Denzin, 1994, p.

505). Thick description Denzin, (1994) claims, helps to establish an ethnography's claim for verisimilitude.

Chapters five and six employ structural corroboration to establish the trustworthiness of the data. Structural corroboration is the process whereby themes in research are supported by multiple sources and forms of data (Eisner, 1979). In this study, the students' understandings of the environment presented in chapter five and six are linked to multiple sources of data. This helps to establish the case that these themes were constructed on solid evidence from within the data.

Delimitations and Limitations of This Study

The study is restricted to an exploration of the pedagogy of environmental education of one primary school classroom. It seeks to generate knowledge through a greater understanding of the role that pedagogies of environmental education might play in the development of students' understanding of the environment in the formal school curriculum. This knowledge is generated through a fine-grained study of one classroom.

This study can only stake a claim for the trustworthiness, or verisimilitude, of the research account. It makes no claim for traditional reliability, validity or generalisability as the study was not designed according to experimental or quasi experimental guidelines. As well, the study is limited to an exploration of the pedagogy of environmental education as it occurs in a classroom and not in any other educational setting.

Ethical Safeguards

I gained ethical approval from the Department of Education and Training and the University of Technology, Sydney to conduct research in schools. Both the DET and UTS seek reciprocal benefit for those involved in the research project and my assistance in the school was offered as part of this reciprocity. This offering of help in order to gain access to a school for research has been used in other ethnographic studies in schools. Researchers have acted as part-time teachers to facilitate access as well as acting as consultants on curriculum (Foster, 1996).

I sought the permission of the principal of the school as directed by DET guidelines. He was happy to grant his consent and an informed consent letter was sent to the parents of the children in the class (Appendix D).

Summary

This chapter has described the methodological design of this study and the methods used to generate the data. The data were gathered in order to address the research question: What is the relation between pedagogy and students' understanding of the environment in environmental education.

In order to address this question, I needed to examine closely the environmental education pedagogy in one classroom over three terms of a school year. The choice of this particular classroom was based on clear selction criteria. These criteria were that environmental education was being taught, I had established a relationship of professional trust with the classroom teacher and the classroom was in close proximity to the university where I was employed as a full-time lecturer.

I chose the research method of participant observation as it was the most suitable for research with younger children in a classroom. The data were generated from a variety of different sources and was manifest in diverse representation. These data were analysed by treating the multiple sources of data as one large transcript. This transcript was coded to identify prominent themes. The coding of the data was only a preliminary form of analysis. A thorough analysis of the data was conducted using two different theoretical frameworks, the NSW Quality Teaching Framework and Bernstein's theory of the pedagogic device.

The final part of the chapter outlined the delimitations, limitations and assumptions of this study before outlining the ethical safeguards that were employed in its conduct. The next part of this thesis presents the context in which the data were generated as a result of the method described here.

CHAPTER FOUR: THE CONTEXT OF THE STUDY

The community, school and classroom context of this study is described in this chapter in order to establish the context for the findings that are reported in the following three chapters. This chapter begins with a brief description of the local community before describing the Dry Creek public school that is a central part of this community. The curriculum of the school in relation to the political mandates of the Department of Education and Training is then explained so that the status of environmental education as a subject in the whole school curriculum may be explicated. Finally, the position of environmental education within the class curriculum of year six at Dry Creek is enunciated.

Dry Creek

Dry Creek Public School is located in a dormitory suburb on the outskirts of a regional town in the central west of New South Wales, Australia. Aerial photographs of the tiny rural village of Dry Creek in the 1950s that are displayed in the foyer of the school demonstrate that the bulk of the residential housing development has occurred in recent decades. Dry Creek is currently experiencing a surge in population, as families from the regional centre look for somewhere quieter and safer to raise their families. Newly built brick veneer houses occupy newly kerbed streets that adjoin older streets with dirt verges. The population of the Dry Creek area was approximately 5 000 in 2002.

There are no modern supermarkets or convenience stores in Dry Creek. However, there is a corner shop that is opposite a wind-swept oval nearby tennis courts that use a light dusting of sand spread over hard, compacted earth as a playing surface.

Outside the shop can be seen the bicycles flung on the hard ground by the young customers who frequent the store outside of school hours. I interpreted this as a sign that the parents in Dry Creek allowed their children the freedom to move independently around the suburb. Another sign of this mobility was the number of bikes and scooters that were tied up at the school's bike rack that I noticed when I rode my own bike to the school.

Dry Creek Public School

Dry Creek Public School seems to have a 'laid-back' ambience. Newish buildings intermingle with older ones and there is a magnificent vista from the back of the school. Standing in the school playground, the observer looks across brown paddocks to a line of hills that is part of the Great Dividing Range. Cows and sheep graze in paddocks alongside the school and the whole impression is of a casual timelessness. This is especially so in the heat of summer when the paddocks bake under a constant dry heat.

Dry Creek Public School is the only public building in this outlying suburb of the larger regional centre that lies over the bridge. However, its position as a central hub of the community is due more to social factors rather than its civic function. The school, in the absence of a post office or town plaza, is the meeting place for the local community. It is a sizeable meeting place as well, with 420 students enrolled in the school in 2002. The school is also the venue for community events, such as fireworks nights, the annual school fete, art shows and school concert nights. Parental involvement was also strongly evident in the classroom curriculum of Dry Creek. I observed many parents in the school during school hours on my visits to the school (Research Diary, 2002). These parents, mainly women, were helping with reading

groups in the classrooms as well as participating in one-to-one guided reading sessions with selected children. On warm, sunny mornings at Dry Creek, it was common to see parent helpers conducting guided reading sessions with individual and small groups of children seated on the playground benches. Parental help was also crucial in the Learnscapes environmental education program that is discussed further on in this chapter.

In summary, the impression I gained from my visits to the school was of Dry Creek Public School being the hub of the social activity of the Dry Creek community. This seemed to be a relationship of mutual benefit as evidence of parent help with the curriculum, particularly reading instruction, was most evident from my observations.

Overview of Curriculum at Dry Creek

Dry Creek Public School, like every other public school in the state of NSW, has to abide by the policy mandates of the NSW Department of Education and Training (DET). In 2002, the DET had a strong emphasis on the teaching of the basic skills of literacy and numeracy in K-6 schools supported by 'high stakes', standardised testing for children in years 3 and years 5. This emphasis on the basic skills was situated alongside outcomes based syllabus documents for the six key learning areas of English, Mathematics, Science and Technology, Human Society and its Environment, Creative and Practical Arts and Personal Development, Health and Physical Education. This might have resulted in a bias towards the key learning areas of English and Mathematics at Dry Creek but in reality was not the case. I will argue here that this was due to the educational philosophy of the principal as well as the experience of the teachers on staff.

The strong emphasis on literacy and numeracy in NSW in 2002 was underpinned by high stakes testing in the form of standardised literacy and numeracy tests for all children in Years 3 and Years 5 in NSW. These standardised tests, or Basic Skills Tests (BST) as they are called in NSW, sometimes have a flow-on effect on the other curricula in public schools. Schools will focus more on the teaching of the basic skills of literacy and numeracy if they are being judged by their outcomes in these areas. Dry Creek Public School was not immune to this orthodoxy of basic skills teaching and testing but its effect was tempered somewhat by the balanced educational philosophy espoused by the principal. Ern Smith (a pseudonym) believed in teaching the whole child and as a result favoured a balanced approach to the interpretation of Departmental policies that were, according to him, sometimes a manifestation of political undercurrents rather than a product of sound educational philosophy (Ern Smith, personal communication, 2002). The teaching staff favoured this approach to the implementation of departmental policy as well (Vicki Smith, personal communication, 2004). All of the 19 staff in the school were over the age of 40, with 10 of these over the age of 50 (Vicki Smith, personal communication, 2004). This amount of teaching experience meant, that in my interpretation, the staff were quite adept at meeting the statuory requirements with minimal changes to their classroom curriculum. For example, Mr Ramsay, the teacher of a year five classroom that adjoined the classroom where I conducted my research, was able to adapt his interest in educational computing with the literacy requirements of the syllabus. He did this through his class's participation in a regional i-movie competition. The students in his year five class created digital movies that were entered into the competition. The literacy requirements of the movie making process were quite rigorous with the

students constructing storyboards and engaging with the meta-language of visual literacy when outlining the technical aspects of each storyboard (Loughland, research diary, 2002). Another experienced teacher on year one was able to incorporate her love of botany into the curriculum by including gardening in her science and technology lessons. The direct experiences in the garden provided the students with the stimulus to write reports and explanations that fulfilled some of the literacy requirements of their stage (Loughland, research diary, 2000).

In summary, the statewide focus on literacy and numeracy was evident in the curriculum of Dry Creek Public School. However, this focus was situated within the context of a school ethos that valued the development of the whole child. As well, the experienced classroom teachers at the school were adept at adapting to the demands of the latest syllabus requirements whilst retaining the particular idiosyncracies of their classroom practice.

Environmental Education at Dry Creek

Environmental education at Dry Creek public school was characterised by the involvement of the whole school community in projects initiated by the environmental education committee at the school. The committee was a loosely comprised body of between three and six teachers that met periodically to discuss environmental education initiatives in the school. Vicki Smith was an active member of this committee. In 2002, the committee encouraged whole school involvement in environmental education under the auspices of the Learnscapes project. Learnscapes was both a product of a new environmental education policy statement released by the NSW DET and funding provided by the NSW Environment Protection Authority

(NSW EPA). The outcomes of the Learnscape project were manifest to this observer by the appearance of many new, freshly mulched gardens in the school grounds.

Environmental education does not have the status of the six key learning areas, such as Mathematics and English, in the NSW Board of Studies K-6 curriculum. Instead, environmental education is embedded within, and contextualised by, the Science and Technology (NSW Board of Studies, 1993) and the Human Society and its Environment K-6 (NSW Board of Studies, 1998) syllabus documents. These outcomes are supported by an overarching policy for environmental education for schools (NSW Department of Education and Training, 2001).

The NSW Department of Education and Training's environmental education policy statement of 2001 emphasised the importance of caring for the school environment by establishing the school as a working model of sustainability. The Learnscapes philosophy that underpins the policy positions environmental education more broadly than previous policies that focused on just classroom curriculum (NSW Department of Education and Training, 2001). Dry Creek public school incorporated this policy in a project to develop the school's grounds as a working model of ecological sustainability. This project was funded by a small grant from the NSW Environment Protection Authority. With the region in the grip of a drought, the school decided to use the initial funding to mulch the existing gardens to reduce water use in the school. The next phase of the project involved the construction of a 'Heritage Garden' at the entrance to the school to commemorate the history (mostly European) of the Dry Creek region. The garden was neatly fenced off and was designed as a place of quiet refuge for children away from the turmoil of the busy playground. Some of the

kindergarten children took to the refuge immediately, with one child famously calling it the ‘hairy chicken garden’! Both the mulching of the gardens and the construction of the Heritage garden involved community cooperation in the form of volunteer labour. This cooperation is an integral part of the community collaboration that is one of the key aims of the Learnscapes philosophy.

The next phase of the Learnscapes program in Dry Creek was to be a junk sculpture display installed in one of the newly mulched gardens. The construction of the junk sculptures by students in Vicki’s class is one aspect of the pedagogy of environmental education that is described in chapter five.

Observing the outcomes of the Learnscapes project, it seemed to me that the school had a clear focus on environmental education projects that produced something tangible that was of benefit to the school. Student involvement in these projects was seen as a good way to get them involved in a practical way with the environment (personal communication, School Principal, May 7, 2003). Using Lucas’s (1979) typology of environmental education introduced in chapter two of this thesis, it might be argued that the environment education that I observed at Dry Creek had a clear bias towards education in the environment rather than education about or for the environment. However, this observation might have been influenced by the fact that the outcomes of the Learnscape project were so visible in the form of new and freshly mulched gardens. The next section of this chapter describes the year six class where I endeavoured to find out more about the environmental education that was happening inside of classrooms at Dry Creek Public School.

Year Six at Dry Creek Public School

There were 28 children in Vicki Smith's year six class at Dry Creek Public School in 2002, 15 of whom were girls and 13 of whom were boys. As previously mentioned in chapter three, the choice of Vicki's class for my sustained study of environmental education was based on three factors. One, it was purposive sampling of a classroom where I knew some environmental education would be taught. Two, there existed a bond of professional trust between Vicki and myself and, finally, the school was in close proximity to the university where I was employed as a full-time lecturer. The following part of the chapter will examine the environmental education curriculum of Vicki's class that was captured by the purposive sampling. This examination will outline Vicki's teaching biography before moving on to look at the types of environmental education curricula that she routinely taught in her classroom.

Vicki was one of the experienced staff members of the school alluded to earlier in this chapter. Vicki had 20 years classroom teaching experience punctuated only by the birth and care of her two children and two stints acting in external roles. The external roles were as acting Human Society and its Environment (HSIE) district consultant for the DET as well as a two-year secondment to the teacher education faculty where I was employed at the time. Vicki was recognised by her employer as an expert in the area of K-6 HSIE teaching and was called upon to represent the district in special events and conferences in the state's capital. This recognition lead to the identification of Vicki as an excellent candidate for secondment to the teacher education faculty where her efforts were rewarded with many offers for permanent employement that she, unfortunately for the university, declined. This brief biography demonstrates that I was working in a classroom where there was a teacher with expertise and interest in

the area of environmental education. This purposive sampling also had an ethical component as it meant that my research would not disadvantage the students by distracting them from their usual program of study. Instead, my participant observation in Vicki's class was designed to enhance and complement the environmental education that Vicki taught as part of her regular classroom curriculum.

2002 was Vicki's first year back on classroom teaching after a two-year secondment at the university. Vicki was able to resume her position teaching on year six. This suited Vicki as she had many programs for year six students that she had developed over many years. A strong aspect of some of these programs was their emphasis on environmental education. Vicki was an enthusiastic user of environmental education programs developed by external agencies. In this vein, she had taught *Streamwatch* units that had been developed by the Department of Land and Water Conservation (DLWC) as well as another iniative, *Murder Under The Microscope,* that was a product of a collaboration between the DLWC and OTEN, the media development unit of the NSW Department of Education and Training. Vicki explained to me that she liked to use the two programs in the same term so that the children had an intensive study of environmental education in that term (Vicki Smith, personal communication, 2002). This fitted in well with the school's curriculum scope and sequence plan that allocated a term in year six for the teaching of an integrated unit on the environment. So Vicki's programming of environmental education reflected the kind of pragmatic scheduling that I have argued was a characteristic of the experienced staff at Dry Creek public school.

My research project could be subsumed into Vicki's environmental education curriculum because my philosophical inquiry lessons complemented the programs that Vicki had planned for them. In 2002, Vicki decided to leave the Streamwatch program out of her intensive unit of environmental education and, instead, extend the unit into the next term with a focus on junk sculpture. The junk sculpture activity was designed to be part of the

Learnscapes project at the school as the sculptures were to decorate the newly constructed gardens. The philosophical inquiry lessons that I designed and taught were added to the environmental education unit that involved the Murder Under The Microscope program in term two.

Conclusion

The community, school and classroom context in which the data for this research study were gathered has been described in this chapter. This description has included the influence of departmental policy mandates on the curriculum of the school and the teacher's pragmatic response to these. Next, the environmental education curriculum of the whole school as expressed in the Learnscapes project being conducted at the time was examined. Finally, the classroom context for the generation of the fine-grained data that is reported in the following chapter was depicted. An integral aspect of this classroom was Vicki's interest and expertise in environmental education. This meant that the purposive sampling that I employed in my research design meant that the research could be prosecuted with minimal disruption to the children's regular program of study.

CHAPTER FIVE: AN ACCOUNT OF THE PEDAGOGY OF ENVIRONMENTAL EDUCATION

The first part of this thesis has presented the justification for the study of environmental education pedagogy in year six at Dry Creek. Chapter One looked at the foundation of environmental education in a context of global concern for the state of the environment. It surveyed the research base in environmental education before outlining my own specific research pathway to this study. Chapter Two examined what is already known about the pedagogy of environmental education. This examination included two different theories of pedagogy and four different paradigms of environmental education research and practice. The literature pertaining to the objectification of the environment was also presented in this chapter. Chapter three presented the methodological design of the study, outlining each method of data generation and data analysis employed. Chapter four presented the school and classroom context of the study.

This chapter is the first of three data chapters in this thesis. All of these chapters focus on the pedagogy of environmental education in year six at Dry Creek. The first of these, Chapter Five, describes the pedagogy of environmental education that was observed using thick description. The purpose of this chapter is to establish the verisimilitude of the research account as well as to locate the study in its ethnographic context. The second data chapter, Chapter Five, uses Bernstein's notion of classification and framing to examine students' understanding of the environment in the pedagogy of environmental education. The final data chapter, Chapter Six, offers

an analysis of the pedagogy of environmental education using the NSW Quality Teaching Framework.

This chapter provides a thick description of the pedagogy of environmental education in the year six classroom at Dry Creek public school in 2002. In term two, the most intensive term for data generation, the three different aspects of environmental education pedagogy are reported separately although two of the activities occurred simultaneously.
. I have ordered the description chronologically, beginning with Term One.

Term One

In term 1, 2002, I began visiting Vicki's year six classroom (children aged 11-13) on Fridays to assist with computer instruction. Friday is sports day at Dry Creek. In terms One and Four, Dry Creek schedules sport in the morning session to avoid the heat of the early afternoon. Sport is scheduled for the afternoon in the two other cooler terms. This has implications for the data collected as some of the children were waiting in excited anticipation for the afternoon's events or tired from their morning's exertions. So Friday was not a regular day in the school week by any means. Following on from this, the children in this class may have seen my participation in their classroom as a special rather than regular routine in their academic week.

The first afternoon I spent in the classroom was a little daunting for me. I had been in many different classrooms both as a teacher and teacher educator so I should have been extremely confident. However, this time I was confused of what role I should take. I thought that if I adopted the teacher role I might have alienated the children from the start and they would have been reluctant to interact with me throughout the

rest of the year. Alternatively, if I tried to be their friend I could have been regarded as a fake in their eyes. There is only one role I was certain I could not play in this classroom, that of the invisible observer. This study was clearly framed as a participant observation and not a 'fly on the wall' ethnography. In the end, I decided to adopt a wait and see approach.

The first afternoon, in February 2002, was a typical hot and dry summer's day in Dry Creek. As it was a Friday, the children had participated in their inter-school sports in the morning. In this part of the world, sport is scheduled in the morning session in summer to avoid the oppressive heat of midday and early afternoon. So the children were tired from their morning's exertions and subsequent lunchtime games by the time I arrived in the afternoon session. I was introduced by Vicki as a teacher from the university and a computer expert. I think the computer word evinced more reaction from the children than either university or teacher. After Vicki had settled the children down and explained the afternoon's academic fare she allocated the four classroom computers to four pairs of children. As mentioned previously, the plan was for me to help the children effectively search for information on the World Wide Web.

Vicki's classroom was one of the newer, ten-year old buildings, at Dry Creek Public School and the architects had thoughtfully designed a little alcove at the front of the classroom for computers. In this alcove were three Apple i-Mac computers set up on a common bench. Another i-Mac was located on the teacher's desk that Vicki allowed the children to use. On the wall behind the alcove bench were various notices, varying from computer tips to posters advertising the latest school website competition.

Scattered all over the bench were the detritus of the previous week's (or term's) activities. This included draft writing assignments on crumpled pieces of paper, numerous pens and pencils and discarded workbooks.

The comfortably dishevelled state of the computer alcove was emblematic of the relaxed, learner-centred ambience of Vicki's classrooms. Other corners of the room seemed to suggest a degree of student ownership of this classroom. Benches were covered with construction activities in varying stages of completion. Student posters adorned the ample display space in the classroom. Once again, the impression the casual observer would get might be one of a general disorganisation. To me as an educator with a similar philosophy to Vicki, it was redolent of the essential chaos of student learning.

On this first afternoon, Vicki had assigned, among the eight children under my tutelage, six of the more robust boys in the class. My role ambivalence of teacher/friend was quickly clarified for me as I had to manage these six boys working shoulder to shoulder in front of three computers in a confined space. Compounding the problem of a lack of space was the slow connection speed of the computer network. Many early innovations in pedagogy using the World Wide Web have founded on the slowness of the school's network. As an experienced computer teacher I was aware of this problem and attempted to ameliorate it a little by directing the students to search different sites at the same time to avoid a logjam. However, this did not seem to help much and we were left with six boys with a little too much idle time on their hands. Jason, one of the more active boys, spent this waiting time swinging his legs under the computer bench. Whether by accident or design, Jason flicked the

power point switch to off. As all the computers were connected to this power point via a power board they were all cut off simultaneously. This caused more than a little frustration for all the children as it had taken them so long to access their required sites. Acting as a teacher now, I had to remove Jason from the computer activity and try to restore calm in the computer alcove. However, one of the computers refused to restart so I had to remove one of the other boys as well as he had nowhere to work. After this hot, stressful session I was thankful to hear the afternoon bell go so I could get some respite. As a result of the behaviour management I had to do, this first session clearly positioned me as a teacher in the eyes of the year six classroom at Dry Creek.

That night as I wrote in my research journal, I reflected on what it actually meant to be a teacher and researcher in Vicki's class at Dry Creek. I realised that I had some unhelpful binaries in my conceptions of classroom research. To be a teacher, especially in Vicki's classroom, was not necessarily going to mean that I had to act as an authoritarian tyrant. Vicki gained the respect of the children through showing them respect. As this was my modus operandi as well, it would not be difficult for me to be seen in the same light. The role of teacher and researcher also focused my attention on the explicit role of the researcher in the generation of the data in the study. As a teacher in this story, I had to clearly show my role in the generation of the data in a way that might not be as apparent if I remained just the observer. Finally, ethically I could not be in a classroom without being a participant. As a teacher educator, I am often awkwardly cast as the silent supervisor of student teachers, furtively scribbling down notes in the back of classroom. This position is untenable to me if I see a child requiring assistance with their learning. As an experienced classroom teacher it was

almost a reflex action on my part to offer help where needed. It was important to me to reconcile this need to take action with my role as researcher in this classroom at such an early stage.

The ensuing small group lessons given the following weeks were moderately successful depending on how much previous experiences students had in searching the web. When the students had completed their assignment on a foreign country, I mentioned to Vicki that I knew of a useful follow-up unit that would consolidate some of the concepts in geography that the children had learnt. The unit was called *Creative Countries.* I had first heard about Creative Countries at a Gifted and Talented education conference I had attended when I was a primary school teacher in 1995. In this unit the students create a fictitious country, replete with topography, currency, religion, government and customs. I also suggested to Vicki that the assessment product for the unit could be a website, with each heading automatically becoming a separate page on the site. As a busy teacher, she readily agreed to my proposal. My role in the pedagogy of the unit was to help the students design and create their website from information they had compiled during other lessons held during the week. I had no actual input into the scaffolding of their development of material for the site. However, in my role as web consultant I often suggested editorial changes to the content of the pages.

As with most other primary aged students that I had helped to learn the basics of web design, the children of the class spent some time playing with the new design tools at their disposal. I believe playing with the materials is an important phase of learning, so I allowed the students in the first lesson to experiment with the design layout of the

site, import pictures and practise making (and breaking) hyperlinks. The next lessons were spent actually putting the content on the pages of the website. Some of the students had typed their initial notes so it was just a case of cutting and pasting from Word across to Netscape Composer. Other students had to laboriously type their text from notes scribbled on loose pieces of paper that would eventually became a part of the detritus in the computer corner. The actual rendering of the text onto the site and the subsequent editing and proofreading took the glamour out of web design for some of the students in this class.

Despite the grind of proofreading and editing in the final stages, I enjoyed teaching web design to children as it gave them an 'ooh-aaah' moment when they mastered the skill of creating hyperlinks. I begun by having the children set up a skeleton framework for their web sites. In this activity, they created pages for each aspect of their country, geography, currency, emblems etc. Then the students made a front page for the website using the list of headings to create an index of hyperlinks on their front page. The final step was to create hyperlinks to link the front page to the rest of the site. Rebecca was one student who quickly learnt the technique of hypertext. After a quick demonstration, she was able to complete all of the hyperlinks on her own. I then urged Rebecca to work on filling up all her empty pages with the draft text that she had written in previous lessons. However, it was obvious that my conception of a website was very different to Rebecca's. Rebecca wanted to spend time refining the design of her website. This included making internal links between pages and importing images from the WWW to use on her site. The result was a highly colourful website, with contrasting colours on every page and vivid images of tropical paradises placed throughout the site. This was supported by text: "Yentruoc is located in the

North Pacific Ocean. It is a member of the Hawaiian Islands. This is a wonderful place, there are six states to visit and many attractions to see" (Rebecca, 3.05.02, creative countries website).

Rebecca's website demonstrates the importance of visual expression for her as well as her understanding of the communicative medium of a webpage. Her website design set out to impress and entice the reader with a visual cornucopia. This contrasted strongly with my idea of the website as a vehicle for the communication of scholarly information.

The marketing genre employed by Rebecca reminded me of my own teaching experience with the *Creative Countries* unit in 1995. The year five class I had then did not have the digital medium but they still produced posters and displays that marketed their countries rather than giving the in-depth information that I wanted them to do. At the time, I put this phenomenon down to the pervasive influence of consumerist culture with its emphasis on selling and products. The students may have also been avoiding the hard work of research in favour of the more attractive activity of designing posters and presentations. In this study, I was interested in how the environment was represented as a commodity by the students: "Rakinda Island is a great and wonderful place in the world and attracts over 100,000 tourists per year. So come along and enjoy our excellent range of hotels and flora and fauna" (Casey, 3.05.02, creative countries website).

As a task that set out to describe in detail the geographical features of a mythical country, I was surprised by the marketing tone employed by the students. The

mythical aspect was taken up by the students in the prevalence of South Sea tropical islands in the countries that they created. The South Sea tropical idyll myth is as old as the history of European sea exploration but it seemed to be still strong in this classroom. I wondered why students did not present arid, pastoral countries like their homeland or a land of exciting and vibrant post-industrial cities. The latter scenario is well covered in the electronic media that children of this age consume. Yet the children opted for the tropical paradise:

> Gluklich Terre is situated in the South Pacific Ocean. Its neighbours are Fiji, Samoa, New Zealand and South America. The name Gluklich Terre stands for happy (in German) and land (in French) (Sharon, 3.05.02, creative countries website)

and,

> Ralaka was first discovered in 1498. Bond Ralak was sailing the Pacific Ocean when caught in a storm and was shipwrecked on the shores of Ralaka. Bond and his crew built villages from our lovely tree trunks. They found food from the trees in the forest and fixed the ships hole in the bottom (Bess, 3.05.02, creative countries website).

I wondered at the time if the islands as a country were an easier 'sell' than the realities of a complex post industrial society. Imagine anyone trying to briefly describe the culture and customs of New York or Sydney using the tools of modernist geography.

Term Two

Environmental education was a major focus in Vicki's class in Term Two of 2002. Vicki had planned to use the Murder Under the Microscope webquest as the central feature of an integrated environmental education unit. I suggested to Vicki that I teach

a series of philosophical inquiry lessons on environmental education as a part of this integrated unit. I must admit that Vicki did not take readily to the idea, as it seemed a little academic and abstract to want to engage children of this age in philosophical discussions. I think it was only the credit that I had built up with the Creative Countries unit that secured her approval. Vicki was also attracted by my intended use of children's literature and Leunig cartoons that seemed to add educational credibility to the exercise. I taught these lessons on Friday mornings immediately after Vicki had completed all of the morning administrative tasks. After I had completed my lessons, the students would then continue with the activities of the MUTM webquest where I would act as a participant observer. After the MUTM webquest and the philosophical inquiry lessons had finished by week eight of Term Two, I created a Macquarie River webquest for the students to work on. In this section, I first describe the philosophical inquiry lessons. Second, I examine the educational experiences afforded by the MUTM webquest, followed by a brief description of the students' interactions with my own webquest.

Philosophical Inquiry

I approached the first philosophical inquiry lesson with some trepidation. The weather seemed to amplify my mood of apprehension. It was a cold, foggy and frosty Friday morning in May. As it was now second term and sport was scheduled for the afternoon, I had changed my visit time to the morning session. The children at the morning assembly, held in the external quadrangle, wore beanies and buried their hands deep into their pockets whilst the principal conducted a brief session pertaining to the arrangements for Friday afternoon sport. Vicki and I then walked the short distance to her classroom with her class. The six boys who I had taught on my first afternoon in term one made the short journey into an opportunity for cheerful jostling

and general ‘tomfoolery’. There was always an extra degree of excitement in the air on sports day, especially for those year six boys who preferred sports to academic pursuits. Vicki, in her calm and relaxed style, soon had the boys join the rest of the class inside.

I had already set up the classroom so that there was a circle of chairs in the middle of the room. Vicki had the children sit in these chairs and then turned the class over to me. Vicki joined us in the circle as an active participant; however, it was clear that she wanted me to take the role of teacher. The children already knew that these lessons had something to do with the environment as this had been included in the parental consent letter. I was alert to the possibility that the children might frame their responses in a pro-environmental way because of this knowledge.

The first lesson used Leunig’s famous cartoon of an adult and child watching a sunrise on TV whilst in the background, framed by the window, there is the identical sunrise outside (see Appendix E). The Leunig cartoon was used as a discussion starter. As this was the first philosophical inquiry lesson, I spent two minutes explaining the rules for the lesson. This included respecting each other’s viewpoint, no right or wrong answers, and students asking questions not the teacher. I gave each child a copy of the cartoon that had been photocopied onto an A4 page and asked them “to think about what sort of questions come to your head when you see that cartoon” (Tony, 10.05.02, philosophical inquiry introduction). The first question was “why don’t they have any clothes on” from one of the more cheeky boys in the class. This could have been a serious question alluding to Leunig’s use of nudity to emphasise the innocence and naivety of his characters but at the time I didn’t

recognise it as such. However, I did not reject any of the other materialist questions outright. After five minutes, the class came up with a list of questions for a discussion. The questions were:

- Why is the same picture outside as on the TV?
- Why are they watching TV instead of being outside?
- Why is there no furniture?
- Why is the adult pointing at the TV?
- Why have a TV and nothing else?
- How come there are only two people?

The discussion that ensued was very interesting. I was fearful that the students would not respond to this type of lesson but they took to it with some gusto. I did my best to maintain order among this enthusiastic cacophony:

> now just stop there for a minute, if we are having a classroom discussion, then we all need to listen to what each other is saying, alright, if there are heaps of voices I won't be able to make out who is saying what on the tape (Tony, lesson transcript, May 10 2004).

At first the students wanted to discuss the fact that the room in the cartoon was bare except for the TV. Different explanations occurred for this lack of furniture, "it shows that they're environmentally friendly and they don't buy lots of furniture" (student, 10.05.02, class discussion).

This response made me think that the student was trying to adopt the pro-environmental line that they thought I wanted; however, it did suggest to me that the student understood the link between over consumption and resource depletion. Other

responses were a little more surprising to me, “because they might only want a television because all you really need is TV because you sleep on the floor and you watch the news and it tells you everything that is happening” (student, 10.05.02, class discussion).

Television seems to be important beyond being a medium of information for these children. Television seems to be offered as a source of authority here:

> Student (S): maybe this happened fifty years ago or summat and it’s happening now
>
> TL: what makes you say that happened fifty years ago?
>
> S: I dunno, the sun rises in a certain place at a certain time
>
> TL: then why are they watching it on TV?
>
> S: no, they were just talking about the one before and then it’s showing the one now
>
> S: maybe they”re trying to see the difference between what it looked like on the outside and what it looked like on TV
>
> TL: What’s the difference?
>
> S: I dunno, maybe there isn’t a difference; they are just trying to find out (student, 10.05.02, class discussion).

This deference to the mediated version of the sunrise on the television is explained a little in the following discussion:

> S: I reckon the environment is better because it is the same thing on the TV but the environment has more colours and it saves money looking outside than watching it on TV

> S: man-made is better because you can get more angles on the sunrise (student, 10.5.02, class discussion).

One student was even prepared to make a case for the window pane to be an alternate television, “well I was thinking you know how the window has things running down it like that and things across that could be like a TV coming down” (student, 10.5.02, class discussion). As the teacher-researcher, I remember feeling very frustrated at the outcome of the discussion because I was anxious that the lessons generate the correct data. I wrote in my research diary that night, “Leunig got a lot of materialist responses, eg. why is there only one window and no furniture. There was not a lot of response to the theme of the cartoon itself” (Tony, research diary, 10.05.02). In fact only one student referred to the theme in the discussion: “Maybe the artist is trying to make us argue about inside/outside” (student, class discussion, 10.05.02). In reflection, my anxiety about the research process led me to construct a strong framing around the philosophical inquiry pedagogy that was not warranted.

Listening to the transcript of the first lesson that night I was struck by the importance the students placed on the role and importance of the television in the mediation of the environment in the Leunig cartoon. To this generation, the television seems to be an all powerful, omnipresent influence. One student thought the cartoon was depicting a breaking news story: “and they have seen on the news like this axe murderer is coming over the hills and it’s on the TV and they are watching the actual reality” (student, 10.05.02).

The other philosophical inquiry lessons used children's literature as stimulus for discussion. In a similar manner to the way the cartoon was used, I read the chosen book aloud, and children then thought of questions that the reading of the text provoked for them. The open-ended questions then served as a framework for an open class discussion with the students sitting in a circle facing each other. Again, it was my role to act as discussion coach without giving any direction on the subject matter itself (Cam, 1995). In this way I used John Marsden's *The Rabbits* (1998), a picture book for older children that uses the metaphor of the rabbit to represent the white human invasion of Australia. The illustrations clearly depict rabbits; rabbits with guns and rabbits poisoning waterholes, so that the reader must understand the metaphor to understand the theme. The main theme of the text is the history of black-white relations in Australia, however, as land is central to that struggle it was used here in the context of environmental education. I liked the text because it did not present as an overtly pro-environment text, like some examples of children's literature, but instead presented the issues in a more challenging and complex manner. The discussion of *The Rabbits* took place over two lessons. In the first lesson I read the book aloud and the children were asked to generate questions that would be suitable for a class discussion. At first the questions focused on a literal understanding of the metaphor, "How can a rabbit hold a gun?" (student, 17.05.02, class discussion), before the following exchange took place:

> Student: Is it possibly that its like calling it *the Rabbits*, like are they really naming it after like white people because white people stole the children from the Aborigines and rabbits are also, um, not native.
>
> Tony L (TL): Mmm. Anyone want to build on that response from Belinda, isn't it?

Vicki: Yes

TL: Let's pursue that line of Belinda's. Belinda's saying…yes…Cameron

S: Um, there was like Aboriginals here and they were like a different colour and the majority of the people were white people and then like we spread and so did the rabbits so the people are the rabbits (Discussion, 17.05.02).

A little further on in the discussion, after I had pointed out to the children that using reasons and criteria for judgments was a valid method of philosophical inquiry, the following excerpt occurred that seemed to signal that we were moving beyond the literal interpretation of the metaphor:

Student (S):It is like they are dangerous to crops and dangerous to native Australian things, that they are a dangerous Australian thing too.

Tony L (TL): So your reasons are that rabbits are a destructive thing like humans.

S: Yeah.

TL: So Marsden might call the book *Rabbits* because…

S: They're like us (17.05.02, class discussion)

The now universal understanding of the metaphor made for more in-depth questions about the text. The rest of the first lesson was spent classifying these questions into common themes and combining them into larger questions where necessary.

The lesson the following week began by discussing the question 'Why does Marsden use the rabbit as a metaphor?' Three students presented three different arguments. The first focused on destruction of the environment: "I think um the rabbits are like are

people because like we cut down trees and wreck the environment and um rabbits are the same because they like eat farmer's crops and grass and stuff" (student, 24.05.02, class discussion). The next explanation focused on contagions: "because they're both white and like rabbits are kind of like contagious and so are we because like we keep on spreading around everywhere and stuff" (student, 24.05.02, class discussion). The third response related to invasion: "He could of used it because they're sort of like white people because they invade and everything" (student, 24.05.02, class discussion).

One student was able to explain the white colonisation of Australia by thinking through the same question:

> oh yeah their population just keeps getting bigger and bigger and not smaller and smaller… most animals they just stay like kind of the same and live in the same area that they were born in whereas rabbits just keep moving and moving (student, 24.05.02, class discussion).

This student's description of an ever-expanding European population invading the world is a key idea in ecological philosophy (Schumacher, 1973).

'Why did the rabbits take over?' was another discussion question in this lesson. When the question was first framed in class, it is not clear whether the student meant the literal or metaphorical meaning of the rabbits. However, as this question followed on from a 'Why rabbits?' question the metaphorical meaning may have been clear to all students. This question prompted some students to defend the actions of the invading rabbits (Europeans): "um, going off Megan's point, we didn't come and steal the black people's land but we did need more and it was there and such like we

needed the land more than they did" (student, 24.05.02, class discussion). This response was supported by another student: "maybe we needed the land more than the Aborigines do because we have more population and we needed more room to live than them because they didn't have nearly so many Aborigines" (student, 24.05.02, class discussion). Another student could not agree with these statements: "I don't reckon that's right because everybody has the right to have something they want and its not like, oh, we need this more than you because we have more people than you. That's just not fair" (student, 24.05.02, class discussion).

The first two responses seem to reveal a weight-of-numbers argument as an explanation for European colonisation of the Australian environment. However, they also imply that the European settlers wanted and needed the land more than the indigenous people. Some students explored possible justifications for the invasion: "well they just, we probably just treated them like animals and sort of, thought oh well they don't really use the land so why don't we take it and use it" (student, 24.05.02, class discussion). Another justification was presented in the discussion: "that is probably why they might of invaded them because they just thought oh yeah we're more important than you so we probably need the land more. You don't matter" (student, 24.05.02, class discussion). The last response reveals an awareness on the student's part that European colonisation of this country was based on racism, indicated by the words "you don't matter". This was also hinted at by another student, "It's like chess, white goes first and black goes last and things'(student, 24.05.02, class discussion).

One student seemed to take offence to the tone of this debate, attacking what John Howard, Australian Prime Minister, once infamously called the black armband view of Australian history:

> The Aboriginals are still whingeing now about like how a hundred million years ago and how he parked his boat in the sea and came over and started shooting them all and they're still whingeing about all these land rights and that oh youse did this to us that long ago and that's like 100 years ago and they're still whingeing about it. (student, 24.05.02, class discussion)

Marsden makes the connection between racism and exploitation of the environment quite strongly through the use of the rabbit metaphor. Students in this context could identify European arrogance towards the environment as well as towards the indigenous people: "Like what Zoe said about like humans can stay in any climate really and humans can also wipe out, like if there's something like a snake or something…that they think is going to harm them then they will probably kill it" (student, 24.05.02, class discussion). One student linked the idea of cultural arrogance to technology: "It is like it said in the story, it said no fence, no hill or no river could stop them. Because we have all this technology that we can get over those sorts of things and keep going" (student, 24.05.02, class discussion).

I believe the narrative strength of the text provoked the thoughtful responses of the students in this lesson. The discussion did seem to demonstrate that the students were required to consider different points of view and offer a deep response: "Maybe the white people shouldn't be here at all, maybe we should be in America or somewhere. Maybe this isn't our world" (student, 24.05.02, class discussion).

To me, *Rabbits* produced the type of philosophical inquiry I had been hoping would occur in this class. This lesson seemed to bring out the ontology of their thinking because the text and discussion demanded reasons behind their thoughts. This is similar to the manner an interviewer might probe a subject to get a deeper response. The best indication I had that the discussion was authentic was the differing viewpoints held by the students. I felt confident that the children were speaking their minds rather than offering responses that the lesson on 'the environment' required.

In the next philosophical inquiry lesson, I used a text that was an old favourite of mine. *The Lorax*, a Dr Seuss picture book, conveys a subtle pro-environment message as it explores the relationship between material progress and environmental degradation. The *Lorax* itself is the voice of the environment in the text that opposes the environmental destruction being wrought by the business activities of the *Onceler*. The Dr Seuss comic illustrations and the rhyming cadence of the text act to disarm the reader into believing that this is a 'fun' story. The humour, however, masks a serious pro-environmental message. Unlike some other pro-environment texts for children that tend to proselytise, this book from the early 1970s sets up some interesting moral dilemmas for the reader. The Onceler wants to get rich and provide jobs for his family, a powerful cultural meme that students aspire to. On the other hand, this wealth comes about at the expense of the natural environment. It is the economy-versus-environment debate presented in a narrative. Despite the subtler pro-environmental message in *The Lorax*, the children's responses seemed to indicate that they detected it: "it might have been like the thing we were doing with murder under the microscope 'cause they ripped down all the trees like the water table comes up

and everything and it goes all brown and dirt gets in" (student, 31.5.02 class discussion).

This comment also reveals a degree of intertextuality occurring between the different environmental education contexts. Although the student was making only factual connections in this instance, it showed that they were making connections between different lessons. Another student could identify the author's purpose: "well maybe the author wanted to get the idea through that if you cut down the air and pollute, cut down the trees and pollute the air that um its goin' to look like that eventually. He just wanted to get the point through" (student, 31.5.02 class discussion).

The author of *The Lorax* asks the reader to consider the economy-versus-environment question. The narrative of the children's text seemed to allow the students the thinking space to consider this question. A clear indication of this was the deviation from the pro-environmental line: "you need trees to build houses to put clothes in to live, so you need trees, if you didn't have trees you wouldn't have a house. Not unless you want to make it out of heaps and heaps of concrete instead" (student, discussion, 31/05/02).

The issues of progress and development were central to the following debate:

> S: Maybe he's too concerned about his business so he couldn't care less about what was happening to the environment.
>
> TL: Perhaps, Rachel.

S: Um, he probably wasn't very rich and he got a business and like Tyler said he was really worried about it so he didn't care about the environment.

TL: Yeah, keep going, sorry, Seb.

S: I think he might have noticed it because like because he's in his room up when he's telling the story he might have just been too busy being inside and never even going outside so he didn't notice.

TL: Hmm. That could be quite possible. Anyone, you've got your hand up, okay your turn, Zoë.

S: Well he didn't notice what was happening to the weather because he was too wrapped up in cutting down the trees and making the thneeds. So he doesn't really care about the weather he just wants to get his business up and running.

TL: Thank-you Zoë. And Amber, last word on this question.

S: Maybe he did notice what was happening because, like he wanted, he needed money badly so he just thought oh I'm not hurting anyone until the that the Lorax comes but he needed money so he just kept on going and chopping down the trees and wrecking the environment (Discussion, 31.05.02).

While the children were not prepared to exonerate the Onceler on the grounds of ignorance, their discussion revealed that they were prepared to go beyond the simple binaries of economy-or-the- environment in their thinking. The discussion in this lesson then moved on to the notion of machines acting as accomplices in the destruction of the trees and the pollution of the pond:

> And he just built some machines and chucked them outside to chop the trees down and got his donkey or whatever and went and picked the trees up. It's not like the machines can come out and say oh the fish are sort of dying mate so you better go and clean the pond out (student, Discussion, 31.05.02).

The idea of needs versus wants is an important problematic in environmental education. One student chose to interrogate the 'he did it for the money' concept by saying: "Um, he said that he needs money, it doesn't say anything in the book that he actually needed money so we don't know if he was rich already" (student, discussion, 31.05.04). Amidst the polarity of the environment-versus-economy debate, one student could identify a middle ground:

> But wouldn't it be more sensible to not just go and cut all these trees down and make all these things, why couldn't he wait for more trees to grow, he didn't have to have such a big business. He would have been making more money anyway out of the little ones. He could have saved the trees and let the trees regrow (student, discussion, 31.05.04).

Murder Under the Microscope

The Murder Under the Microscope (MUTM) program was another part of the environmental education curriculum during Term Two. The students in the MUTM multi-media online webquest act as detectives to solve a fictional environmental crime. The program has the children identify the crime site, environmental issue, villains and victims in a fictional crime site which is a water catchment area.

MUTM, however, is more than just dry environmental science presented in the guise of a game. The use of narrative is a crucial element of the game. The scenario in

2002, entitled *Rumble on the River,* had Marina Tornados as the rapacious developer, Harry Cruse the eco-tourism operator, farmer Natasha Von Squatta-Smith, and the unlikely hero, chef Winston No Wei. The simple punning humour of the names and the ICT quest environment, with its gaming-type interface, appeals to the students. The actual desk top interface resembles the flight deck of an aeroplane, with buttons on the instrument panels acting as portals to information required by the students (see Appendix F). Codes and passwords are required to access some of the restricted areas of the site. Only school groups that have paid their registration receive an access code. The online webquest is supported by four broadcast updates on SBS television. The online webquest could stand alone without the broadcasts but they are retained due to the lack of reliable broadband access for schools in some areas of Australia.

The narrative element of MUTM is only one part of its resemblance to a computer game. It also has levels of increasing difficulty similar to that of a computer game. At the first level, students work through a series of possible crime sites, villains, victims and issues in an effort to identify the correct site. The MUTM game begins with a reporting of the environmental crime. The report is anonymous and couched in very broad terms. The detectives are then given a list of possible crime sites to search. This search is done with the benefit of the information given by the SBS broadcast and through clues posted on the MUTM website. This information assists the students to eliminate sites that could not possibly be host to the crime. For example, water quality analysis data in 2002 gave the water temperature as 15 degrees Celsius. This ruled out sites located in tropical Australia. Subsequent postings of climate and rainfall data also assisted in this process. The conglomeration of the various clues led students in this class to narrow their investigations down to three possible crime sites in the

Murray-Darling Basin. As these students lived on a river that is part of the Murray-Darling system, the location of the 2002 quest added special relevance to this learning activity. This was enhanced by the issues under investigation, water flow and consumption that were very relevant given that the school was in a region suffering a punishing drought.

This process of the logical elimination of superfluous clues, although akin to a gaming device, is also a clever teaching ploy. The number of possible crime sites was such that students needed to work in small groups to investigate every possible location. This investigation involved research into the characteristics of each catchment area. I assisted the students in their research of the various catchment areas. As they had only basic clues to work on this proved to be a difficult task. Students were more accustomed to doing a Google search on a specific topic rather than first piecing together clues to know where to begin their search. This extra step in the research process was a worthwhile learning experience for these students as it involved them in the critical analysis of the information they received as well as developing their own strategies for efficient information searching.

The students in each research group presented their information to the rest of the class. These presentations formed part of regular class discussions conducted by Vicki that were a feature of the MUTM unit. The computer quest or the broadcasts on their own were not enough to help the children solve the mystery. A learning community was created in the same way keen computer gamers meet online or face-to-face to discuss their latest quest. The children's findings were presented on A3 sheets of paper and were displayed on a prominent noticeboard in the classroom. This was an

attempt by Vicki to not only share the learning but also to give the learning unit a scope beyond the set hours every week.

Adding to the continuity and flow of the MUTM curriculum was the free access the students had to the Murder website on the classroom's four online computers. Keen students were able to search the webquest for clues during free time in class and before school and during lunch periods when a teacher was present. The fact that students gave up their free time willingly to engage in the eco-game was testimony to its popularity in the classroom. Sport was the only other school activity that was more popular during my year of observing these children. This popularity might be attributable to a few factors. The multi-media aspect of the eco-game was undoubtedly an attraction for the students but was not enough in itself to guarantee children's attention. The gaming aspect of MUTM, the actual role-playing as a detective, seemed to be engaging for these children. The role of the detective is clearly outlined on the MUTM website (OTEN, 2002):

> Detectives' Objectives: The immediate objective for detective teams is to solve a fictitious eco-crime**.** Detectives must identify who died (victim), why (villain), the catchment where it happened (crime site), and the contributing catchment factor (issue). There is only one right answer for each of these categories.

The quest is a familiar genre to this generation of students, who have been exposed to video and computer games from a young age. However, their quests generally involve fighting bad guys and mythical creatures, not solving environmental crimes. Maybe the appropriation of the quest genre is enough to get the children into the pro-

environmental activity. It may also be the case that children have taken up the pro-environmental line promoted in school and community-based environmental education programs. The secret to the eco-game's popularity might also lie in its novelty value, something that exists in contrast to the didactics employed in most classroom lessons.

The substance of the MUTM curriculum was environmental science focusing on water catchment issues as the program was sponsored by the Department of Land and Water Resources as it was called back in 2002. You would not normally expect Year Six children to be engaged by scientific language such as this:

> Crimesite catchment is a flat river valley with two big dams and over 300 weirs. The catchment is characterised by silted banks, dry floodplains and wetlands. Water temperature is slightly higher than normal but nothing out of the ordinary. Vegetation and earthworms appear stressed though (OTEN, 2002)

This reads like dry scientific discourse that might not appeal to students of this age. However, when the science was enlivened by a human character that goes by the name of Harry Cruse, student engagement was high:

> Harry dropped in today. He'd accidentally swallowed an Orchard Swallowtail Butterfly while canoeing and needed a glass of water. He says the waterway has never run dry. That's why so many families depend on it and not just for farming. However, given the information we have on climate change in Australia over the past 5000 years, I wouldn't count on it always being there!

> Quite frightening to think about it if there was a sudden change! (OTEN, 2002)

Given a good dose of intrigue to whet their detective appetites, the students in this class were hooked: “Both Harry and Natasha suggested, however, that saving the district from economic hardship was more important than the technical ownership of a water license” (OTEN, 2002).The popularity of MUTM in this classroom, then, seemed to be due to a number of factors. The multi-media component, the quest genre, the narrative within that quest and the relevance of the issue to their local area all seemed to contribute to the program’s popularity.

The students at Dry Creek were successful at finding the correct crime site, Billabong Creek, the victim, Murray Cod, the villain of water consumption and the issue of flow. The MUTM program sets a deadline for all the school detectives to make an accusation. All of the correct entries are rewarded by a listing on the MUTM website ordered by their time of arrival. The children in this class were keen to have their *Wild Yabbies* team listed at the top of the honour list. The teacher and the students made plans to fax their winning entry in as close as possible to the 2:45 deadline. This they did, unfortunately they had misread the 1345 deadline posted on the website as 2:45pm!

Macquarie River Webquest

Successful detection of the crime is part one of the MUTM quest. Part two entails the completion of a catchment plan to ensure that the environmental crime does not happen again. The catchment plan activity appeared to be an add-on to the crime detection as there was not the same amount of support given to it on the web site.

Instead of completing the catchment plan, Vicki decided that her class should refine their environmental crime detection skills on their local river, the Macquarie. I offered to create a Macquarie River webquest to assist in this objective. My webquest was a very amateur production in comparison to MUTM and was put together with the aid of a digital camera and some basic web design skills. I took some digital photos of sites on the Macquarie River with obvious environmental problems and constructed a webquest using Dreamweaver, a web design program. The result was a simple six screen web quest (see Appendices G-L). The first screen asked the students to find out where the Macquarie River begins and ends. I gave links to some websites to assist them in this endeavour. This first screen was designed to help build an awareness of the extent of the Macquarie catchment. The second screen asked the students to choose an environmental issue from the MUTM program and investigate whether this issue was applicable to the Macquarie River. This activity was supposed to help students transfer their learning from MUTM to a new context. Screen three required the students to identify the environmental problems evident in the aforementioned photographs of the Macquarie River. The students worked on the Macquarie River webquest over three Friday mornings at the end of Term Two. They produced PowerPoint presentations of their responses to the questions posed on the quest (see Appendices M-P). They were encouraged to insert images from the quest site and other sites they visited into their PowerPoint slides.

The first question did not pose too many difficulties for the students and most were able to insert the correct answer into slide one of their presentation: “The Macquarie River begins where the Fish River meets the Campbell River. This is just south-east

of Bathurst. It ends where the Castlereagh River and the Barwon River meet to the north of N.S.W." (student, 5.7.02 Macquarie webquest).

The next task in the quest involved a little more thinking on the children's part. First they had to trawl their collective memories for issues from MUTM and then research the prevalence of this issue in the Macquarie catchment. One of the group presentations clearly showed transfer of learning: "the flow of the Macquarie River is affected by irrigation. It affects it by people taking water out of the river which slows it down" (student, 5.7.02 Macquarie webquest).

The last activity in the quest involved application of the children's previous learning around catchment issues. This activity was the most engaging for the children as it involved the analysis of nine photographs of the Macquarie River that were taken close to their village (see appendix L). An amount of communal identification of landmarks occurred before the students approached the question. As the designer of the quest, I was pleased with the answers that the children were able to come up with: "riparian vegetation has been extensively modified by stream clearance" (student, 5.7.02 Macquarie webquest); "tree decline can cause stream bank erosion and can kill wildlife and plants" (student, 5.7.02 Macquarie webquest); "there are lots of trees being cut down. That causes erosion on the stream bank"(student, 5.7.02 Macquarie webquest); "there are lots of cars driving on the bridge which causes pollution and no wildlife" (student, 5.7.02 Macquarie webquest).

Term Three

In term three, environmental education at Dry Creek took a different direction. Vicki initiated a junk sculpture activity as part of the school's Learnscapes program.

Learnscapes is the expression of the most recent environment educational policy of the Department of Education and Training in New South Wales (DET, 2001). Learnscapes asks schools to consider the entire school environment as a working model of ecological sustainability. Examples of activities that have been inspired by the policy include permaculture gardens, outdoor learning environments, energy audits and conservation measures and recycling programs.

At Dry Creek, the creation of new gardens and some tree planting formed part of their commitment to the new policy. The heritage garden (hairy chicken garden as named by one kindergarten child) planted at the front of the school received an environmental award. The environmental education committee at the school then decided that they would build a sculpture garden with sculptures created by students. Vicki chose some students from her class to participate in the creation of the sculptures. It suited her classroom schedule in term three to have a smaller group on Friday mornings as other children from her Year Six class were participating in other special projects such as dance and drama groups at this time.

I volunteered to help with this activity by assisting children with the heavier lifting and material handling that required an adult. The more complex tasks such as welding were undertaken by qualified tradespersons who also happened to be parents at the school. The interest for my research project lay in the fact that the students were constructing their sculptures to be representative of their impressions of the Dry Creek environment.

Materials for the sculptures were gathered and donated from local tips and farms. There were parts of tractor engines and other farm machinery, household items such as an old fan and numerous strips of thin aluminium. The entire collection was stored in an area of the playground that was out-of-bounds for children during play periods.

On the first Friday morning of Term Three, Vicki and I took the students to an exhibition of junk sculpture at the local art gallery. We directed the student's attention to the type of materials used in the sculptures and how these materials enhanced the meaning of the artwork. Later that morning back at school, the students looked at websites of junk sculpture images as well as an example of a junk sculpture in the school, Rusty the dog, which had been made by a Year Six in a previous year. At this stage, we also had a brief discussion about the subject of the sculptures which was to make something which they thought represented the local environment.

The morning of the second Friday of the junk sculpture activity was a clear and cold late-winter morning. It was quite a novelty for me to be outside and I remember feeling pleased at the thought of conducting research at such a picturesque site. The students were also enthusiastic participants and rummaged through the junk materials looking for suitable pieces. From my observation, the design and make process for these students was more a dynamic loop rather than a stepped process of design then make. This process was also influenced by the chosen medium of junk sculpture where the materials themselves have a strong influence on design. For example, an old air filter cover became a face. An old welded stand became a skeleton. A fan cover became a bird nest. This type of improvisation caused me to question whether the students' sculptures represented their thinking on the local environment or the

availability of particular shaped materials from the local tip. However as the focus of the study was on the process of pedagogy as well as its products it was still useful for me to conduct participant observation of the activity.

The following four weeks were spent constructing the sculptures along with the help of parents with welding gear during the last two sessions as students put together some of the larger parts of their sculptures (see Appendice Q). Despite my earlier doubts about the possible utility of the sculptures as evidence of these students' understandings of the local environment, they represented an interesting interpretation of the local environment. There was an indigenous Australian, a convict, a grazier with a cow horn hat and many animals including a bird, an echidna, several snails and a snake. During the last Friday of the activity, Vicki and I mounted the sculptures in the garden that was chosen for the display (see Appendice R).

Summary

This chapter, the first of two data chapters, has provided a thick description of the environmental education classes observed in year six at Dry Creek. This account was presented to establish the verisimilitude of the research study. This chapter has fulfilled one purpose of the study to offer a fine-grained account of the pedagogy of environmental education.

CHAPTER 6: THE PEDAGOGICAL RECONTEXTUALISATION OF ENVIRONMENTAL EDUCATION

This chapter uses the Bernsteinian (Bernstein 1990) notion of the pedagogic recontextualising field as a framework for the analysis of the pedagogy of environmental education. This analysis directly addresses the research question of this thesis that asked; what is the relation between pedagogy and students' understanding of the environment in environmental education?

The Pedagogic Recontextualising Field of Environmental Education

The pedagogic recontextualising field (PRF) was defined in chapter two of this thesis as the arena of contestation where knowledge in the form of curriculum documents is recontextualised into pedagogic practices for the classroom (Bernstein, 1990). The PRF in the area of environmental education is populated by university academics and curriculum developers who create curriculum materials. In NSW, the curriculum documentation that the PRF recontextualises is not extensive as the area of environmental education is not a subject in its own right. Instead, its implementation is guided by a non-mandatory policy statement that was last renewed in 2001**.** As a result, the PRF of environmental education in New South Wales has the potential to be a major influence on the classification of knowledge within the pedagogic discourse as there are no prescriptive guidelines from the state curriculum authority, the NSW Board of Studies, in this area.

The data reported in chapter four focused on the teaching of environmental education. Bernstein (1991) regarded the classroom as a site of pedagogical reproduction, his model of the pedagogic device ceding the power of defining and recontextualising curriculum knowledge to higher fields in the educational hierarchy. This hierarchy is not as obvious in marginal areas of the formal school curriculum, such as environmental education, where there is not much direction given by the pedagogic recontextualising fields of the academy or the state curriculum authority.

In Bernstein's original work, he described pedagogy as being comprised of classification and framing (Bernstein, 1971). Classification referred to what was taught and framing to how it was taught (Bernstein, 1971). Bernstein described both classification and framing as having either strong or weak boundaries (Bernstein, 1971). A subject with strong classification and framing would have clear curriculum guidelines and prescriptions for how it is to be taught. Subjects with weak classification and framing would be the opposite with flexible subject boundaries and less prescriptive teaching guidelines. Bernstein's purpose was not to value strong classification more highly or visa-versa but to establish his thesis that the strong and weak framing of pedagogy reflect underlying power relations in the sociology of curriculum knowledge. The validity of Bernstein's thesis is evident when one examines the pressure to teach the basic skills of literacy and numeracy in the UK, US and Australia. The strong classification and framing of basic skills pedagogy reflected in prescriptive curriculum guidelines and high stakes assessment reflect the influence that powerful interests can bring to bear on school curriculum (Chapman & Snyder, 2000).

The concepts of classification and framing are used in the following section to analyse the pedagogy of environmental education at Dry Creek. This analysis reveals evidence of both the strong classification and the strong and weak framing of the pedagogy.

The Strong Classification of the Pedagogy of Environmental Education

The strong classification of the pedagogy of environmental education is evident when the curriculum is focused on a common theme or on the achievement of common outcomes. This strong classification was evident in the Murder Under The Microscope (MUTM) and Macquarie River webquests.

Strong Classification in Murder Under The Microscope

The Murder Under The Microscope program positions the environment as an endangered entity, where environmental problems need to be solved. The environmental problem in all the MUTM scenarios is caused by human economic activity. The tension between economic development and ecological sustainability is the central problematic of MUTM. The following excerpt from the solution notes in *Rumble on the River* (OTEN 2002) expresses this theme perfectly:

> In 2001 there was a long hot summer with unusually hot dry winds and no rain. This was followed by a cold winter with little rain. The Creek level dropped to historically low levels. In the middle of winter the water levels in 'the Pond' also dropped substantially. Using her full water allocation Marina topped up The Pond with water from the creek. But the next day the water level was down again and a waterlogged area began to develop on the

> outskirts of the town. The problem was obviously a leak. Marina was worried. To fix the leak she would need to close for two months at the height of the season. In this time the tourists would disappear, the restaurants would have to close, the land buyers would feel duped and the whole economic miracle would crumble. What she needed was access to more water to continue to top up her fish farm on a nightly basis until the low season in June when they could close without damaging the local economy. But Marina had already used up her entire water allocation (OTEN, 2002).

The environment in MUTM is besieged by problems created by 'greedy' humans that need solutions devised by more ethical members of the species. MUTM has the participating students cast as these ethical environmental managers. They are given the title of 'eco-detective' and must identify the what, why, who and where of the eco-crime. The language of crime detection used in the quest positions the environment as a victim of a heinous crime, which emphasises the representation of the environment as endangered in the pedagogy of the webquest.

The eco-detectives must have access to the facts of the case in order to solve the eco-crime. This presentation of scientific facts is through direct transmission or, most commonly, through embedding of the facts within the narrative of the quest. The scientific facts presented in the quest generate a process of enquiry whereby students have to examine a range of concepts in order to identify the correct clue needed to solve the quest. The webquest is an ingenious pedagogy that engages the students in learning as well as ensuring they learn the scientific facts that are contained within it.

The environmental facts presented in the webquest are presented at a reasonably complex level for primary school students. The following table from the 2002 quest, *Rumble on the River*, demonstrates some of this complexity:

Water Quality Analysis: Crimesite waterway 28 May 2002

Parameter	**Reading**
Turbidity	50 NTUs (Nephelometric Turbidity Units)
Temperature	15 degrees C
Nitrates	0.02mg/L
Total Phosphates	0.06mg/L
Toxic compounds	*
Chlorophyll A	5 µmg/L (micrograms per litre)
pH	7.0

Nothing out of the ordinary there! I'll post the analysis of the second sample from the fish farm tomorrow (OTEN,2002).

Most of the units of measure employed in the water quality analysis would not be familiar to 11-12 year old students, apart from the centigrade and pH scales. The other measures worked as generative tools in the educative process. Students first had to discover what each of the measures actually measured and then explain the implications of each datum. At the most basic level, it forced the elimination of some of the prospective crime sites as the water temperature was too cool for tropical regions to be considered as possible crime sites.

In other sections of the webquest the scientific facts are presented in a more conversational modality. The following excerpt demonstrates this modality

convergence between the narrative of the quest and its role as an information source for eco-detectives. The product of this dual purpose resembles the discourse of a biological field trip demonstrated by the conversational banter and the use of homely metaphors, such as the 'bath tub ring':

> Incidentally Winston was the one that gave Harry the info' on the cycle of life in the wetlands which he now delivers to tourists. Also the info' on biofilm. It's the green stuff you see at the edge of rivers and wrapped around river snags. Apparently a great source of food for everyone. Scientists describe the effect as the 'bath tub ring'. I guess we can all relate to that! (MUTM website, OTEN 2002).

The strong classification of the environmental education curriculum was focused on developing students' conceptual understandings of the environmental science of water catchment issues. The eco-detectives of the *Wild Yabbies* team at Dry Creek correctly identified the crime site as Billabong Creek and the victim of the environmental crime which was the Murray Cod. The other two categories, the villain and the issue, required an understanding of the basic scientific concepts promulgated by the webquest. The eventual deduction of the villain of water consumption and the issue of water flow were pieced together as the students moved through the webquest clues. At first the clues provided were of a very general nature:

> Harry dropped in today. He'd accidentally swallowed an Orchard Swallowtail Butterfly whilst canoeing and needed a glass of water. He says the waterway has never run dry. That's why so many families depend on it and not just for farming. However, given the information we have on climate change in Australia over the past 5000 years, I wouldn't count on it always being there!

> Quite frightening to think about it if there was a sudden change (MUTM website, OTEN 2002).

Despite the future-casting in this excerpt, the focus is on the importance of fragile water supplies to communities such as Billabong Creek. The students at Dry Creek, which was in the middle of a punishing drought and resultant water restrictions in 2002, did not require this reminder of the importance of water to inland regional centres.

Several other similar clues alerted the students' attention to the scarcity of water in this catchment. This made the crime of the over-consumption of water by the developer, Marina Tornados, particularly heinous. The fact that her crime constituted an actual breach of the water licences that she owned added a legal violation to her environmental crime. Marina also had accomplices in the theft of the water, Natasha Von Squatta-Smith and Harry Cruse, who were pursuing personal economic gain rather than ecological sustainability.

Once the students realised that the villain in the environmental crime was water consumption, they had to deduce the exact cause of death for the victim, the Murray Cod. The narrative of the webquest established the field of information required for the conceptual understanding in its usual developmental fashion:

> the floodplains and wetlands of Billabong creek are as important to the health of this creek system as the body of water itself. Fish and birds rely on the wetlands to breed and feed. Our floodplains soils rely on the flood of nutrients,

> carbon and moisture to allow for other life to take root and spring into life when the wet season comes (OTEN 2002).

The students at Dry Creek now understood the importance of the wetlands and floodplains to the creek ecosystem. The link then had to be made to the importance of regular overflows from the creek for the survival of the wetlands. This process took two lessons as the students had a list of issues that they had to work through in order to reach the correct issue of flow. For example, the students had to investigate stormwater runoff, pollution from the fish farm and bank erosion until they identified flow as the likely culprit. They had to make their choice given information like this: "Rain dictates the natural flows. The seasonal pattern is rain in winter followed by long, hot, dry summers. Consequently the Creek experiences natural high flows most often in winter whilst low flows are typical in summer and autumn" (OTEN 2002).

To add to their knowledge of the perils of water over-consumption, the students at Dry Creek now could add an awareness of the importance of seasonal flows to riverine ecosystems. The inductive nature of the quest pedagogy also ensured that the students developed their conceptual understanding of related topics, such as erosion and runoff that they needed to eliminate as likely culprits as they worked through the quest. The webquest is an engaging pedagogy for 11-12 yrs old to learn about environmental facts and concepts. MUTM has enough narrative depth and inquiry learning embedded in the program for the students to be able to develop a good understanding of salient concepts such as water flow and consumption. The environment is strongly classified in this pedagogy as an object that can be inscribed by scientific facts and concepts. The design of the webquest itself constitutes the

strong classification as it facilitates the student learning of the relevant scientific concepts.

Another example of the strong classification of the environment in MUTM is the characterisation that reinforces the theme of the environment as an economic resource. The 2002 MUTM scenario had as one of its key characters, Harry Cruse, the eco-tourism operator:

> Paddling down the waterway, listening to the breeze through the River Red Gums, I thought I heard the Red Tailed Black Cockatoo but it was just Eco-tourism operator Harry Cruse practising his bird calls. Apparently tourists rave about him. His Eco-Tour even teaches them to identify the trail of a Western Blue Tongued Lizard through native grasses (OTEN, 2002).

Harry Cruse's economic activity was at the greener end of the environmental scale but it still constitutes a strong classification of the environment as an economic resource. All of the characters in the 2002 scenario, *Rumble on the River*, used the local riverine environment as an economic resource. There were different levels of this economic use evident in the narrative. Harry Cruse's ecotourism qualified him at the sustainable level of usage although the writers implicated Harry in the illegal water use crime that led to the decline of the Murray Cod stocks. Natasha Von Squatta-Smith, the local grazier, represented the traditional pastoral land use of the environment, with their exploitation of the environment somehow softened by the longevity of their tenure. Marina Tornados, the land developer and perpetrator of the environmental crime, definitely represented the worst of the economic exploitation of the environment. Winston No Wei, local chef and ecologist, harvested the river for fish for his

restaurant. Through this characterisation, Murder Under The Microscope positions the environment as a resource, albeit as a resource to be used sustainably. The success of the moral of the tale concerning the sustainable use of water relies on the students empathising with the hero of the story, the eponymous Winston No Wei. It can be seen then there was a strong classifcation of the pedagogy of the MUTM webquest that favoured a representation of the environment as an economic resource, albeit a resource that must be used in a sustainable fashion.

Strong Classification in Macquarie River Webquest

There was a strong classification of the pedagogy that supported the representation of the environment as a scientific object in the Macquarie River webquest that the students completed as a follow-up activity to MUTM. The Macquarie River webquest focused on scientific facts and figures without any of the colourful narrative or special effects of MUTM. The purpose of the Macquarie River quest was to reinforce the scientific concepts that the students had learnt from MUTM. The strong classification of the webquest originated from the limited parameters of this original objective. When the pedagogy is strongly classified and there is little mediation from any subsequent framing of the pedagogy, the students' responses echo the dominant theme of the curriculum:

> Wind erosion in the catchment occurs mostly during dry periods on cultivated lands, and on grass land or scrub land that has been grazed bare of vegetated cover. Erosion is also due to land and tree clearing.(student, Macquarie River Webquest presentation, 5.07.02)

> Tree decline can cause stream bank erosion and can kill wildlife and plants (student, Macquarie River Webquest presentation, 5.07.02)

> There are lots of trees being cut down. That causes erosion on the stream bank. (student, Macquarie River Webquest presentation, 5.07.02)

> Removing trees causes salinity. So people plant trees to stop the salinity (student, Macquarie River Webquest presentation, 5.07.02)

> There used to be many floods on the Macquarie River and, in fact, life in the Macquarie marshes including the River Gums, depended on regular flooding (student, Macquarie River Webquest presentation, 5.07.02).

The strong classification, or boundaries, around the environment as scientific object theme in the Macquarie River webquest do not automatically imply that this is a limited pedagogy in any way. Indeed, it might be argued that strong classification of pedagogy is appropriate when the objective of the lesson is students' understanding of scientific concepts.

The Strong Framing of the Pedagogy of Environmental Education

The strong framing of pedagogy occurs when the outcomes of the lesson are influenced by how the lesson is taught by the teacher. In the junk sculpture activity in term three, the students were asked to create a junk sculpture that represented their interpretation of the Dry Creek environment. The result of this exercise was that the students tended to represent the Dry Creek environment as an economic resource in their creations. The largest figure standing in the newly established sculpture garden

is the farmer wearing a cow horn hat with a rabbit trap dangling from his wrist. The farmer is flanked by much smaller sculptures representing a Koori man and convict. There are also many sculptures of animals scattered throughout the garden. The overall impression I got from looking at the sculptures was a sense of a local environment dominated by men, firstly, with the alpha male being European and representative of the new economic system brought to this country. All the garden needs is for the farmer to have a snake under his foot to complete the overall picture of complete economic and andocentric dominance.

This might be an over reading of the sculptures on my part as there were also a plethora of animals sculpted which suggests that an environment as nature is also represented. Although you might expect that an artistic activity like this might tend towards the interpretative, weakly framed end of the pedagogical framework the sculptures produced by the children suggest that the teacher's framing of the activity supported an objectivist representation of the local environment. This strong framing was assisted by the definition of the task by the teachers as being about the students' representation of *the* local environment rather than spending some lesson time discussing what different artistic interpretations of this might look like.

The Weak Framing of the Pedagogy of Environmental Education

There was evidence of the weak framing of the pedagogy of environmental education when the learning activity did not progress as planned by the teacher or there were unexpected learning products created by the students. This weak framing occurred when there was little prescription, or framing developed by the teacher around the

learning activities. This was intentional in the case of the philosophical inquiry lessons where the students were encouraged to take direction of the class discussion.

The weak framing of pedagogy was evident in the philosophical inquiry lesson that used the children's text, *The Lorax* (Seuss, 1972), as stimulus for a class discussion. One of the themes of the text is the idea of needs versus wants. The use of the invented word in this text, thneed, actually seems to be a play on the notion of going beyond our basic needs into desiring superfluous wants. One of the actual questions students devised for this class discussion was "Why do you need a thneed?". Most of the resultant discussion did not reflect any awareness on the students' part of the metaphorical meaning of the word:

> TL: why do we need thneeds then?
>
> S1: To keep warm
>
> TL: Rachel?
>
> S2: To keep alive and living because like if you didn't have clothes or something you would probably freeze.
>
> TL: Thank-you and Amber
>
> S3: If we didn't have trees and stuff we wouldn't be able to survive because trees provide oxygen
>
> S4: We need paper to write on at school.
>
> TL: We do, so that's why we need thneeds. We do use a lot of paper that is a fact. All of a sudden we can't say we've got a paperless society. Any more comments around this question, why do we need thneeds? Thank-you Justin.
>
> S5: Because just in case you"re outside and you get all cold and you need a jumper or something.

TL: Belinda

S6: But when you”re outside when it’s too hot you need shade. (class discussion, 31/05/02)

If this was a teacher-directed discussion of the text then the teacher might have directed the students’ attention to the meaning of the metaphor. However, as this was a philosophical inquiry lesson that action was not appropriate. The following excerpt demonstrates some of the different responses to the question, “why didn’t he notice what was happening to the environment?”, that was formulated by one of the students:

S: Maybe he’s too concerned about his business so he couldn’t care less about what was happening to the environment.

TL: Perhaps, Rachel.

S: Um, he probably wasn’t very rich and he got a business and like Tyler said he was really worried about it so he didn’t care about the environment.

TL: Yeah, keep going, sorry, Seb.

S: I think he might have noticed it because like because he’s in his room up when he’s telling the story he might have just been too busy being inside and never even going outside so he didn’t notice.

TL: Hmm. That could be quite possible. Anyone, you’ve got your hand up, okay your turn, Zoë.

S: Well he didn’t notice what was happening to the weather because he was too wrapped up in cutting down the trees and making the thneeds. So he doesn’t really care about the weather he just wants to get his business up and running.

TL: Thank-you Zoë. And Amber, last word on this question.

S: Maybe he did notice what was happening because, like he wanted, he needed money badly so he just thought oh I"m not hurting anyone until the Lorax comes but he needed money so he just kept on going and chopping down the trees and wrecking the environment (Discussion, 31.05.02).

The above excerpt from the class discussion demonstrates that the weak framing of the philosophical inquiry lessons gave students the opportunity to think beyond an objectivist representation of an endangered environment to examining some of the complex economic reasons underlying human degradation of the environment. This process was aided by the text of *The Lorax* (Seuss, 1972), with its narrative complexity that forces the reader to examine the issues in some depth. When used in a weakly framed philosophical inquiry lesson it allows for the expression of pragmatic ideas such as this one:

S: But wouldn't it be more sensible to not just go and cut all these trees down and make all these things, why couldn't he wait for more trees to grow, he didn't have to have such a big business. He would have been making more money anyway out of the little ones. He could have saved the trees and let the trees regrow (student, discussion, 31.05.04).

The above response almost constitutes a rationale for sustainable development that might have been the outcome of a strongly framed lesson on environmental sustainability. Instead, the student arrived at the outcome inductively and with little direction. I am not arguing here for the superiority of student-centred inductive reasoning but just establishing the difference between strong and weak framing of the pedagogy of environmental education.

The weak framing of the pedagogy of environmental education was also evident when the students discussed the European occupation of Australia, the main theme of the text *The Rabbits* (Marsden & Tan, 1998). The question that was asked by one of the students, why did the rabbits take over?, prompted some students to give an economic rationale for the invasion: "um, going off Megan's point, we didn't come and steal the black people's land but we did need more and it was there and such like we needed the land more than they did" (student, 24.05.02, class discussion). This economic imperative for more land was linked to our greater population by another student: "maybe we needed the land more than the aborigines do because we have more population and we needed more room to live than them because they didn't have nearly so many Aborigines" (student, 24.05.02, class discussion).

The occupation of the land was then linked to the apparent uneconomic use of the land by the indigenous population:

> um, we just like took the land and parts of land like we wanted it to be in our ownership like cause we wanted it to be ours and not theirs because like they weren't really using it and stuff (student, class discussion, 24.05.02).

This rationale was echoed in the comments of another student: "well they just, we probably just treated them like animals and sort of, thought oh well they don't really use the land so why don't we take it and use it" (student, 24.05.02, class discussion).

Once again, these responses to the text by the students might not be encouraged in a lesson where the teacher directed the students' attention to the central theme of the injustice of the European invasion. However, one student did touch upon one of the

reasons for the success of the invasion: “It is like it said in the story, it said no fence, no hill or no river could stop them. Because we have all this technology that we can get over those sorts of things and keep going” (student, 24.05.02, class discussion). Another student reflected on the injustice of the invasion: “Maybe the white people shouldn’t be here at all, maybe we should be in America or somewhere. Maybe this isn’t our world” (student, 24.05.02, class discussion). The diversity of students’ responses in this lesson reflects the inherent weak framing of the pedagogy of philosophical inquiry which is designed to encourage this diversity of responses.

Weak framing was also evident when a Leunig cartoon (Leunig, n.d.) depicting a natural and a television sunrise was used as discussion stimuli in another one of the philosophical inquiry lessons. On the first reading of the transcript, I was surprised by the emphasis the students placed on the mediated representation of the environment. As one student said, “all you really need is television…it tells you everything” (student, class discussion, 10.05.02). It is also better than the real thing according to one student “because you can get more angles on the sunrise” (student, class discussion, 10.05.02). One student thought the cartoon was depicting a breaking news story, “and they have seen on the news like this axe murderer is coming over the hills and it’s on the TV and they are watching the actual reality” (student, 10.05.02).

These comments reminded me of Wark’s notion of third nature (Wark, 1994). Wark (1994) argues that humans can no longer claim to have a relationship with a pristine first nature as most natural environments have been altered in some way by direct or indirect human intervention. Our rare direct contact with nature then is with a modified second nature. According to Wark (1994), our most common interaction

with nature is with a third nature mediated by communication technologies such as television or a computer. For Leunig and me, this is cause for thought and reflection. For the 11 and 12 year olds at Dry Creek, the fact that people would choose to watch the sunrise inside on television instead of the real thing through the window is less important than the house having no furniture (see chapter four). This might only indicate that the deeper philosophical message of the cartoon that was the teacher's focus for the lesson was beyond the students but their influence over the direction of the discussion is evidence in support of the view that there was weak framing in the pedagogy of philosophical inquiry.

The weak framing of the pedagogy of environmental education was also evident when the students in year six at Dry Creek were asked to create a fictitious country in a social studies activity entitled Creative Countries. The student-directed weak pedagogy emerged despite the fact that the activity was given a strong geographical framework by the teacher who expected the students to construct a coherent set of geographical characteristics for their chosen country. For example, the students might have listed staple crops that were appropriate to the latitude, altitude and climate of their country. Instead, the students framed their own learning to develop their creative countries. The most interesting aspect of these creative countries was that six out of the seven were tropical islands replete with wonderful tourist attractions:

> Rakinda Island is a great and wonderful place in the world and attracts over 100,000 tourists per year. So come along and enjoy our excellent range of hotels and flora and fauna. (student, 3.05.02, creative countries website)

> Yentruoc is located in the North Pacific Ocean. It is a member of the Hawaiian Islands. This is a wonderful place, there are six states to visit and many attractions to see (student, 3.05.02, creative countries website)

> Mokono is located in the tropic of Capricorn and the climate is very tropical (student, 3.05.02, creative countries website)

> Gluklich Terre is situated in the South Pacific Ocean. Its neighbours are Fiji, Samoa, New Zealand and South America (student, 3.05.02, creative countries website).

The above excerpts are evidence that the students adopted the marketing discourse of the tourism industry, even referencing that mightiest of all tourism icons, the Hawaiian Islands. The first student even cited tourist statistics as evidence of their islands' popularity. I can not fully explain why the students chose tropical islands as their country. Tropical islands are associated strongly with marketing and tourism but so are Disneyland, Bali and Paris. Perhaps the reasons behind the strong framing of the environment as recreational idyll go deeper than the impact of modern marketing strategies on these children. One student wrote a history for her tropical island that reflects the South Sea paradise theme that is over 300 years old:

> Ralaka was first discovered in 1498. Bond Ralak was sailing the Pacific Ocean when caught in a storm and was shipwrecked on the shores of Ralaka. Bond and her crew built villages from our lovely tree trunks. They found food from the trees in the forest and fixed the ship's holes in the bottom. Ralaka has been ruled by the same family for 200 years. (student, creative countries website, 3.05.02)

This is a representation of the natural environment as a recreational commodity for human enjoyment. This representation is manifest in the students' selling of the good aspects of their country, the attractions, things to see, the beaches and the climate:

> The main form of transport is cars, motorbikes, helicopters, & for children under 15 they have mini jeeps. All of the vehicles are solar operated which causes no harm to the environment. (student, creative countries website, 3.05.02)

> The name Glucklich Terre stands for happy (in German) and land (in French). Its highest point is Mt. Thatch in Ciffo, the four main beaches are Bom Bay, Billaba Bay, Binton Beach and Bubble Beach. Gluklich Terrains are all kind and friendly. The population is 11170 and they all speak English. (student, creative countries website, 3.05.02)

In this extract, the student referred to 'solar operated vehicles that cause no harm to the environment'. The student obviously was implying that this would reduce the air pollution caused by the burning of fossil fuels. This overlooks the physical damage to the environment that would be caused by the abundance of vehicles there for human recreational use, including jeeps for the under 15s! The apparent lack of logical coherence in the student's ecological thinking here is less important than the fact that the abundance of transport on the island was there for the convenience of the human population, to assist them in using the environment as a recreational resource.

The computers and the web-design software may have had some impact on the representation of the environment as a recreational idyll. These children might see the World Wide Web as a commercial medium given the proliferation of dot.com marketing vehicles for children's games, toys and other consumer goods. This might explain why the website was used by the students as a promotional vehicle for their creative countries. Their learning products were far from the expected outcome of the activity, evidence of the weak framing of the pedagogy in this instance.

The Classification and Framing of the Pedagogy of Environmental Education and Students' Understanding of the Environment

This chapter, having already presented evidence of the strong classification and the strong and weak framing of the pedagogy of environmental education, turns to a discussion of how they relate to students' understanding of the environment. This is in response to the research question of this thesis that focuses on the relation between pedagogy and students' understanding of the environment. The classification and framing of the pedagogy of environmental education is then linked to the paradigms of environmental education research and practice that were outlined in chapter two.

The students' understanding of the environment as an endangered entity, environment as scientific facts and environment as economic resource were associated with the strong classification of the pedagogy of environmental education. This suggests that there is a clear relation between the strong classification of pedagogy and the resultant objectification of the environment by students in the pedagogy of environmental education. The origins of these objectified representations of the environment that

appear in the strong classification of the pedagogy can be identified in the official pedagogic field of environmental education.

The official pedagogic field in Bernstein's pedagogic device (1990) is where the knowledge of the discipline or subject is originally created and modified. The representation of the environment as scientific facts can be traced to the strong influence that the science discipline has on environmental education (Greenall Gough, 2004). The representation of the environment as an economic resource could be due to the strong focus on sustainable development by UNESCO (2005). UNESCO has been an important player in the official pedagogic field of environmental education since its inception as a subject in the school curriculum. It has been argued that sustainable development is by definition an economic framework as it implies sustainable development of the environment for the economic benefit of humans (Jickling, 2001). Finally, the representation of environment as endangered may be linked to the raison d'etre for the existence of environmental education as a subject. Environmental education was developed as one part of a solution to global environmental problems (Van Weelie & Wals, 2003). Hence, the environment is automatically constructed as endangered in the pedagogy of environmental education. In summary, a relation between strong framing and the objectification of the environment present in the strong classification of the pedagogy can be demonstrated using the Bernsteinian notion of the official pedagogic field (Bernstein, 1990).

The strong classification of pedagogy directs students' learning towards uniform outcomes. If these outcomes involve the objectification of the environment then objectivist orientations in students' understanding of the environment will be the

result. However, when the pedagogy is characterised by weak framing, the outcome is less certain. This weak framing was particularly evident in the philosophical inquiry lessons. There was no uniform student outcome that could be identified from these lessons as the students had different responses to the texts and cartoons that were used as discussion stimuli. The only generalisation that could be made from these series of lessons is that students, when given the opportunity, express a diverse range of viewpoints on environmental issues.

The strong and weak framing of the pedagogy of environmental education can also be linked to the theoretical paradigms that are part of the pedagogic recontextualising field of environmental education. Four paradigms were outlined in chapter two of this thesis. They were the positivists, constructivists, critical theorists and post-modernists.

The strong classification of pedagogy that supports the objectification of the environment is associated with the positivist paradigm of environmental education. The strong classification of the pedagogy of environmental education results in curriculum that aims to educate students about the endangered environment. The positivist view of education is that the acquisiton of this knowledge will lead to pro-environment attitudes and behaviours in students. This emphasis on behavioural change is indicative of the influence of the positivist paradigm on environmental education. There is more emphasis in this paradigm on the classification of pedagogy that reflects the positivist emphasis on what should be taught rather than how it should be taught.

In contrast, the weak framing of pedagogy suggests a more interpretative view of environmental education curriculum. This interpretative approach aligns with the constructivist paradigm of environmental education that recognises students' agency in the construction of their knowledge. Biggs, in an examination of pedagogy in higher education, identified two contrasting theoretical traditions, objectivist and constructivism (Biggs, 1996). He described the objectivist approach to teaching as a matter of transmitting knowledge, "learning or receiving it accurately, storing it, and using it appropriately" (Biggs, 1996 p.347). In contrast, constructivism sees "the learner as central in the creation of meaning, not the teacher, as the transmitter of knowledge" (Biggs, 1996 p.348). Biggs' theoretical traditions of pedagogy are important to this study as he draws links between pedagogy and epistemology. The objectivist pedagogy emerges from a positivist epistemology that sees knowledge as separate from the knower whereas constructism is linked to an epistemology where knowledge is socially constructed and knowledge and knower is intricately linked (Biggs, 1996). Using Bernstein's (1990) model of the pedagogic device it can be argued, therefore, that the final realisation of knowledge in the classroom is linked to the epistemological foundations of this knowledge in the pedagogical recontextualising field of the academy. This might explain why the strong classification of pedagogy is associated with the positivist paradigm of environmental education and weak framing with the constructivist paradigm.

Summary

This chapter has used Bernstein pedagogical device and his ideas of classification and framing as a theoretical framework for the analysis of the pedagogy of environmental education. The first finding of this chapter was that the strong classification of the pedagogy of environmental education supports the objectification of the environment.

This objectification was linked to the origins of environmental education in the official pedagogic field represented by global policy bodies such as UNESCO as well as in the discipline of environmental science. The pedagogic recontextualising field of the positivist paradigm of environmental education also contributes to objectivist curriculum that leads to objectified representation of the environment by students.

The second finding of this chapter is that the weak framing of environmental education produced a diverse range of student outcomes that could not be predicted by the teacher before the lesson. This weak framing was associated with an interpretative orientation to curriculum development that was associated with the constructivist paradigm of environmental education.

CHAPTER SEVEN: THE QUALITY TEACHING FRAMEWORK AND THE PEDAGOGY OF ENVIRONMENTAL EDUCATION

The Quality Teaching Framework offers a contrast to Bernsteinian pedagogical theory as it focuses on student performance rather than the sociological construction of pedagogy. This is consistent with the broader paradigm of authentic pedagogy to which it belongs. Proponents of authentic pedagogy have described this approach as putting performance before pedagogy (Scheurman & Newmann, 1998). This chapter examines student performance as evidence for an analysis of the pedagogy of environmental education at Dry Creek. This constitutes a form of theoretical triangulation for this study as the data are examined from a different epistemological standpoint than the one adopted in chapter five (Alexander, 2003). This chapter builds on the theoretical framework of Bernstein's pedagogic device to analyse aspects of the pedagogy of environmental education at Dry Creek as it was described in chapter four.

The purpose of this analysis of the pedagogy of environmental education is not to valorise the teaching I observed there for being an exemplar of environmental education. Instead it constitutes an argument in support of a theory of pedagogy as a complex sociological construction that goes beyond the naive definition of teaching as being just the unproblematic transmission of knowledge. This view of pedagogy positions the relation of pedagogy and students' understanding of the environment that is the focus of this study as an interaction rather than as a causal or linear relationship.

This chapter uses the three main tenets of the Quality Teaching Framework which are intellectual quality, significance beyond the classroom and supportive learning environment to tease out the different elements of the pedagogy of environmental education. This process is assisted by the use of the specific criteria of each tenet that are used to examine the pedagogy in fine-grained detail.

Intellectual Quality

Intellectual quality is made up of six criteria. These are deep knowledge, deep understanding, problematic knowledge, higher order thinking, metalanguage and substantive communication (NSW Department of Education and Training, 2003b). Each of these criteria is used here to examine the pedagogy of environmental education in this study.

Deep Knowledge

The Quality Teaching Framework defines deep knowledge as tasks that focus on key concepts and ideas and the relationship between these (NSW Department of Education and Training, 2003b). When the students at Dry Creek were engaged in the Murder Under The Microscope (MUTM) webquest (OTEN, 2002) they had to understand the importance of water flow in maintaining the health of the river in order to solve the riddle and reach the end of the quest:

> The disappearance of the natural high and low flow cycle changed the riverine environment. Without the natural flooding that came with high flows water couldn't reach the wetlands. The wetlands themselves shrunk affecting the food chain of the creek community. Without their swampy woodlands habitat, bird numbers declined. Fish stocks declined. These environmental changes

impacted on communities like Conargo up and down the Creek (excerpt from *Rumble on the River*, OTEN 2002).

The next conceptual link the students had to make was an understanding of the impact on water flow of excessive water consumption by humans. Students have to make these conceptual links in order to solve the quest. Along the way to making these links students have to investigate other concepts in riverine ecology that are eventually ruled out as being the culprit in the case at hand. Some of these concepts presented in the 2002 quest, Rumble on the River, included dryland salinity, stream bank erosion, devegetation and water pollution (OTEN, 2002). The presentation of scientific knowledge as concepts and the linking of these concepts together suggests that deep knowledge was a feature of the MUTM pedagogy, as it "required clear articulation of the relationship between and among concepts" (NSW Department of Education and Training, 2003b).

Deep Understanding

According to the Quality Teaching Framework, students should be able to demonstrate their deep understanding of what they have learnt (NSW Department of Education and Training, 2003b). This criterion is different from deep knowledge because of the requirement that the students must demonstrate their understanding of the knowledge that has been taught. The Macquarie River webquest that followed on from MUTM asked students to demonstrate their knowledge of the key concepts that they had learnt in MUTM. They had to apply these concepts to an examination of their local river and present their findings in a PowerPoint presentation. The students were able to do this successfully: "Removing trees causes salinity. So people plant trees to stop the salinity"(student, Macquarie River Webquest presentation, 5.07.02)

and “Wind erosion in the catchment occurs mostly during dry periods on cultivated lands, and on grass land or scrub land that has been grazed bare of vegetated cover. Erosion is also due to land and tree clearing” (student, Macquarie River Webquest presentation, 5.07.02).

The students had to thoroughly understand the concept in order to correctly apply it to problems with their local river. This demonstrates that this part of the pedagogy in year six at Dry Creek required deep understanding on the part of the students.

Problematic knowledge

Tasks that have a high degree of problematic knowledge require students to present or analyse different perspectives and/or solutions and to demonstrate how the construction of knowledge relates to their understanding of the task (NSW Department of Education and Training, 2003a). The philosophical inquiry lessons involved the students in an examination of the different perspectives that the featured authors and artists brought to bear on environmental issues in their texts. In a discussion of Leunig’s sunrise cartoon (Leunig, n.d.), the students contributed questions that became the basis for a classroom discussion. The subsequent discussion of one of these questions touched on Leunig’s motives in the creation of the cartoon. The following excerpt from this discussion is presented as dialogue rather than separate quotes to emphasise the role of the discussion in drawing out students’ ideas about the artists’ role in the construction of knowledge:

T: let’s have a look at question one, who asked question one, why is the same picture outside as on the TV?

Belinda: well maybe they have a security camera and they have seen on the News like this axe murderer is coming and , over the hills, and so they have a security camera on the hills around their house and it's on the TV so they are watching the actual reality
Tyler: maybe the cartoonist drew this so everyone starts arguing with each other
T: just explain what you are on about
Tyler: maybe he drew this so that everyone can start an argument, making a big discussion saying they're are correct and no he is not (class discussion, 10.05.02)

After the initial foray into the realms of reality TV, Tyler's contribution focused the discussion on the role of the cartoonist in the construction of the theme of the cartoon. In my role as discussion coach, I directed the students to build on Tyler's promising lead:

T: has anyone seen other cartoons like Tyler said, possible make you argue. Interesting point of view that one Tyler
Brendan: this is another one, the cartoon dude might have drawn this picture to say like these people are poor people this is what poor people live like
S: maybe they have a security camera just in case there are punks on motorbikes and they try to smash up the windows
T: just put your hands down for a minute I want you to look at Tyler's extension question, Tyler said maybe the cartoonist wants people to argue and people to take on different sides. Think now what possibly could the different sides be if you look at that cartoon, the cartoon is trying to make people argue, what's the two different arguments? Do you want to start with one?
S: mmm, TV and the window

T: right, what is the cartoonist trying to make you argue about Tyler?

Tyler: some people reckon that this thing is this and they start arguing about it

T: OK. That's what I want you to think about, what possible positions could they be taking if one person is saying one thing and one person saying another

S: there is a security camera outside

T: yeah, what else is the cartoonist trying to make us think about?

S: well I was thinking you know how the window has things running down it like that and things across that could be like a TV coming down and they are arguing about who had the idea first about the mountains with the sun on it

T: maybe, yeah

Gaby: maybe the artist is trying to make us argue about inside/outside

T: Did you hear that, Gaby reckons the artist is trying to make us argue about inside/outside but Tyler has started an excellent arm of the discussion which is an excellent take and Gaby has pushed that along a bit. (class discussion, 10.05.02)

This excerpt provides evidence that Gaby and Tyler (not their real names) were able to problematise the construction of knowledge represented by the theme of the cartoon. It also demonstrates that this type of meta-analysis does not come naturally to students and the prompting provided by the teacher as discussion coach was vital for this understanding to take place. However, the fact that the students were able to arrive at this point with assistance rather than simply having the theme pointed out to them is an argument in support of this type of learner-centred pedagogy.

This meta-analysis of the perspectives of the author was also evident in the discussion of Marsden's (1998) use of the rabbit metaphor in *The Rabbits.* An understanding of

Marsden's use of the rabbit metaphor to represent the European invasion of Australia is crucial for any in-depth understanding of the text to take place. The pedagogy of philosophical inquiry provided the opportunity for students to discuss Marsden's construction of the theme using the metaphor. The first discussion question focused on the rabbit metaphor:

> Tony: Okay, Chantell's away. Who would like to start the discussion on why did Marsden use rabbits as a metaphor for this book? Thank-you.
>
> Student: Me? Um, well he might of used it as a metaphor because, because he liked rabbits.
>
> Tony: That's one point of view. Your point of view?
>
> Student: Well my point of view is that rabbits, because some rabbits are white and if you mean like white man and black man well then they could have used the white rabbits as a metaphor for the white man.
>
> Tony: Okay, so why, why is he using white rabbits to mean white man? Why would he put that in the book?
>
> Student: Because they're both white and like rabbits are kind of like contagious and so are we because like we keep on spreading around everywhere and stuff, so.
>
> Tony: So what do rabbits do that's similar to white people. Let's explore that idea. Why are rabbits contagious like white people?
>
> Student: Um, well they move across the oceans in boats and stuff with man and then they spread across all countries and everything and that's what we"re doing we"re taking over countries that belong to Aboriginals and stuff, so.
>
> Tony: That's a fair analysis of the book, thank-you.

> Student: It's like it said in the story it said no fence, no hill or no river could stop them. Because we have all this technology that we can get over those sorts of things and keep going. (class discussion, 24.05.02)

The excerpt of the discussion shows the focus of the class discussion was on the theme of the text. This might not constitute evidence of the students making problematic Marsden's construction of the theme unless one accepts that this type of discussion could not occur unless the students understood the literary device of the metaphor. The explicit mention of the author's use of metaphor, "he could of used it because their sort of like white people because they invade and everything" (student, class discussion 24.05.02) is evidence that the students were aware of Marsden's purpose in the use of the metaphor.

Higher Order Thinking

Students demonstrate higher order thinking when learning tasks require them to organise, reorganise, synthesise, and evaluate knowledge and information (NSW Department of Education and Training, 2003b). The *Creative Countries* activity required the students to reorganise their existing knowledge of geographical concepts that they had learnt from a previous study of an international country. This involved students creating their own country replete with location, climate, resources, language, history, natural features, currency and religion. This reorganisation is one example of higher order thinking. The next example of higher order thinking was the presentation of this new country on a website (see Appendices S & T). For a year six class in 2002, creating a website was quite a progression on the PowerPoint presentations that they were accustomed to producing (see Appendices M-P). The students had to learn how to create hyperlinks and the principles of basic site and page design. This level of design constituted higher order thinking for these children.

The Macquarie River webquest also involved activities that required higher order thinking on the part of the students. The students had to synthesise information from different sources such as websites, apply concepts they had learnt from the Murder Under The Microscope webquest as well as use their local knowledge to develop their response to the problems posed by the webquest (see Appendices G-L). This higher order thinking is demonstrated in an excerpt from one of the slides that was produced in response to a photo published on the webquest (Appendix L): “there are lots of trees being cut down. That causes erosion on the stream bank” (Appendix O). The concept of stream bank erosion being caused by devegetation the students learnt from the Murder Under The Microscope webquest. The students then applied this knowledge to an image of their local river that was published on the site.

Metalanguage

The use of metalanguage in tasks requires students to comment on the language used and the reasons for its use in that particular context (NSW Department of Education and Training, 2003b). This was not a strong feature of the environmental education pedagogy employed in year six at Dry Creek. It was only apparent when one philosophical inquiry lesson focused on Marsden’s *The Rabbits* (1998): “um, there was like Aboriginals here and they were like a different colour and the majority of the people were white people and then like we spread and so did the rabbits so the people are the rabbits” (student, class discussion, 17.05.02).

This discussion arose in response to the question, ‘Why Rabbits?’, framed by one of the students. After this student had clarified for the class that the rabbit was actually a metaphor, a new question was framed that focused on this linguistic device, ‘Why

does Marsden use the rabbit as a metaphor?'. The focus on metalanguage allowed the discussion to move into a discussion of the main theme of the text: "he could of used it because they're sort of like white people because they invade and everything" (student, 24.05.02, class discussion). This one example of the use of metalanguage does not constitute strong evidence for the use of metalanguage in the pedagogy of environmental education in this study.

Substantive Communication

Substantive communication is evident when many opportunities are provided for students to engage in student-student and student-teacher communication that focuses on the substantive topic of the lesson (NSW Department of Education and Training, 2003b). These opportunities were evident in the following tasks in the pedagogy of environmental education observed in this study.

The Murder Under The Microscope webquest involved small group collaboration and whole class discussions that focused on the key concepts that were needed to solve the environmental crime. I noted this phenomenon in chapter four: "the students in each research group presented their information to the rest of the class. These presentations formed part of regular class discussions conducted by Vicki that were a feature of the MUTM unit". In the MUTM unit there were many opportunities for substantive student-student and student-teacher communication.

The Macquarie River webquest involved students developing their presentations in pairs. One pair of boys who I thought would use the opportunity to communicate on other issues like football surprised me by producing a detailed presentation that demonstrated their good understanding of the concepts of riverine ecology (see

Appendices N & O). The text in the appendix also shows that they used their own words, including grammatical errors, to express their understanding, “the Flow of the Macquarie river is affected by irrigation. It effects it by people taking water out of the river which slows it down” (Macquarie River webquest presentation, 5.7.02). I had been observing these two boys closely as I thought they would be off-task in this lesson. Instead, I observed them talking about the question posed on the Macquarie River webquest and was able to read their completed presentation (Appendices N & O). I believe this is evidence in support of substantive student-student communication occurring in this lesson.

The philosophical inquiry lessons were dependent on substantive student communication for their success as students developed the questions that instigated the class discussion. The following excerpt from the philosophical inquiry lesson that focused on *The Rabbits* text (Marsden & Tan, 1998) demonstrates this communication. I had read the text aloud to the class before asking the children to contribute questions that might be worthwhile discussing as a group. These data are presented as dialogue rather than block quotes to emphasise the communicative aspect:

Student : Why were they fighting?

Tony: Why were they fighting? And…Ash.

Ash: Why were like they, why were they, um, why were they fighting white people?

Tony: Yeah, I think that’s probably what he was trying to say, but, Angus I hear your concern. And Nathan.

Nathan: How could they cut down the trees?

Student: That's what I was going to say.

Teacher: It might have been (unclear) as a tributary.

Student: Is that a rabbit.

Student: It's a chook.

Student: That's a beaver.

Tony: Rachel, had a go yet? Rachel.

Rachel: Um, why did they steal what they did if there's something else?

Teacher: Why did they steal..…what they did.

Rachel: Yeah.

Tony: And you Zeb.

Zeb: How come they, how did they do ..(Unclear) they were too small?

Tony: Alright. Who hasn't had a question out of you guys?

Student: Me.

Student: How could they come over the sea on a boat and that?

Tony: Right. How could the rabbit come from overseas? Leave your hand up if you haven't had a question yet. If you haven't had a question.

Student: Me.

Tony: Yep.

Student: Um, how can they make boats come over from the sea? (Class discussion, 17.05.02).

Although the discussion demonstrates some confusion around the understanding of the rabbit metaphor, the students are still discussing the text in an enthusiastic manner. I am arguing that this is different from a teacher question and answer session where only some students might get an opportunity to discuss the theme of the text. Furthermore, some of the questions they developed became the focus of the later class

discussion so the substantive communication on the text continued into another phase. Therefore, most of the communication in this lesson focused on the substantive topic rather than on managerial issues such as teacher rule reminders.

Supportive Learning Environments

The six criteria of supportive learning environments are used in the following section to analyse the pedagogy of environmental education in year six at Dry Creek. These are explicit quality criteria, engagement, high expectations, social support, self regulation and student direction (NSW Department of Education and Training, 2003b).

Explicit Quality Criteria

Teachers provide explicit quality criteria for learning tasks when the quality of work the students are expected to produce is made clear, generally in the form of a rubric (NSW Department of Education and Training, 2003b). No explicit criteria to define the quality of student work were employed in the environmental education tasks in year six at Dry Creek. There are two possible reasons for this. One, the Quality Teaching Framework was published in 2003, a year after these data were collected at Dry Creek in 2002. Although the use of rubrics in NSW did not begin in 2003 their use has become more prevalent since the publication of the Quality Teaching Framework in that year. Two, the location of environmental education outside the key areas of literacy and numeracy in the subject hierarchy in Dry Creek meant that the teacher was less accountable for the outcomes (Smith, personal communication, 2005). This is different to the outcomes for literacy and numeracy in NSW which are made accountable through departmental high stakes testing.

Engagement

Student engagement occurs when lessons relate to students' interests or goals (NSW Department of Education and Training, 2003b). Engagement also occurs when the lesson draws in the student through a compelling issue, question or problem (NSW Department of Education and Training, 2003b). Both types of student engagement occurred in the pedagogy of environmental education in year six at Dry Creek.

Students in year six at Dry Creek had a strong interest in computers. I observed this interest when I tutored the students in the use of the computers in my first visits to the classroom. Vicki capitalised on this interest by integrating the computers into the pedagogy of her classroom in MUTM, Creative Countries and the Macquarie River Webquest. This integration of computers into the pedagogy of classrooms has been identified as a crucial factor in the use of information and communication technologies in primary schools (Moseley et al., 1999). This is in contrast to the use of computers as an alternative free time activity that sits outside of the class curriculum.

The MUTM webquest engaged students through the use of a compelling problem that needed to be solved. In the case of MUTM, the students had to solve the mystery of the disappearance of a fish species. The engagement of students in the quest was demonstrated when I observed the students working on the quest in the classroom outside of the regular class hours. The use of the attractive online interface (Appendix F) and the narrative of the quest itself were important factors in this student engagement. Student engagement in the pedagogy of environmental education

at Dry Creek was engendered through exploiting the students' interest in computers as well as through the setting of compelling problems in the webquests.

High Expectations

High expectations are evident in pedagogy when learning tasks are challenging and conceptual risk taking is encouraged and rewarded (NSW Department of Education and Training, 2003b). The junk sculpture activity was an example of one of these tasks. The students had to create a sculpture from materials found on local properties that represented their view of the Dry Creek environment. This task was artistically challenging because the materials were very hard to manipulate. The students had to be quite ingenuous in their use of the materials in order to represent their concepts (see Appendix Q). In some of the sculptures, this led to students moving to symbolism to convey ideas. For example, a snail was symbolised by a swirl of thin metal rather than a detailed sculpture. The farmer was recognisable by the cow horn hat and the rabbit trap dangling from his arm. The convict was symbolised by a chain around the leg. The junk sculpture activity was challenging because the materials used for the sculptures were junk objects that had to be adapted and interpreted by the students to fit their artistic purposes.

Social Support

Social support involves providing opportunities for students to support each other in achieving the desired outcomes. The provision of tools and scaffolds by the teacher assists in this process (NSW Department of Education and Training, 2003b). Social support was very evident at Dry Creek as Vicki encouraged an atmosphere of respect and support among the students in her class. This social support was underpinned by

the specific pedagogical strategies of small group and whole group discussion and through the use of guides for learning tasks.

The MUTM webquest was an exemplar of the use of social support as a pedagogical strategy. The quest could not be solved without the collaboration of all students in the class. Vicki organised the class so that small groups had to solve different parts of the quest. She regularly brought the small groups together for whole class discussions that focused on the clarification of concepts needed to solve the mystery. The fact that the quest required students to work as a class team greatly assisted in building collaboration in year six at Dry Creek.

The use of learning guides was another method used for social support in year six. Once again, MUTM provided a good example of this feature. The entire learning experience is supported by the online support given on the MUTM website. The mission of the quest is clearly outlined:

> Detectives'Objectives
>
> The immediate objective for detective teams is to solve a fictitious eco-crime**.** Detectives must identify who died (victim), why (villain), the catchment where it happened (crime site), and the contributing catchment factor (issue). There is only one right answer for each of these categories. (OTEN, 2002)

The search for the victim, the villain, the crime site and the issue provides a strong framework for the quest. The strength of this framework combined with the regular small group and whole class discussions provided strong social support for students learning in the MUTM webquest.

The use of the computer as a learning tool was another aspect of the social support provided in the classroom at Dry Creek. In chapter four, I described the computer alcove in the classroom, "scattered all over the bench were the detritus of the previous week's (or term's) activities. This included draft writing assignments on crumpled pieces of paper, numerous pens and pencils and discarded workbooks". From this description it can be seen that the computer alcove was a well used learning station in this classroom. In every teaching/learning activity that was examined in this study apart from the philosophical inquiry lessons the computers had some role to play. This seamless integration was facilitated by a combination of three factors. First, the computers were always on and connected to the Internet. Second, Vicki's student-centred teaching philosophy meant that she could manage the students that were working on group tasks at the computer whilst at the same time have other small groups of students engaged in learning tasks elsewhere in the room. Finally Vicki was able to adapt external curricula, like the MUTM webquest so that the computers were used productively. This productive use was exemplified when I observed the students working on four different tasks at the computers whilst they were solving the MUTM quest. One pair of students was researching catchment areas in an attempt to match these locations to the clues given in the quest. Another group was listening to an audio message of a 'news bulletin' that was archived on the MUTM website whilst another group was researching freshwater fish species of inland Australia. The last pair of students was trawling the MUTM website for more clues that might help them solve the quest (Research diary, 18.05.02).

Vicki would be surprised to see herself being described here as a teacher who employs computers to good effect in her classroom. A part of her rationale for

inviting a researcher into the classroom was to help her strengthen the relationship between computers and learning in her classroom. However, what I found was a classroom that was already using the computers as an everyday tool to enhance learning experiences. All I added to this environment was some extra skills like website design. It was Vicki's notion of a classroom as a student centred learning environment that involved students learning at their own pace on different tasks that was the driving force behind the effective use of computers as a tool in her classroom. The extensive use of student-centred learning and the provision of the computer as a learning tool were salient aspects of the social support that was evident in the pedagogy of environmental education at Dry Creek.

Self Regulation

Self regulation refers to pedagogy where teachers are able to spend more time on teaching rather than managing the class because the students have learnt to regulate their own behaviour (NSW Department of Education and Training, 2003a). There was a strong degree of self regulation in Vicki's classroom as evidenced by the amount of student centred learning tasks that the students were able to complete successfully. These tasks included the websites produced in creative countries (Appendices S & T), the presentations in response to the Macquarie River webquest (Appendices M-P) and the extensive small group work in MUTM that has been mentioned previously in this chapter. I cannot substantiate this claim further because I was focusing on the students' learning rather than keeping logs that recorded their on-task and off-task behaviours. However, it is the students' learning that I have been documenting throughout this chapter that provides evidence that there was a substantial amount of on-task learning occurring in this classroom.

Student Direction

This criterion involves student direction over selection of activities as well as the means and the manner by which these tasks will be done (NSW Department of Education and Training, 2003b). The students in year six at Dry Creek were accustomed to working at activities where they were responsible for the management of their own learning. This management of learning involved the finding of resources, the storing of materials appropriately and making group decisions on the development of their learning product. This was apparent during the junk sculpture activity when students were able to select the subject of their sculptures and the materials used to construct the sculptures.

Student direction was also evident in the philosophical inquiry lessons. The students, with the guidance of the teacher, formulated a list of questions in response to a reading of a text or after looking at a cartoon. The following excerpt is taken from the philosophical inquiry lesson where Leunig's sunrise cartoon (Appendix E) was used as a stimulus for discussion. I introduced the lesson in this way:

> We will sit in a circle I will give you a poem to read or a cartoon to look at like today and I am going to get you to make up some questions so instead of the teacher making up the questions you guys make up the questions. Ms Smith is kindly going to write up those questions on the board and then we will frame those questions up for our discussion. So if you obviously ask a really interesting question then that is much better for discussion , if you ask a simple comprehension question like what colour is the window than that is not much good for discussion. There's one for you Adam, take one and pass it along. When you get it,

don't talk to the person next to you, think about what sort of questions come to your head when you see that cartoon.

A lot of classroom noise of shuffling chairs

Make up your own questions, look at the sheet quietly.

Let's have some questions to start with, anyone in the circle? Tyler?

(Teacher, philosophical inquiry lesson, 10.05.02)

At first, the students' questions were simple comprehension questions and I had to explain the difference between questions that had simple answers and questions that might be used in a class discussion:

Tyler**:** Why don't they have any clothes on?

TL: I don't think we need to write that down. Cartoonists use different styles and this guy, Michael Leunig, just draws people with big noses and goggle eyes, that's just his style, that's a fair enough question, that's just the cartoonists' style. Another question over there?

S: they're watching TV.

TL: mmm, frame it like a question

S; the sun is setting

Other students: that's not a question

TL; let's not criticise each other

S: why is it the same picture out the window as it is on the television?

Tl: that's a good question, that's a question we could work from. We are all new at this, so we can all have a go at asking questions, there is no right or wrong

S: they're on the TV, why are they watching TV and not outside on the mountain

T: that's a good question for you Ms Smith

S: why aren't they sitting on chairs or something?

T: that could be a good question, why aren't there no chairs in the room?

S: why is there only two buttons on the TV?

S; if they like the environment why have they like got wooden floorboards because that is just cutting down trees?

Tl: mm, why is there wooden floorboards, that might be a good question!

Tyler: Why wouldn't they buy furniture before they bought a TV?

T: that's an excellent question, Tyler might be saying why is the TV important? Why is the TV there instead of something else., is it Ok if I rephrase your question like that?

S: how come there is only two of them? (Philosophical inquiry lesson, 10.05.02)

The questions the students construct are often in contrast to the type of questions that a teacher might have framed themselves (Cam, 1995), eg. I would not have thought to ask the question about the clothes, the floorboards or the television. As a teacher, I would have been focused on what I thought was the theme of the cartoon, which only came up in one question: "why is it the same picture out the window as it is on the television?". It would be easy to describe the students' questions in the excerpt above as frivolous or off task but I don't think that would recognise the role that this type of discussion plays in developing students' understanding of abstract themes that the teacher can grasp easily but they may not. This gradual learning process was

continued into the next phase of the lesson when the class discussed the questions that had been formulated and refined in the first part of the lesson.

In common with the first phase of the lesson where the questions were formulated, the transcript of the second phase of the lesson seems to contain what seem like frivolous contributions from the students. These types of unfocused discussion mixed with what I thought were important contributions were one manifestation of student direction at Dry Creek. The following excerpt is from the second phase of the same philosophical inquiry lesson cited above. The discussion occurred in response to the question: why is the same picture outside as on the TV?:

> Belinda: well I think they're saying what is better- man-made better or environmentally friendly products, environment or man-made
>
> T: that's an interesting point in the discussion, it's gone from the Tyler thing about cartoonists trying to make us argue to Jody saying inside/outside and then Belinda saying, OK, what's better, seeing sunrise on TV or the sunrise out the window
>
> Students: TV, TV
>
> T: wait a minute, hands up take your turn, that's the question Belinda has put forward now we can discuss it, thank you Belinda, often asking another question gives us much better answers, Chantelle?
>
> Chantelle: if they were really magic then they could put one eye on the window, one on the TV
>
> Nick: maybe they're trying to see the difference between what it looked like on the outside and what it looked like on TV
>
> T: what is the difference, Nick?

Nick: I dunno, maybe there isn't a difference they are just trying to find out

Seb: I reckon they are watching the TV because they mightn't be strong enough to stand up and look out the window, they might be paralysed or summat and they can't stand up

Jody: maybe it's cold outside and they want to watch it inside

(philosophical inquiry lesson, 10.05.02).

The salient part of the discussion above is Belinda redirecting the question from inside/outside to man-made/natural. Although I adopted the role of discussion coach to draw attention to what I thought was a good discussion question, the question still originated from the students. The response from Chantelle: "if they were really magic then they could put one eye on the window, one on the TV" and the other responses do not appear to build on this question. However the conceptual leap taken by Belinda supports the claim that student direction occurred in philosophical inquiry lessons at Dry Creek. As well, it seems that seemingly unfocused contributions are a necessary part of lessons where the teacher allows student direction to occur.

Significance Beyond the Classroom

The Quality Teaching Framework promotes pedagogical strategies that give learning significance beyond the classroom. The six criteria of significance are related to the pedagogy at Dry Creek in the following section. These are background knowledge, cultural knowledge, knowledge integration, inclusivity, narrative and connectedness (NSW Department of Education and Training, 2003b).

Background Knowledge

This criteria involves building explicit links from students' background knowledge to the pedagogy in this classroom and making links from the known to the unknown for

students (NSW Department of Education and Training, 2003b). This was most evident in the Macquarie River webquest where the students brought their knowledge of concepts learnt in MUTM to the solution of questions posed on the Macquarie River webquest about their own river.

The first screen of the Macquarie River webquest asked the students : “Where does the Macquarie River begin and end?”(Appendix I). I was hoping to draw upon the background knowledge of these students, some of whom had been camping and kayaking in locations very close to the headwaters of the Macquarie River. To help build on this knowledge; I included the end of the river as well in the question. The students were directed to websites by a hyperlink so that they could find the answer: “If you don’t know the answer go to this website to find it.” (Appendix I). Two students were able to locate the information successfully as demonstrated from their presentation: “the Macquarie River begins where the Fish River meets the Campbell River. This is just south-east of Bathurst. It ends where the Castlereagh River and the Barwon River meets to the north of N.S.W.” (Appendix M).

The second screen was designed so that students had to draw upon concepts they had learnt from MUTM. This link to MUTM was made in the instructions given on screen two: “think back to the environmental issues that were investigated in Murder. Choose one of these and investigate if the Macquarie River suffers from the same problem” (Appendix J). A different pair of students from the presentation cited in the previous paragraph was able to utilise the knowledge that they had gained from MUTM: “the Flow of the Macquarie River is affected by irrigation. It effects it by people taking water out of the river which slows it down” (Appendix N).

The third screen of the Macquarie River webquest required the students to identify environmental issues in the local river by looking at images posted on the website (Appendix L). This required students to draw upon their background knowledge of environmental issues that they had developed in the MUTM webquest and that were utilised in the previous activity in the Macquarie River webquest. One group of three girls was able to identify four environmental issues in the local river that were evident from their study of the images on the website:

> Pollution-is caused by careless people littering near and around the river.
>
> Erosion-is caused by land and tree clearing
>
> Effluent-is caused by stormwater run-off and animal poop from the showground.
>
> Salinity-is caused when tree roots are removed and the water table rises (Appendix P).

Another pair of boys cut and pasted one of the images from the website into their presentation and wrote their explanation next to it: "there are lots of trees being cut down. That causes erosion on the stream bank" (Appendix O). These two examples from student presentations support the finding that utilising background knowledge was part of the pedagogy of environmental education at Dry Creek.

Cultural Knowledge

This criterion involves incorporating the cultural knowledge of diverse social groupings into learning activities (NSW Department of Education and Training, 2003b).

The incorporation of cultural knowledges was featured in two of the curriculum texts used in the pedagogy of environmental education at Dry Creek. The hero in the

narrative of the Murder Under the Microscope (OTEN, 2002) was the chef and ecologist Winston No Wei which might suggest that the authors were promoting the benefit of adopting the wisdom of other cultures in our treatment of the environment. Winston's role of ecologist was outlined in the following clue that was posted on the MUTM website during the quest in 2002:

> Visited Winston to pick up that waste schedule. Looks very comprehensive! Had forgotten about drinking from his artificial wetlands though so the visit wasn't totally pleasurable! It tasted OK but when you see the duck pen next door it does put you off! Incidentally Winston was the one that gave Harry the info on the cycle of life in the wetlands which he now delivers to tourists. Also the info on biofilm. It's the green stuff you see at the edge of rivers and wrapped around river snags. Apparently a great source of food for everyone. Scientists describe the effect as the "bath tub ring". I guess we can all relate to that!(OTEN, 2002).

It is interesting to note that it was the Chinese-Australian Winston No Wei, and not the European Australians Harry Cruse or Natasha Von Squatta-Smith, who had the ecological knowledge to notice that something was wrong with the local catchment. Winston's role as ecological whistle blower was noted in the solution notes to the 2002 *Rumble On The River* (OTEN, 2002): "Only one person recognised the crime for what it was. On May 14 2002, Winston No Wei made an anonymous phone call to Catchment HQ to tell them that there had been an unfortunate death. The solving of the crime he left in the hands of the detectives". The incorporation of a Chinese Australian as a hero in the narrative of MUTM could also have been included in

recognition of the fact that Chinese people have been migrating to Australia since the 1850s and have a long history of sustainable market gardening in riverine environments.

The other example of the incorporation of diverse cultural knowledges in the pedagogy of environmental education was the voice of indigenous Australians represented by the first person narrative of *The Rabbits* (Marsden & Tan, 1998). This text was used in a philosophical inquiry lesson (see Appendix U for the entire transcript). The rabbits in the text represent the European invaders of Australia. The import of their ancestry being likened to a feral species caused a reaction in some of these students. Some students could immediately identify with the indigenous perspective and indicated their remorse at the invasion: “Um, well the white people come to the black people and like they should have stayed where they were like they didn’t have to go and take all the black people’s land” ; “it was the black land, the black people’s land and why couldn’t they just share it out and say youse have this half and we’ll have this half ; “Maybe all the white people shouldn’t be here at all, maybe we should be in America or somewhere. Maybe this isn’t our world” (students, class discussion 24.5.02).

Another student in the class disagreed with these sentiments:

> The Aboriginals are still whingeing now about like how a hundred million years ago and how he parked his boat in the sea and came over and started shooting them all and their still whingeing about all these land rites and that oh youse did this to us that long ago and that’s like 100 years ago and their still whingeing about it. And we’re letting them live in a free country and their

> still whingeing about us, not treating them right (student, class discussion 24.5.02)

The authors of the NSW Quality Teaching Framework acknowledge that indigenous accounts of Australian history are a fundamental cultural knowledge requirement for NSW classrooms (NSW Department of Education and Training, 2003a). This fundamental requirement seems to be met in challenging style by the theme of the text, *The Rabbits*, especially when students are given the chance to engage in class discussion as represented by the quotes cited in this section.

Knowledge Integration

Knowledge integration is evident in learning activities when students need to make links between and within subjects (NSW Department of Education and Training, 2003b). The links between activities within the environmental education pedagogy in year six at Dry Creek were strong, especially during the second term of the school year when environmental education was a key focus of the pedagogy. In term two there was explicit links made between MUTM and the Macquarie River webquest. In fact, the sole purpose of the Macquarie River webquest was to consolidate the concepts learnt in MUTM.

There was also implicit integration of the pedagogy as the philosophical inquiry lessons occurred at the same time as the class was working with the MUTM quest. In the philosophical inquiry lesson that focused on the Dr Seuss text, *The Lorax*, (Seuss, 1972), the students were discussing one of the questions that they had formulated:

> Tony: Okay, question 5, why was the land so miserable after the trees were gone? Can I have a look at the book? Yeah but there were no trees, but

> Rachel's point was saying that there was still grass but it looked pretty miserable. So who wants to come in first on that one? Jody.
>
> Student: Megan. Well the trees would have provided food and shade and stuff for animals so if you cut it down then that's it.
>
> Tony: Seb.
>
> Seb: It might have been like the thing we were doing with murder under the microscope 'cause they ripped down all the trees like the water table comes up and everything and it goes all brown and dirt gets in.
>
> Student: Salinity.
>
> Tony: Nice connection with murder under the microscope there. Dan, sorry for taking your book before, your turn (Class discussion, 31.05.02).

This excerpt from the lesson reveals that there was a transfer of learning from one program to another in the pedagogy of environmental education. This knowledge integration was facilitated by the programs running together in the same school term.

This study has demonstrated that environmental education can be taught as an integrated unit in the primary school. The trans-disciplinary nature of environmental education lends itself to curriculum integration. In Bernstein's terms, the integrated code of environmental education blurs the subject boundaries of the key learning areas or subjects in the primary school (1971). According to Bernstein (1971), integration involves 'the *subordination* of previously insulated subjects *or* courses to some *relational* idea" (p.53, italics in original). The relational idea in all the pedagogy was the environment, whether positioned as endangered in Murder under the Microscope, a subject of sculpture in the Junk Sculpture activity or a focus of discussion in the philosophical inquiry lessons.

Inclusivity

Inclusivity is evident in tasks that require the active participation of all students (NSW Department of Education and Training, 2003b). Inclusivity was evident in the diverse learning experiences of the environmental education pedagogy at Dry Creek. The diverse learning experiences that included sculpting with junk materials, using computers to design and create and being actively involved in classroom discussions offered something to most children in this class. One child who only attended the class for two days a week because his behaviour did not permit full integration was an enthusiastic participant in the philosophical inquiry lessons. His contributions were relevant to the discussion about racism in *The Rabbits* (Marsden & Tan, 1998): "It's like chess, white goes first and black goes last and things" (student, 24.05.02, class discussion).

Some of the other students in the class who were not fond of deskwork activities also thrived in the discussion lessons. This was a surprise to me in the first philosophical inquiry lesson as I had expected the children would be reluctant to contribute. In fact, the reverse was true and I had to appeal for order:

> now just stop there for a minute, if we are having a classroom discussion, then we all need to listen to what each other is saying, alright, if there are heaps of voices I won't be able to make out who is saying what on the tape (lesson transcript, May 10 2004).

This enthusiasm to participate on the part of the students was engendered by the pedagogy without the aid of motivational tricks such as giving rewards for good behaviour and having the right answer. This enthusiasm may have been facilitated by the opportunity for the students to learn in different modalities, including verbally

through class discussion, with hands-on activities such as sculpture as well as the computer activities.

Connectedness

This criterion of significance beyond the classroom describes tasks that apply school knowledge in real-life contexts or problems (NSW Department of Education and Training, 2003b). Connectedness to the real world was embedded in the two webquests that the students completed in term two. The Murder Under The Microscope webquest scenario of 2002, *Rumble On The River,* was based in a catchment region very similar in climate and topography to that of Dry Creek:

> Flow is the key to this cycle of life. The creek's natural cycle of seasonal low and high flows provides the vital wetting and drying phases needed for a sustainable ecosystem. Rain dictates the natural flows. Consequently, the creek experiences natural high flows most often in winter while low flows are typical in summer and autumn (OTEN, 2002).

This connectedness was also enhanced because the issues of water flow and water consumption that were the central issue of the MUTM webquest were topical during the three-year drought that Dry Creek was experiencing at the time. It was fortunate in 2002 that the Murder under the Microscope webquest was based on dryland riverine ecology but other curriculum choices such as the junk sculpting also emphasised the connection of environmental education to the students' immediate environment.

The subject of the Junk Sculpture activity was the local Dry Creek environment. This established a direct connection with the students' local environment. The students'

sculptures were of animals, including humans. I noted this in my research diary (August 23, 2002): ‘there are many animals present, like snails, waterbirds and ducks but there was a farmer and a Koori to bring in the historical context”.

This activity enhanced the connectedness of the pedagogy of environmental education to the local environment because it gave the students the opportunity to express their interpretation of the environment in the junk sculptures.

Narrative

This criterion is exemplified by tasks that employ narrative aspects to enhance their significance and enrich student understanding (NSW Department of Education and Training, 2003b). Narrative was a strong feature of the learning in the philosophical inquiry lessons. Both of the texts studied in these lessons approached complex issues in a way that made them accessible to students. For example, *The Lorax* (Seuss, 1972) treated the economy versus environment question as the complex issue that it is rather than take the simple option of polemics. This allowed some students to take different positions on the environment versus economy question posed in *The Lorax*:

> S: You need trees to build houses to put clothes in to live, so you need trees, if you didn’t have trees you wouldn’t have a house. Not unless you want to make it out of heaps and heaps of concrete instead (student, discussion, 31/05/02)

Another student could see an argument for more sustainable business practice on the part of the Onceler:

> S: But wouldn’t it be more sensible to not just go and cut all these trees down and make all these things, why couldn’t he wait for more trees to grow, he didn’t have to have such a big business. He would have been making more money anyway out of the little ones. He could have saved the trees and let the trees regrow (student, discussion, 31.05.04).

MUTM employed narrative to great effect. Characters such as Winston No Wei, Marina Tornados, Natasha Squatter-Smith and Harry Cruse carried the tale of surreptitious ecological crime committed in the name of economic prosperity. The narrative framing of the environmental science concepts enriched student understanding of these concepts. The use of the online learning environment on its own would not have been successful without the narrative.

The narrative in MUTM explored the economic, moral and ethical dimensions involved in environmental decision making. The narrative was sustained by three dimensional characters with complex motivations. Harry Cruse, the ecotourism operator, was a great example of the characters used in MUTM. Harry's business relied on the long term ecological sustainability of the river yet he was drawn into making short term economic decisions that would harm the creek. It was he and Natasha Squatta-Smith, the grazier, who urged Marina Tornados, to keep pumping water out of the local creek even though Marina had already used her allocated water license. This situation was described in the solution notes that were published on the MUTM website after the quest deadline had passed:

> Both Harry and Natasha suggested, however, that saving the district from economic hardship was more important than the technical ownership of a water licence. They urged Marina to take the water anyway. They cited many good reasons for this course of action. It would be an interim measure only. Someone would definitely sell their licence in the next couple of months. Rain was predicted. Lowering the water level a couple of centimetres wasn't going to make that much difference. The creek had never dried up. The downstream

> users would use it if Marina didn't. Marina was persuaded. But the cost to the environment was considerable (OTEN, 2002).

The range of human motivations that influence environmental decision making are evident in the above excerpt from the MUTM webquest. In effect, the characters of the quest were the vehicles for engaging multiple perspectives on environmental issues for the students. This type of engagement afforded by the narrative is a little different from an environmental education lesson that merely seeks to convince students of the merit of a particular position on the environment.

Environmental Education as Quality Pedagogy

This chapter has provided evidence that the pedagogy of environmental education contained many aspects of a quality pedagogy as defined by the NSW Quality Teaching Framework (NSW Department of Education and Training, 2003a). The Quality Teaching Framework could be regarded as a blueprint for the weak framing of pedagogy. This is exemplified by the plurality of pedagogical approaches that the framework promotes. As this weak framing of pedagogy is not prescriptive it does not support any particular representation of the environment such as the objectification of the environment associated with the strong classification of pedagogy.

The student-centred learning promoted by the framework is also implied by criteria such as problematic knowledge, self-regulation, student direction and cultural knowledges that suggest that framing of the pedagogy is not solely teacher-driven. Therefore, the quality pedagogy of environmental education detailed in this study constitutes weak framing that does not support any particular representation of the environment. This is the same weak framing of pedagogy that was identified in Chapter Five. The Quality Teaching Framework, with its emphasis on student centred

pedagogies, has highlighted the weak framing of the pedagogy of environmental education in this chapter.

Summary

This chapter analysed the pedagogy of environmental education using the criteria of the Quality Teaching Framework (NSW Department of Education and Training, 2003a). This analysis revealed that environmental education in this study demonstrated many aspects of quality pedagogy. This quality pedagogy was then linked to the Bernsteinian notion of weak framing that was characterised by plurality of teaching approaches and student-centred learning. It was argued that this weak framing was not prescriptive so it could not support any particular representation of the environment in the pedagogy of environmental education.

This finding of the association of quality pedagogy and weak framing is now set aside the other finding from chapter five that the strong classification of the pedagogy of environmental education supported the objectification of the environment. The contrasting findings could be regarded as a measure of the worth of conducting an analysis of the data using two different theoretical frameworks. The Quality Teaching framework (NSW Department of Education and Training, 2003a) has assisted in the explication of Bernstein's weak framing of pedagogy as it applies to environmental education. This explication, along with the account of the strong classification and strong and weak framing presented in chapter five, has presented a broad picture of the pedagogy of environmental education.

CHAPTER EIGHT CONCLUSION: PEDAGOGY AND STUDENTS' UNDERSTANDING OF THE ENVIRONMENT IN ENVIRONMENTAL EDUCATION

This thesis set out to explore the pedagogy of environmental education in one school classroom. The aim of this exploration was to develop a better understanding of the pedagogy of environmental education as well as to examine its relation to students' understanding of the environment. The justification for this exploration, the methodology employed in its execution and the findings are summarised in the first part of this chapter. The implications of these main findings for the theory-practice of environmental education are then presented. The second part of this final chapter outlines some recommendations for the research and practice of the pedagogies of environmental education for the primary school classroom.

Justification

The first justification offered for the conduct of this study was the paucity of published research evidence relating to the pedagogy of environmental education. This paucity was apparent in a survey of the articles published in the Journal of Environmental Education (US) and Environmental Education Research (UK) published in the last ten years. The survey revealed that there were more articles published on what should be taught in environmental education (curriculum) rather than how it should be taught (pedagogy). The results of the survey also revealed that there was a strong evidence base pertaining to the philosophy and methodology of environmental education and environmental education research that needed to be matched by commensurate research into the pedagogy of environmental education.

One argument put forward for the dearth of research into pedagogy was that the marginalised position of environmental education in the school curriculum in NSW did not provide enough opportunities for this research to take place.

The second warrant for the study was grounded in an exploration of the objectification of the environment finding that emerged from the research project that preceded this study. This finding that was the outcome of a survey conducted in a school context required further exploration as it suggested that schools might play a role in this objectification of the environment (Loughland et al., 2003). This argument was qualified by the reality that the objectification of the environment was an inevitable product of a traditional episteme of education that is built on the subject-object distinction. However, it was also argued that this objectification had particular implications for students' understanding of the environment that seemed to run counter to some of the aims of environmental education.

The educative process, or the pedagogy, of environmental education was analysed using Bernstein's (1990) model of the pedagogic device. The key concept employed from this device was the Pedagogic Recontextualising Field (PRF) and the associated Bernsteinian notions of classification and framing. These concepts underpinned the analysis of the major stakeholders in the PRF of environmental education in the state of NSW. These included the four main paradigms of environmental education theory-practice that were identified as the positivists, constructivists, critical theorists and post-modernists. Each of these paradigms with their distinctive epistemologies and pedagogies provided more evidence of research into the classification rather than the framing of environmental education.

The other theory of pedagogy introduced in chapter two was the Quality Teaching Framework (NSW Department of Education and Training, 2003b). This framework emanated from a larger body of pedagogical theory that was traced back to the authentic pedagogy movement in the US (Newmann, 1996a). Essentially these theories focus on the nature of student performance rather than on the construction and deconstruction of pedagogies. From this perspective, pedagogies are only important in their role in producing authentic student achievement (Newmann, 1996a). The Quality Teaching Framework was important to this study as it offered another analytical framework for the analysis of the pedagogy of environmental education. This analysis commenced with student performance, complementing the Bernsteinian analysis that focused on the sociological construction of curriculum in the pedagogic recontextualising field.

The two theories of pedagogy presented in chapter two, although different in their foci, presented an overall view of pedagogy as being a complex socio-cultural construction. This view of pedagogy contrasted strongly to the positivist view of pedagogy as being a simple act of knowledge and attitude transmission and acquisition. The more complex understanding of pedagogy was crucial to the conduct of this study as it presented pedagogy as a phenomenon that could be analysed in sufficient depth to warrant a study of this kind.

Methodology

The methodology chosen for this study was a classroom ethnography of the pedagogy of environmental education. The selection of one particular classroom was based on three selection criteria. One, the classroom teacher planned to focus for at least one

term on environmental education. This form of theoretical sampling was necessary because the marginalised position of environmental education in the primary school curriculum meant that random selection might have yielded a class where no environmental education was taught at all. Two, there was already a relationship of professional trust established between the researcher and the classroom teacher. Three, the classroom was located in close proximity to the university campus where I was employed as a full-time lecturer.

The classroom ethnography was underpinned by the researcher acting in the role of participant observer in the year six classroom for one day a week over three terms of a school year. The researcher also contributed ideas to the planning of the lessons, planned and conducted a series of lessons as well as offering specific expertise in the form of computer mentoring to the students in this class. These methods yielded a variety of data that presented a broad picture of the range and possibilities of the pedagogy of environmental education.

The data were analysed by treating all the diverse forms of data as one large transcript. These data were coded using the principles of coding suggested by Glesne and Peshkin (1992). Provisional codes were developed from the initial reading of the transcripts that were then refined into key categories that involved the aggregation of these initial codes (Glesne & Peshkin, 1992). These categories were tested by re-examining their validity within the complete data to prevent the reductionism that might occur when working with isolated quotes from the data (Bowden, 2000a). The process of writing data summaries and conference papers constituted another important form of thematic analysis for this thesis.

The analysis of the data that occurred during the process of writing led to the realisation that the analysis needed to be strengthened by a more robust theoretical framework. As a result, the two theories of pedagogy examined in chapter two, Bernstein's and the NSW Quality Teaching Framework, were employed in analysing the data. This resulted in the creation of two different views of the pedagogy of environmental education. These different views are summarised in the findings of the thesis.

Findings

This thesis set out to examine the relationship of the pedagogy of environmental education to students' understanding of the environment. This exploration resulted in two main findings. One, that there is strong classification and framing of the pedagogy of environmental education that supports the objectification of the environment. Two, there is also weak framing of the pedagogy of environmental education that does not support any particular representation of the environment in the pedagogy of environmental education.

The first finding of this thesis is that there is evidence of the strong classification and framing of environmental education that is centred on the objectification of the environment. Chapter six of this thesis identified four different representations of an objectified environment in the pedagogy of environmental education. These were environment as endangered, environment as economic resource and environment as scientific object. The strong classification and framing of the pedagogy meant that these themes were prominent in student's understanding of the environment. There was also one objectified representation of the environment, that of environment as

recreational idyll, that emerged from one aspect of the pedagogy where the students took control of the framing of the task. This was one example of the unintentional weak framing of the pedagogy of environmental education.

The second main finding is that environmental education at Dry Creek contained aspects of a quality pedagogy as defined by the NSW Quality Teaching Framework (NSW Department of Education and Training, 2003a). In Bernstein's terms, the quality pedagogy was an example of the weak framing of pedagogy as evidenced by the amount of student-centred learning that occurred in the classroom (Bernstein, 1971). So the analysis that employed the Quality Teaching Framework confirmed the weak framing of the pedagogy that was established using the Bernsteinian framework in Chapter Five.

The two main findings outlined cannot be used as evidence to argue that students will develop more relational, rather than objectivist, views of the environment as a result of the quality pedagogy of environmental education that is associated with the weak framing of the pedagogy of environmental education. Instead, the focus should be on providing pedagogies of environmental education that allow students to develop their own views on contentious issues such as environmental degradation. These pedagogies of environmental education will be enhanced if curriculum developers and teachers are aware of the implications of the strong and weak classification and framing of the pedagogic discourse in this area. This understanding is especially pertinent for teachers given the reminder that the classroom is an important site of pedagogical recontextualisation that has been one outcome of this study.

The Implications of the Research Findings for the Pedagogy of Environmental Education

The implications of the findings for the pedagogy of environmental education are presented in the next part of this thesis. First, the implications of the strong classification and framing of pedagogy that supports the objectification of the environment are addressed. Second, the implications of the weak framing of the pedagogy of environmental education are explicated. Included in the implications of weak framing is a re-examination of Bernstein's model of the pedagogic device in light of this study's outcome that the classroom is an important site of pedagogical recontextualisation.

Implications of the Strong Classification and Framing of the Pedagogy of Environmental Education

This study found that the strong classification and framing of the pedagogy of environmental education supported the objectification of the environment in students' understandings in this area. This finding needs to be examined in the broader context of the subject-object distinction that lies at the foundation of western epistemology. The subject-object distinction dates back to Aristotle. Esland (1971, p.75) argues that objectivism has been "embedded in the norms of academic culture and its transmission". It may be that the objectification of the environment in the pedagogy of environmental education is almost inevitable given this weight of academic tradition. This inevitable construction of the environment as an object in formal education has prompted calls for the abolition of environmental education as a separate subject area in the school curriculum. Orr (1992) argues that all education should be regarded as environmental education as the values of environmentalism

need to underpin all schooling. Martin sees the dangers inherent in the existence of environmental education as an "adjectival adjunct" to a system that 'tends to neglect the social, economic, political, and deeper cultural aspects of the ecological problem" (Martin, 1996, p.51).

There is an argument, therefore, that the existence of the objectification of the environment within the pedagogy of environmental education is due to the position of the discipline within the formal education system. However, this thesis argues the relation is more complex than is suggested by the critiques offered by Martin (1996) and Orr (1992). This complexity is presented in the implications of each particular objectified representation of the environment that were identified in this study.

Environment as Endangered

The specific objectification of "environment as endangered" in the pedagogy of environmental education that was evident in this study can be read as being a product of the guiding rationale of environmental education (Grun, 1996). As outlined in Chapter One, the area of environmental education was established to solve the growing environmental problems of the planet. Therefore, the raison d'etre of the emerging subject area was to solve environmental issues (Van Weelie & Wals, 2003). The construction of an objectified, endangered environment in need of salvation in the pedagogy of environmental education emerges from this rationale (Grun, 1996).

The raison d'etre of environmental education is that human damage to the environment requires human intervention in the form of an environmental education (Grun, 1996). In this discourse, environmental education is the solution and the salvation. This type of environmental education is underpinned by the assumption that

improved knowledge of the endangered state of the environment will lead to improved environmental attitudes and behaviour. However, it has been argued that the endangered environment/ environmental crisis discourse has reached saturation point in our society through over-exposure in the electronic media (Grun, 1996). Grun (1996) argues that this saturation leads to helplessness and despair on the part of children and adults who then see the environmental crisis as being beyond their locus of control.

Environment as Recreational Idyll

It has been argued in the literature that the representation of the environment as a recreational idyll is inaccurate, creates false expectations and leads to unhelpful environmental evangelism on the part of some educators. The representation of the environment as a recreational idyll reflects a passive, static view of a nature whose only function is to act as a human playground. This static conception of nature does not reflect the reality of the natural environment now or in the past. The natural environment has always been in a state of flux (Veel, 1998). This representation also does not reflect the interconnectedness of humans with the biosphere (Veel, 1998).

The objectification of environment as idyllic nature has been described as an "environmental arcadianism or a post-historic primitivism" (Grun, 1996, p.342). An integral part of this conceit is that the human species can return to a pristine nature once we eliminate all of our current environmental problems. This myth is particularly problematic when the Earth is positioned as a "spurned lover with whom we are trying to renew an intimate relationship" (Gough, 1992, p.199). Gough (1992, p.199) regards this myth as "especially ironic" when Mother Earth is gendered female given the suppression women have suffered for aeons.

The return to a pristine, unspoilt nature as portrayed in the nature as idyll representation is a false hope. Nature everywhere is no longer unspoilt (if it ever was) given the impact of human settlement across the planet on the natural environment. There is no going back. Luke (1997) describes this condition as the state of 'Denature': "Whatever Nature once was cannot be regained because it existed as a set of forces, settings, or conditions when the human, or, more pertinently, the humachinic, influences upon planetary ecologies were very low impact" (p.1377).

Environment as Economic Resource

It is argued by some environmental educators that the concepts of environmental and ecological sustainability disguise exploitation of the environment through semantic camouflage. The camouflage occurs because the word sustainability has become a cliché taken up by neo-conservatives as well as pragmatic environmentalists (Jickling, 2001). The sustainability threshold moves up or down according to the economic paradigm that you are working from. Foster (2001) argues that the concept of economic sustainability is not something that can be objectively measured, therefore making it unsuitable as an external goal for environmental education. Instead, he maintains that determining what exactly is sustainable should be the process rather than a predetermined goal for environmental education (Foster, 2001). This notion of curriculum as a process seems to be close to the Bernsteinian notion of the weak framing of pedagogy.

Environmental sustainability has become a feature of international policy documents in environmental education since it first appeared as the principle idea in the Agenda 21 document that emerged from the 1992 Rio Summit (United Nations Sustainable

Development, 1992). Sustainability was the key goal for environmental education outlined in the Thessalonika Declaration (UNESCO, 1997) and its importance is recognised in the title of the 2005 UNESCO policy on education for sustainable development (UNESCO, 2005). This policy forms the centrepiece of UNESCO's decade for sustainable development 2005-2014. However, it has been argued that the concept of sustainability so enthusiastically embraced without proper critique can become self-validating (Jickling, 2001). Jickling (2001) argues that the broad differences in the meanings inscribed by the term sustainability by the diverse range of stakeholders in environmental education make the concept too broad to be useful.

The determinism of environmental education implied by an education *for* sustainability is reminiscent of the evangelical discourse identified in the pedagogy of religious education in the 1980s (Crawford & Rossiter, 1988). Crawford and Rossiter went beyond the critique of evangelistic pedagogy to suggest an alternate pedagogy that recognised that adolescents needed an educational context in which to develop their own values and identity rather than being expected to conform to an imposed set of values (Crawford & Rossiter, 1993; Crawford & Rossiter, 1995; Crawford & Rossiter, 1996). Jickling's (2001) critique of education for sustainability is similar to Crawford and Rossiters' critique of the evangelism inherent in religious education. They both see education as being about giving students the chance to develop their own beliefs and values rather than have them imposed from above.

Environment as Scientific Object

Chapter Two of this thesis outlined the important influence that the discipline of environmental science has had on the development of the associated area of environmental education. This influence of environmental science was associated

with the positivist paradigm of environmental education. It was argued that the positivist paradigm was associated with education *about* the environment. Education about the environment was exemplified in this study in the representation of environment as scientific facts (see Chapter Five). At Dry Creek, the discourse of environmental science was most evident in the Murder Under The Microscope webquest. Salient aspects of this discourse included the presentation of scientific measures in the webquest: "Water temperature is slightly higher than normal but nothing out of the ordinary" (OTEN, 2002). In the language of science education, the environment is an object of study. This has been described as the orientation of the science curriculum towards "curriculum as fact" (Young, 2004, p.115). It could be argued that this is a positivist view of pedagogy concerned with the transmission of these facts. There are clear links, therefore, between positivism, objectification and the origins of environmental education pedagogy in environmental science.

Implications of Weak Framing for the Pedagogy of Environmental Education

There are both positive and negative implications of the weak framing of the pedagogy of environmental education. The positive implications centre on the opportunity for teachers to develop their own pedagogies for environmental education. This opportunity for school-based curriculum development is also supported by the evidence presented in this study that the classroom is a legitimate site of pedagogical recontextualisation. The negative implication of weak framing stems from the non-compulsory nature of environmental education.

The weak framing of the pedagogy of environmental education presents opportunities for practitioners of environmental education to develop their own pedagogy for their

class that is suitable for their context. As there is no system of state-wide testing for environmental education as there are for the main subjects of Mathematics and English, there is no pressure for the teacher to cover any prescribed curriculum outcomes. This may result, as was the case in Dry Creek, in the emergence of diverse pedagogies of environmental education. This diversity has been criticised for its educational tokenism by Gruenewald (2004, p.74) who argued "that teachers and students can be said to "do" environmental education if they plant a garden, write a poem about nature, measure pollution, or research the extinction of species". Foster (1999) has also claimed that the interdisciplinary nature of environmental education is problematic as the integrity of each discipline is significantly compromised in any integrated learning unit. However, this thesis takes a different view of the effects of a diverse pedagogy of environmental education, arguing from the evidence of this study that the weak framing of pedagogy seemed to represent quality pedagogy as measured by the NSW Quality Teaching Framework (NSW Department of Education and Training, 2003b). The weak framing of the pedagogy approached the environment, which is out there and objectified in the strong classification of pedagogy, from perspectives that seemed to draw that environment into a closer relationship with the lives of the students. This reality seemed to reflect some of the pedagogical possibilities of humanities-based responses to the environment suggested by Foster (1999).

The possibility of school-based development of pedagogy for environmental education is further enhanced by the recognition that Bernstein's model of the pedagogic device gives to the classroom as being a legitimate site of pedagogical recontextualisation (Bernstein, 1990). This recognition that teachers and students play

a significant role in the realisation of curriculum knowledge should encourage teachers to take an interpretative approach to the pedagogy of environmental education. This approach would give the teacher a role in the interpretation of curriculum documents that recognised their professional status. As well, students would have a chance of constructing their own knowledge in this pedagogy.

This influence of teacher and student on the realisation of knowledge in the classroom is recognised in Bernstein's model (1990) as taking place in the field of pedagogic reproduction. Bernstein identified three fields in the pedagogic device. These were the fields of production, recontextualisation and reproduction of knowledge (Bernstein, 1990). According to this model, the production of knowledge occurs in the academy and private research centres (Singh, 2002). In the pedagogy of environmental education, the production of knowledge about environmental issues occurs in the faculties of environmental science. The model of the pedagogic device succeeds as an explanatory theory for environmental education at the level of knowledge production. The application of the model to the pedagogy of environmental education becomes more complicated at the level of the fields of pedagogic recontextualisation and reproduction.

Bernstein described the recontextualisation of knowledge as occurring in state departments of education and training, curriculum authorities, specialist educational journals and in teacher education institutions (Bernstein, 1990). In this study, the recontextualisation of the knowledge taught in the classroom occurred at the authors' (and cartoonists) table that created the texts used in the philosophical inquiry lessons. The only other source of recontextualised knowledge evident was in the Murder

Under The Microscope webquest that was produced by OTEN, a state agency involved in the production of curriculum resources. The junk sculpture activity, the Macquarie River webquest and the creative countries tasks used in the classroom were all produced onsite. This level of curriculum development by the teacher was described by Bernstein as occurring in the field of knowledge reproduction (Bernstein, 1990). This apparent merging of the field of knowledge reproduction and recontextualisation could be used as an argument to rethink Bernstein's model of the pedagogic device until one re-examines Benrstein's explication of the field of knowledge reproduction.

The label of knowledge reproduction is a little misleading as Bernstein argued that knowledge recontextualisation occurred in the classroom as teachers and students translated the pedagogised knowledge from the field of recontextualisation (Singh, 2002). There are two types of recontextualising discourses in the classroom. The first is where "teachers may recontextualise discourses from the family/community/peer groups of students for purposes of social control…" (Singh, 2002, p.577). The second is the opposite situation where "the family/community/peer relations can exert their own influence upon the recontextualising field of the school and in this way affect the latter's practice" (Bernstein, 1990, p.199). Both recontextualising discourses were evident in the field of knowledge reproduction of the pedagogy of environmental education in this study.

Vicki's recontextualisation of the Murder Under The Microscope webquest was not for the purpose of social control but to enhance the pedagogy of the quest. Another teacher employing this pedagogy might have used the webquest as a tool for the

explicit teaching of the ecological concepts that were the core knowledge of this curriculum. Instead, the students in Vicki's class worked inductively towards an understanding of the concepts, constructing their own understanding of the concepts in small groups and through whole class discussion. This student-centred learning is not inherently a superior pedagogy but this example does demonstrate that teachers like Vicki have an important role in the recontextualisation of knowledge that is realised in the classroom. This is especially true in a marginal area of the formal curriculum such as environmental education where there are no strong prescriptions for what is taught and how it is to be taught by state curriculum authorities.

The philosophical inquiry lessons were an example of a recontextualising discourse where the students had some influence over the direction of the lessons. The students developed the questions that guided the ensuing class discussion and that meant that the outcomes of the lessons were not predictable. The students responded to the knowledge as represented by the themes of the texts in ways that could not be anticipated. The complexity of the narratives used in the lessons meant that the students did respond in quite different ways to these texts. This process was facilitated by the use of philosophical inquiry as a means of accessing the students' responses. The diversity of students' responses that resulted in these lessons supports the view that the classroom is important as a site of recontextualising discourse in the field of knowledge reproduction. This recontextualising discourse as represented by the pedagogy of philosophical inquiry might also help to prevent the type of determinism inherent in environmentalist approaches to education that only endeavour to teach, or inculcate one view of environmental issues.

The negative implication of the weak framing of the pedagogy of environmental education is that it has no official mandate for its implementation. In the marketisation of the school curriculum that has occurred with the dominance of economic rationalism, the measurable basic skills take precedence over subjects like environmental education (Bernstein, 2000). This means that in some schools there will be little environmental education taught at all. This should not be the case as there are many spaces within the existing curriculum where teachers can address the objectives of their particular environmental education policy documents. Some of these spaces are included in the recommendations for the practice of environmental education that appear in the next part of this chapter.

Recommendations for the Practice of Environmental Education

The practice of the pedagogy of environmental education could be enhanced by incorporating some or all of the following elements. The elements are connected trans-disciplinarity, the technoscape, and explicit science and technology. As well, the discipline should take advantage of the resources that are made available for environmental education by external agencies.

Connected Trans-disciplinarity

The trans-disciplinary nature of environmental education was evident in the classroom that was the focus of this study. Environmental education was taught in the subject areas of visual arts, science and technology and social studies. An explicit approach to developing such trans-disciplinary units has been developed in the state of Queensland. 'Rich tasks' was the name given to the practice of developing trans-

disciplinary learning units by Education Queensland as part of their New Basics framework:

> The Rich Task is a reconceptualisation of the notion of outcome as demonstration or display of mastery; that is, students display their understandings, knowledges and skills through performance on transdisciplinary activities that have an obvious connection to the wide world (Education Queensland, 2001).

'Rich Tasks' is a useful organizing concept for this study because it connects the subject integration and connectedness to the real world that was a feature of the pedagogy of environmental education in this study. As well, it clearly identifies the development of new practices as being a central aim of pedagogy. This emphasis on assessing students through their performance on a well scaffolded task that has "obvious connections to the wide world" (Education Queensland, 2001) seems almost tailor made for the pedagogy of environmental education. The coupling of assessment with performance also embeds the accountability processes of education systems within the teaching and learning experience (Loughland & Parkes, 2004). This obviates the need for discreet assessment systems like standardised testing in schools that tend to reinforce the subject/object binary rather than break it down.

Utilising the Technoscape

The seamless integration of computers in the classroom at Dry Creek was described in chapter six. This integration is particularly important given that children now inhabit a technoscape in their out-of-school lives (Payne, 1997). Payne describes this technoscape: "where individuals are constantly surrounded by, preoccupied with and engaged by an ever increasing range of technological artefacts, economic imperatives

and necessities and other lifestyle complexities and demographic/ geographic realities" (Payne, 1997, p.136).

The reality of the technoscape is a part of a strong argument that suggests that classroom pedagogies should recognise that students come from backgrounds replete with all types of technological artefacts (Nixon, 2001). This reality, however, does not mean that educationalists have to accept the technological determinism of the argument that if computers exist then schools must use them (Bigum, 1997). There is some evidence from the data in this study that suggests the strategic use of small number of classroom computers is a worthwhile educational investment. In Vicki's classroom the computers were just one part of a learning environment where students used a variety of technical artefacts and engaged in social interaction to achieve their learning aims.

Explicit Science and Technology

In NSW, science and technology are combined in the one key learning area for the K-6 grades (NSW Board of Studies, 1993). Many of what might be termed environmental education outcomes are located within this key learning area (NSW Board of Studies, 1993). This means that the pedagogy of science and technology education in the primary school is often the pedagogy used to teach environmental education. This might result in the strong framing of environmental education pedagogy as the simple transmission of scientific facts unless the process of doing science is made explicit for the students. Fortunately, there are some existing pedagogical strategies in primary science and technology that facilitate this process. These strategies are border crossing and appropriate design.

Border Crossing

Border crossing is the term coined by Aikenhead (2000) to describe the teaching of science as an explicit process that clearly defines for students the boundaries of the paradigm. In this process, Aikenhead (2000) suggest that teachers act as travel agents who assist in the students' crossing of the border that separates common sense interpretations of scientific phenomena with the western scientific explanation. Aikenhead (2000) suggests that the cultural diversity of student populations requires the explicit teaching of the science paradigm as most students will not bring experience of scientific discourse to the classroom. This thesis recognises Aikenhead's (2000) argument in respect to cultural diversity but also believes that the explicit teaching of the boundaries of science develops the scientific literacy required for students to be able to read and critique scientific texts. This is especially important when environmental issues are often reduced to scientific problems that ignore any of the moral and ethical implications of the situation (Bowers, 1996). Border crossing can facilitate an awareness of the limitation of the science paradigm in the framing and description of environmental issues.

Appropriate Design

Design education is an integral part of the technology education that is included in the NSW K-6 Science and Technology Key Learning Area (NSW Board of Studies, 1993). Design education is often stereotyped as the domain of the Design, Make and Appraise heuristic associated with students creating new products. However, a productive area for ecological debate is the discussion of appropriate design focusing on existing products. The criterion of ecological sustainability can be added to the regular criteria of form, function, aesthetics and cost (Fleer & Jane, 1999) . In this way, young students can develop ecological literacy as an analytical tool. This is

especially pertinent given the hyper-consumerism that seems to be a priority in affluent western societies (Oliver, 1996). A critical ecological literacy that may impact on students' patterns of consumption (and over consumption) is an example of the how ecological values might be incorporated into the science and technology education of primary school classrooms.

Use of External Resources

There are many curriculum developers in environmental education outside of the school system that are producing a diverse range of resources for environmental education. Teachers in schools need to take advantage of this surfeit. In this study, Vicki successfully employed Murder Under The Microscope, a webquest produced by the Department of Land and Water Conservation in her classroom. As well, Dry Creek Public School had successfully applied for grants from the NSW Environment Protection Authority to help towards the beautification of the school grounds. The use of these external agencies can supplement the meagre resources of schools.

Many of the educational packages and kits that are developed by external agencies need to be modified and translated by the teacher, which is very similar to the translation of syllabus outcomes that is the daily work of schools. There is a clear difference between using external resources judicially and the uncritical adoption of them by teachers.

Recommendations for the Research of Environmental Education

Chapter two of this thesis argued that research into the pedagogy of environmental education had contributed more to its classification than framing. That is, the majority

of the research has focused more on *what* should be taught in the name of environmental education rather than *how* it should be taught. This has important implications for the area of environmental education as it has not appeared to sufficiently problematise the objective construction of the environment in the curriculum. In essence, the majority of the research has taken this objectification as a given rather than seeing it as the realisation of a traditional epistemology (Esland, 1971). The key idea here is that of pedagogy as the active realisation of knowledge (Esland, 1971). If research in environmental education recognised the recontextualising role of pedagogy then a different account of the possibilities of environmental education might be constructed. This view of pedagogy is a more empowering vision for the area of environmental education than the caricature constituted by a deterministic intervention designed to change the environmental behaviours and attitudes of school students.

This thesis makes recommendations for research into environmental education that flow out of the implications of the findings presented in the first part of the chapter. The main thrust of the implications for research was that pedagogy should be regarded as being the social realisation of knowledge. This would involve research in environmental education making problematic both the classification and framing of the pedagogy of environmental education. This process would necessarily involve examining the question of what counts as valid knowledge in environmental education and examining the arbiters of this validity. As well, it would focus attention on the theories of learning that are privileged in the teaching of environmental education. Finally, it might involve a fine-grained exploration of the processes of mediation that occur in the pedagogy of environmental education.

Recommendation One: Research into the Framing of Environmental Education

The first recommendation that this thesis makes for research into environmental education is that both the classification and framing of environmental education should be subject to the scrutiny of critical research. This thesis has argued that existing research in environmental education has focused more on the classification, or what is taught, in environmental education rather than the framing, or how it is taught. This recommendation is not a simplistic call for more research into framing so as to balance the account but more a call for the reconceptualisation of pedagogy as the active realisation of cultural knowledges. This involves examining the role of pedagogy in the recontextualisation of cultural knowledges through the processes of classification and framing. This reconceptualisation leads to a scrutiny of what counts as valid knowledge in environmental education, which is the next recommendation of this thesis for research into environmental education.

Recommendation Two: Research as Contestation

If research into environmental education is to be a legitimate field of recontextualisation then it must question the epistemologies of the cultural knowledges with which it engages. Environmental science, with its focus on the study of the objectified environment should be seen as a conditional episteme open to contestation and not as a holy relic that cannot be challenged. The official discourse of environmental education, as represented in UN declarations such as Thessalonika and Agenda 21 (UNESCO, 1997; United Nations Sustainable Development, 1992), also needs to be recontextualised by research that examines its instrumentalism and determinism. This thesis does not advocate the wholesale rejection of both of these epistemologies. They will continue to be a source of knowledge for the area of

environmental education. However, research in environmental education needs to play a proactive role in the critical application of these sources of knowledge.

Recommendation Three: Embracing Learning Theory

The next recommendation is for research into environmental education to recognise validated theories of learning in their accounts of learning in the discipline. The emphasis on positivist research in environmental education in the first two decades of research in the discipline meant that learning theories that were being developed and refined in the broader field of educational research were largely ignored (Dillon, 2003). Dillon goes a step further than suggesting mere engagement with learning theories as he calls on researchers to focus "on developing new models of learning in the context of environmental education" (Dillon, 2003 p.4). This thesis endorses Dillon's view, especially given the freedom that exists for innovation given the weak state accountability measures for the area of environmental education.

Recommendation Four: Embracing Pedagogical Theory

The final recommendation for research into environmental education is that it should examine in fine-grained detail the processes of mediation that take place in the pedagogising of environmental knowledge. Bernstein's pedagogic device (1990) provided a useful structural framework for the analysis of the pedagogy of environmental education for this study. However, the pedagogic device remains an abstract model that needs to be disciplined by empirical accounts. This thesis was able to shed some light on the role of the pedagogic recontextualising field in the objectification of the environment in the pedagogy of environmental education. More research needs to be conducted in the semiotic mediation that is integral to the construction of this pedagogical device. Indeed, Bernstein himself (2000) commented on the contribution that the field of systemic functional linguistics and its fine-grained

discourse analysis had made to his model of pedagogical relations. This thesis is particularly interested in further research that would involve fine-grained linguistic analysis of the objectification of the environment in classroom discourse.

Final Thoughts

The most important aspect of the model of pedagogical relations described in this thesis is that it places renewed importance on the classroom as a site where cultural knowledges are recreated and reproduced. As well, it emphasises the seminal role that research in environmental education has in the critical scrutiny and contestation of official cultural knowledges that emanate from environmental science and the official channels of environmental education. The objectification of the environment may well remain a strong feature of environmental education but its dominance should not remain uncontested or unexamined given the findings of this study. Finally, the quality pedagogy of environmental education that was evident in this study should be promoted as one possible method of teaching environmental education in schools in NSW.

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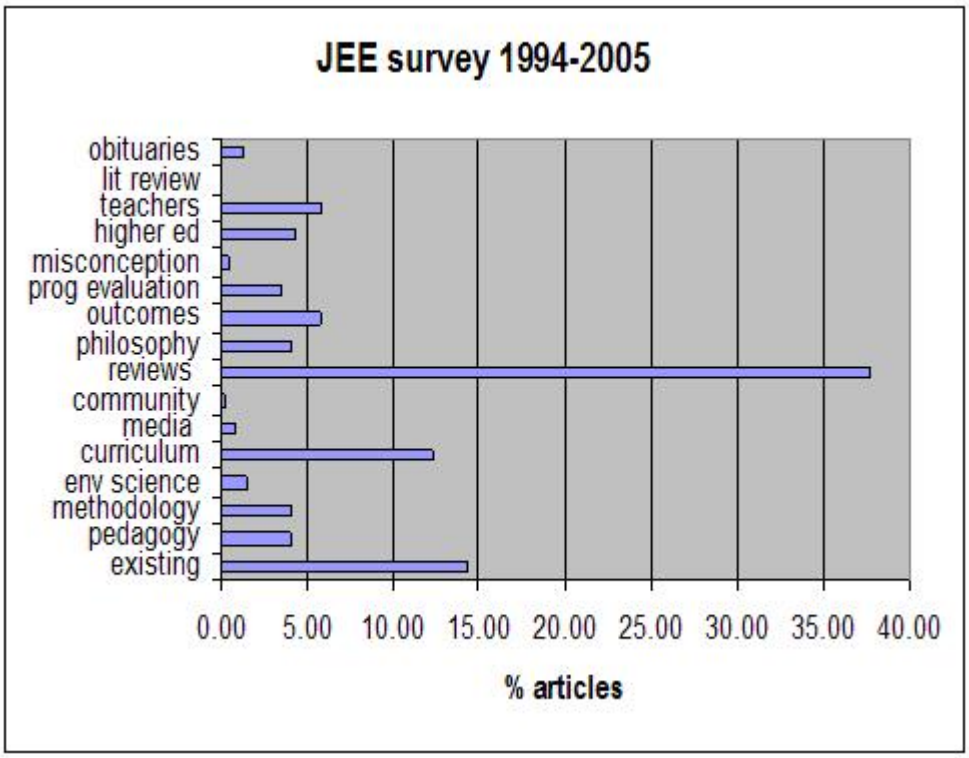
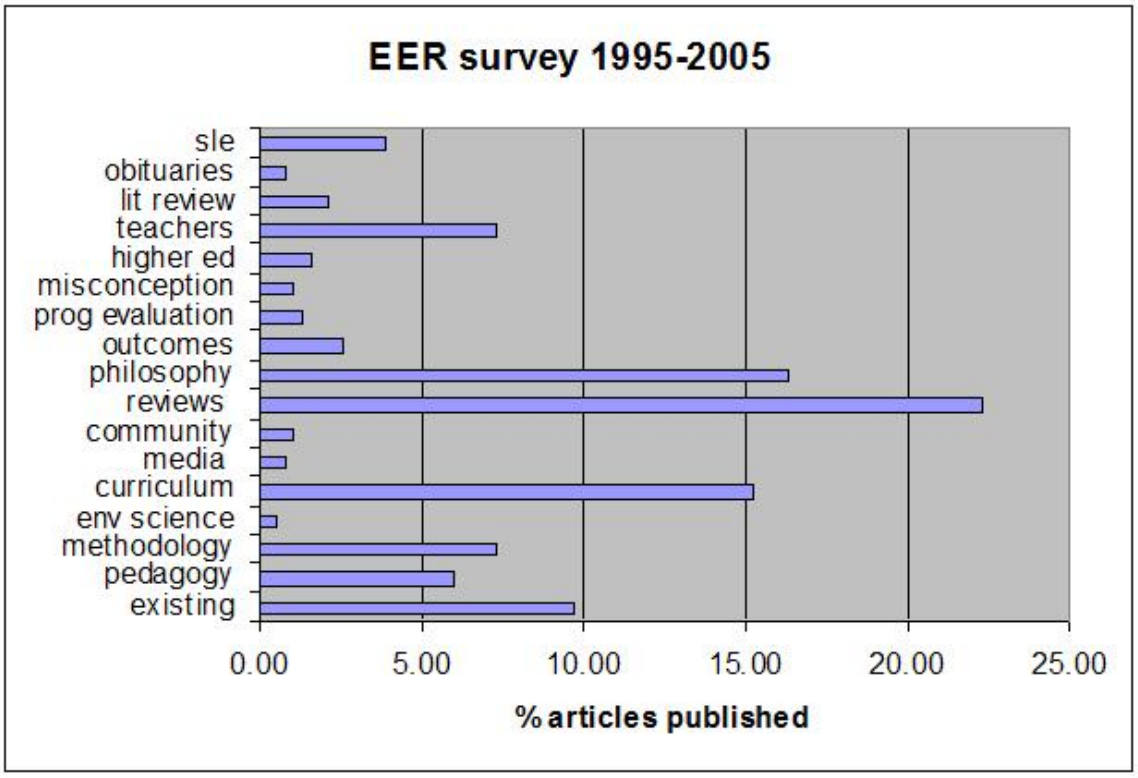
APPENDIX A: JEE SURVEY 1994-2005



APPENDIX B: EER SURVEY 1995-2005



APPENDIX C: SURVEY QUESTIONS

See PDF attachment

7.5 The biggest environmental threat to Australian farmland is...

(a) soil salinity

(b) land clearing

(c) drought

(d) pesticides

7.6 Most of the electricity in NSW is generated by...

(a) burning coal

(b) nuclear power

(c) solar power

(d) hydro electricity

7.7 The MOST COMMON reason an animal species becomes extinct is...

(a) they are killed by pesticides

(b) their habitats are being destroyed by humans

(c) there is too much hunting

(d) there are climate changes that affect them

7.8 The greatest source of landfill material in garbage dumps is...

(a) Disposable nappies

(b) Lawn clippings and leaves

(c) Paper products including newspaper, cardboard and packaging

(d) Glass and plastic bottles and aluminium and steel cans.

7.9 The current worldwide reduction in the number of ocean fish is mainly due to...

(a) pollution in oceans

(b) increased harvesting by fishing vessels

(c) changes in ocean temperatures

(d) loss of deep sea habitats

8 **I think the term environment means...**

.....

.....

.....

.....

.....

.....

.....

9 **Tick one box**

How important are environmental problems to you?

Very Important	Important	Not Important

Thank you for doing this survey

Students' Attitudes Survey

This is not a test. There are no right or wrong answers. Your privacy is guaranteed when you complete the survey because you do not put your name on it. The answers you give will be used to help make better programs for your school.

Thank you for doing this survey.

Please answer the following two questions before you begin the survey.

I am:

☐ **Male** ☐ **Female** **Age** .....

What is the main language spoken in your home?

.....

1 **What three (3) things concern you most in your local area?**
Place a tick in three (3) boxes only.

☐ Litter

☐ Alcohol abuse

☐ Drug abuse

☐ Graffiti

☐ Traffic congestion

☐ Unemployment

☐ Water pollution

☐ Homeless people

☐ Teen pregnancies

☐ Street violence

☐ Bushfires

Other... please write them down in the spaces provided

☐ .....

☐ .....

☐ .....

2 **What three (3) things concern you most in Australia?**
Tick three (3) boxes only.

☐ Land erosion

☐ Illegal immigration

☐ Homeless people

☐ Aircraft noise

☐ Racism

☐ Crime

☐ Not enough national parks

☐ Politicians

☐ Land clearing

☐ Air pollution

☐ Unemployment

Other... please write them down in the spaces provided

☐ .....

☐ .....

☐ .....

3 **What three (3) things concern you most in the world?**
Tick three (3) boxes only.

- ☐ The hole in the ozone layer
- ☐ War
- ☐ Extinction of plants and animals
- ☐ The greenhouse effect
- ☐ Poverty
- ☐ Hunger
- ☐ Disease
- ☐ Ocean habitat destruction

Other… please write them down in the spaces provided

- ☐ .....
- ☐ .....
- ☐ .....

4 **Indicate your opinion by placing a tick in one of the boxes.**

4.1 In the future my **local** environment will be...

Much Better	Same	Better	Worse	Much Worse

4.2 In the future the **Australian** environment will be...

Much Better	Same	Better	Worse	Much Worse

4.3 In the future the **global** environment will be...

Much Better	Same	Better	Worse	Much Worse

5 **Indicate your opinion by placing a tick in one of the boxes.**

	Strongly Agree	Agree	Disagree	Strongly Disagree
5.1 I can help the environment				
5.2 Most people don't care about the environment				
5.3 The government doesn't do enough for the environment				
5.4 Business thinks profits are more important than the environment				
5.5 What I learn at home allows me to help the environment				
5.6 I think my friends care about the environment				
5.7 Not all environmental problems can be solved				
5.8 I think my parents care about the environment				
5.9 All this talk about the environment is boring				
5.10 Scientists will solve environmental problems				
5.11 Kids my age can solve environmental problems				
5.12 Most people don't know what to do to help the environment				

6 **How much information about the environment do you usually get from...**
Tick the appropriate box

	A lot	A little	Not at all
6.1 Dad			
6.2 Mum			
6.3 Brothers/sisters			
6.4 Other relatives			
6.5 Internet			
6.6 School			
6.7 What I see			
6.8 Television			
6.9 Radio			
6.10 Newspapers			
6.11 Magazines			
6.12 Clubs			
6.13 Computer Games			
6.14 Friends			
6.15 Ads			
6.16 Being outdoors			
6.17 Documentaries			
6.18 Teachers			
6.19 Other, please specify			

7 **Circle the correct answer**

7.1 The term biodiversity refers to...

(a) the total number of plants and animals in an area

(b) the number of plant and animal species in an area

(c) variations between plants and animals

(d) the destruction of animal species in an area

7.2 Global warming is caused by...

(a) a hole in the earth's atmosphere

(b) increased radiation from the sun

(c) increased cloud cover

(d) increased carbon emissions from cars, homes and industry

7.3 The MAIN cause of water pollution in the ocean and rivers is...

(a) run-off from farms, yards, streets and gutters

(b) waste from factories

(c) pollution left on beaches

(d) oil spills

7.4 The ozone layer is being depleted by...

(a) burning of fossil fuels

(b) pollution from garbage tips

(c) the release of CFCs into the atmosphere

(d) the increasing temperature of the sun's rays

APPENDIX D: INFORMED CONSENT LETTER FOR PARENTS

Faculty of Education
Teacher Education Program
PO Box 222
Lindfield NSW 2070
Australia

Tel. +61 2 9514 5621
Fax +61 2 9514 5556
E-mail teached.office@uts.edu.au
I'net http://www.education.uts.edu.au/

University of Technology, Sydney

Dear Parent or Caregiver,

My name is Tony Loughland and I am a PhD student from the University of Technology, Sydney. I am involved in a research project that is trying to understand more about how children and young people think about nature and the environment. The knowledge that is gained from the project will be used to help improve the environmental education programs that we teach in schools.

I am seeking permission for your child to be part of this project. What it would involve is them taking part in a weekly class in environmental education where they will take part in discussions about how they think about different aspects of nature and the environment. I think these lessons will help your child to develop their own understandings of the environment as well as developing their thinking and discussion skills. The development of higher order thinking skills is crucial to the development of the intellectual capacity of children.

We are not testing children and we will not be identifying individuals in anything we write about the research - we are more interested in how children at primary age are thinking compared with those at secondary school, and how well our education is working for them.

You may withdraw your child from the research at any time and without an explanation.

The classes and my research have been approved by the school, by DET and by UTS.

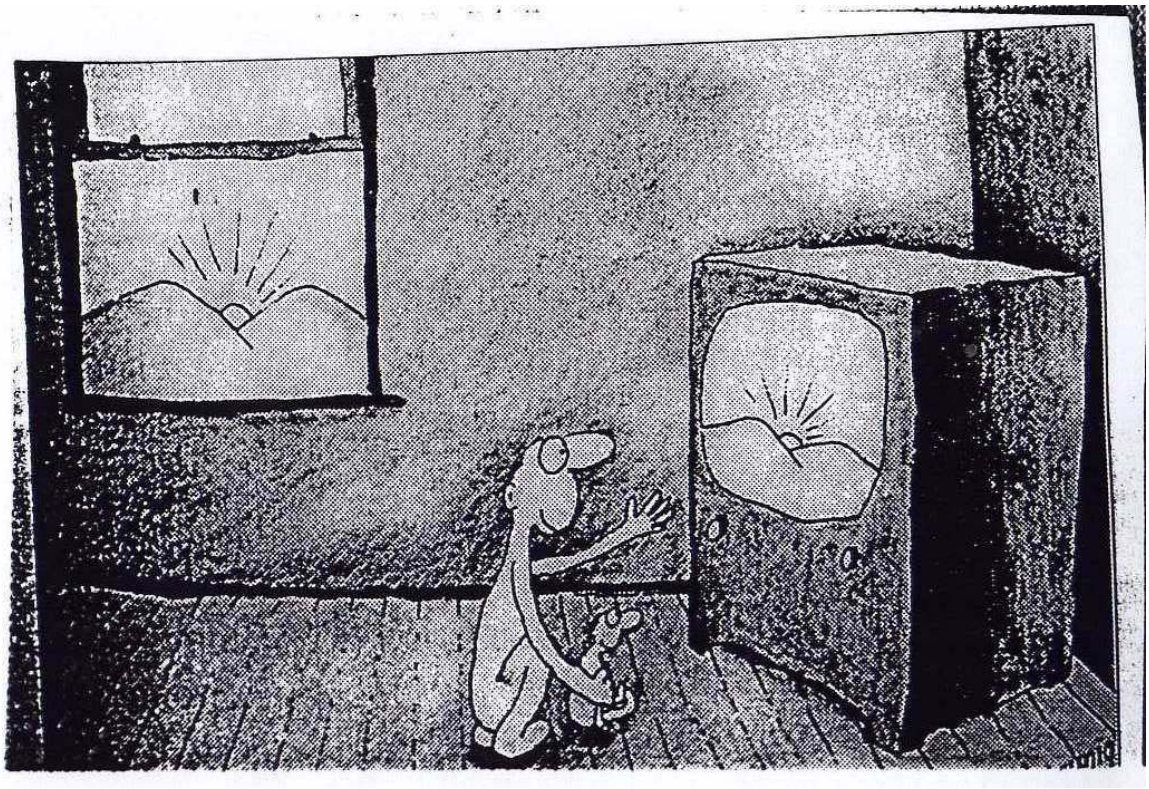
Yours sincerely,

Production Note:
Signature removed prior to publication.

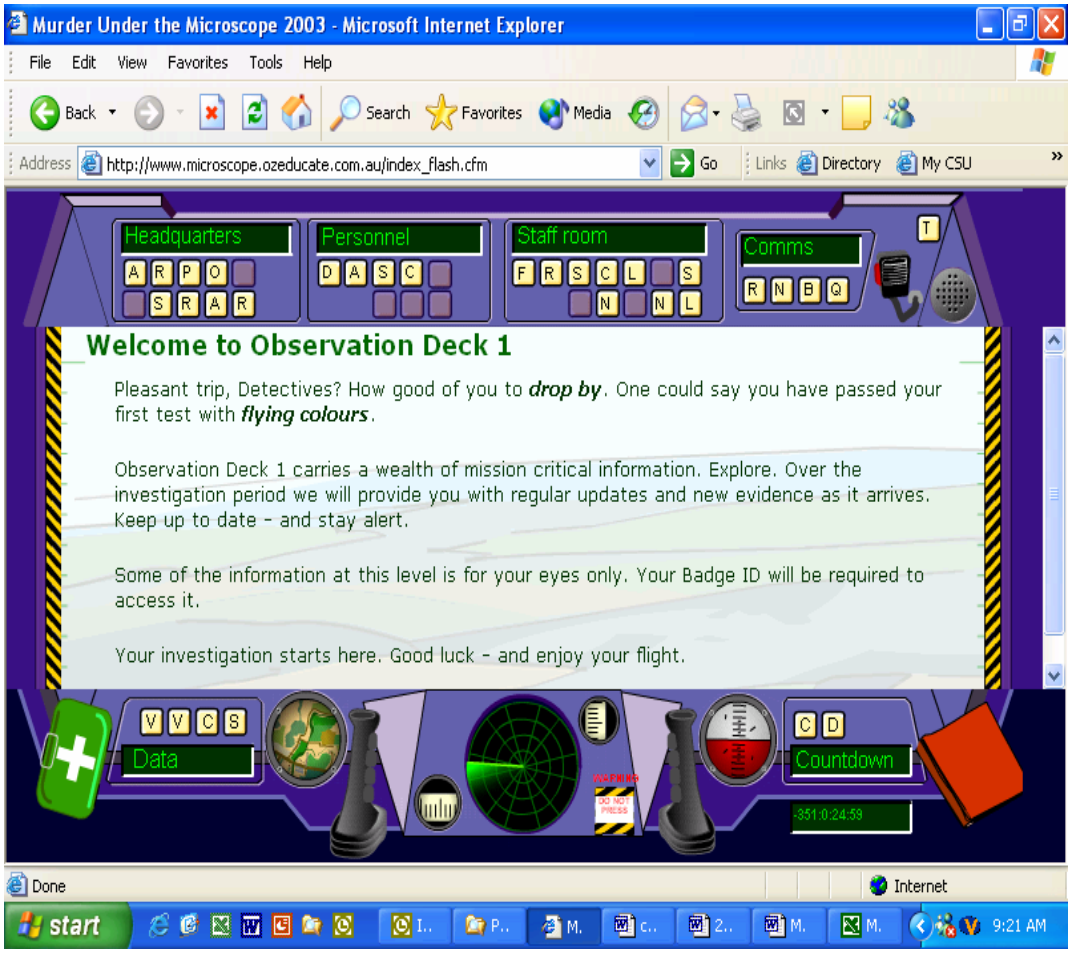
Tony Loughland

_____ (Parent or Caregiver) give consent for my child_____ to participate in the research project Social Construction of Environmental Conceptions of Young people in NSW being conducted by Tony Loughland, a PhD student at the University of Technology, Sydney.

APPENDIX E: LEUNIG CARTOON #1

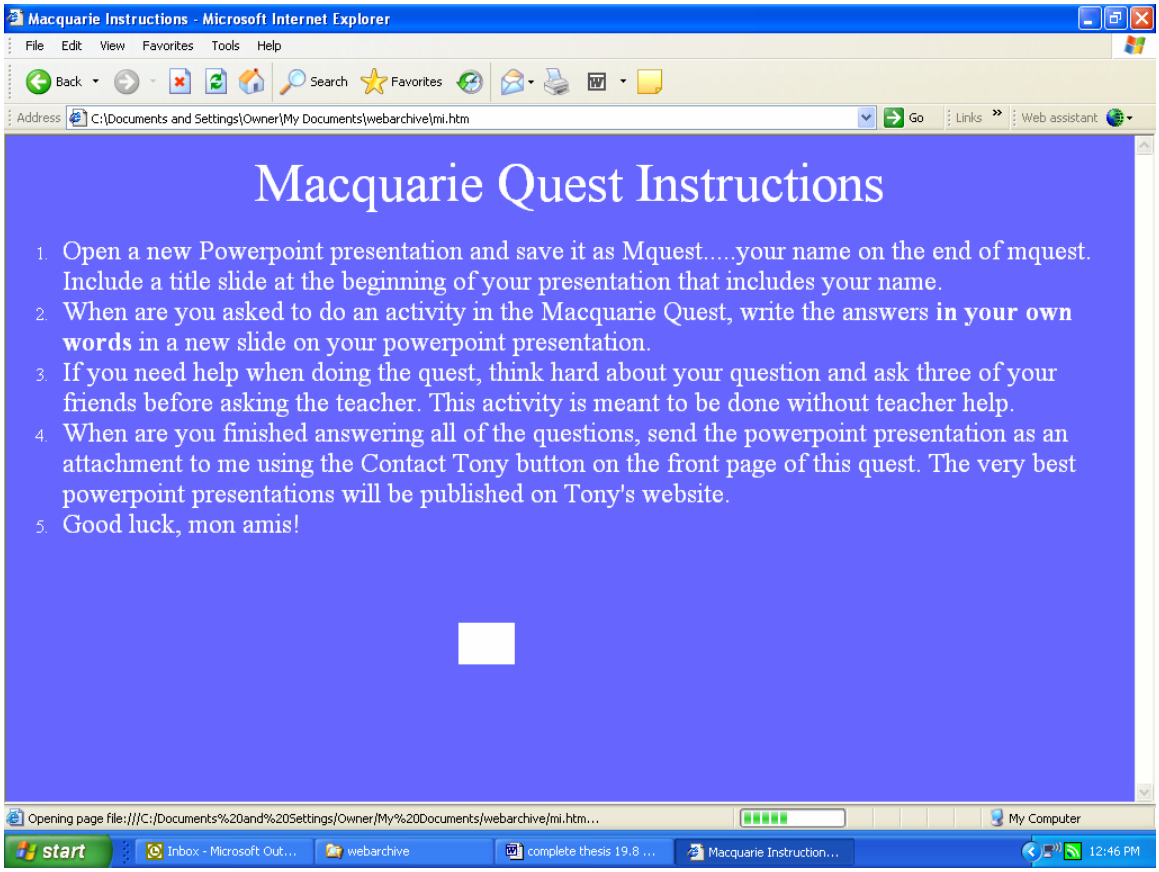


APPENDIX F: MURDER UNDER THE MICROSCOPE SCREEN



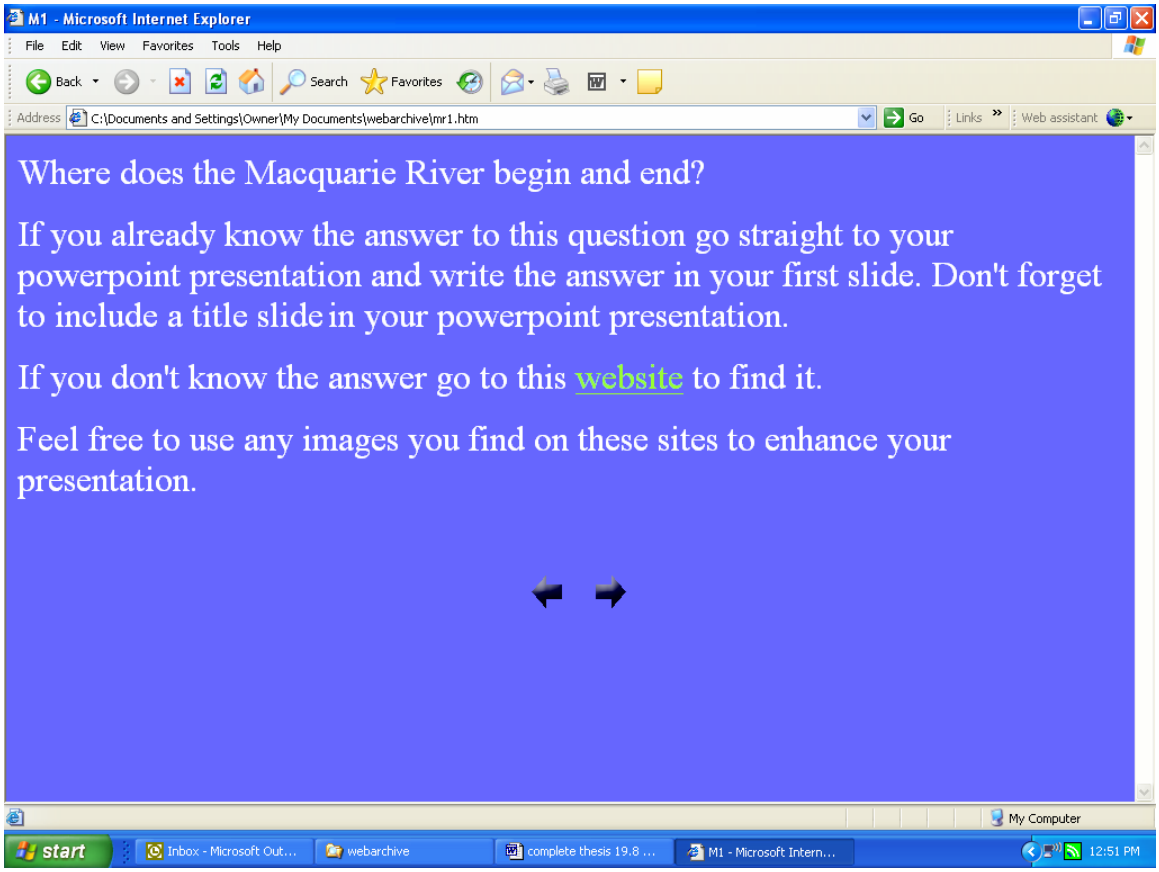
APPENDIX G: MACQUARIE RIVER WEBQUEST FRONTPAGE

APPENDIX H: MACQUARIE RIVER WEBQUEST INSTRUCTIONS



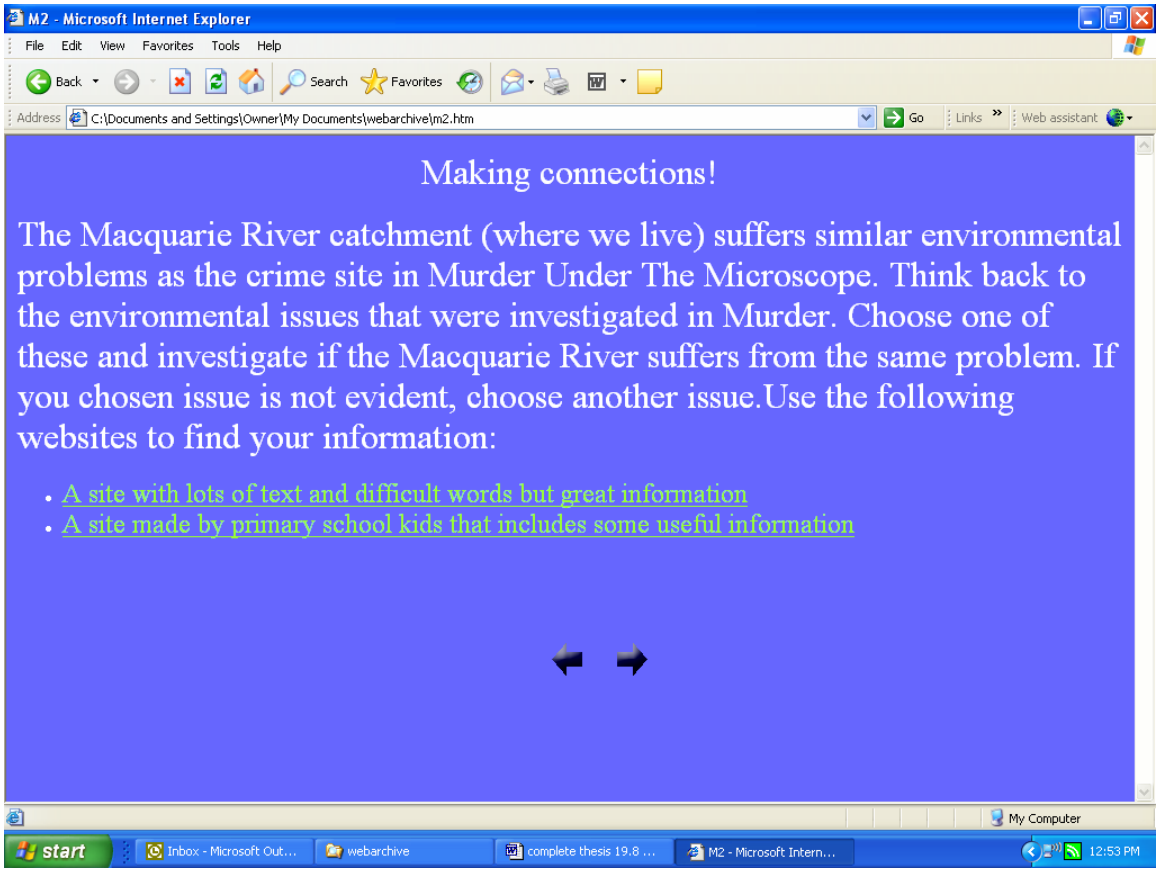
APPENDIX I: MACQUARIE RIVER WEBQUEST

ACTIVITY ONE



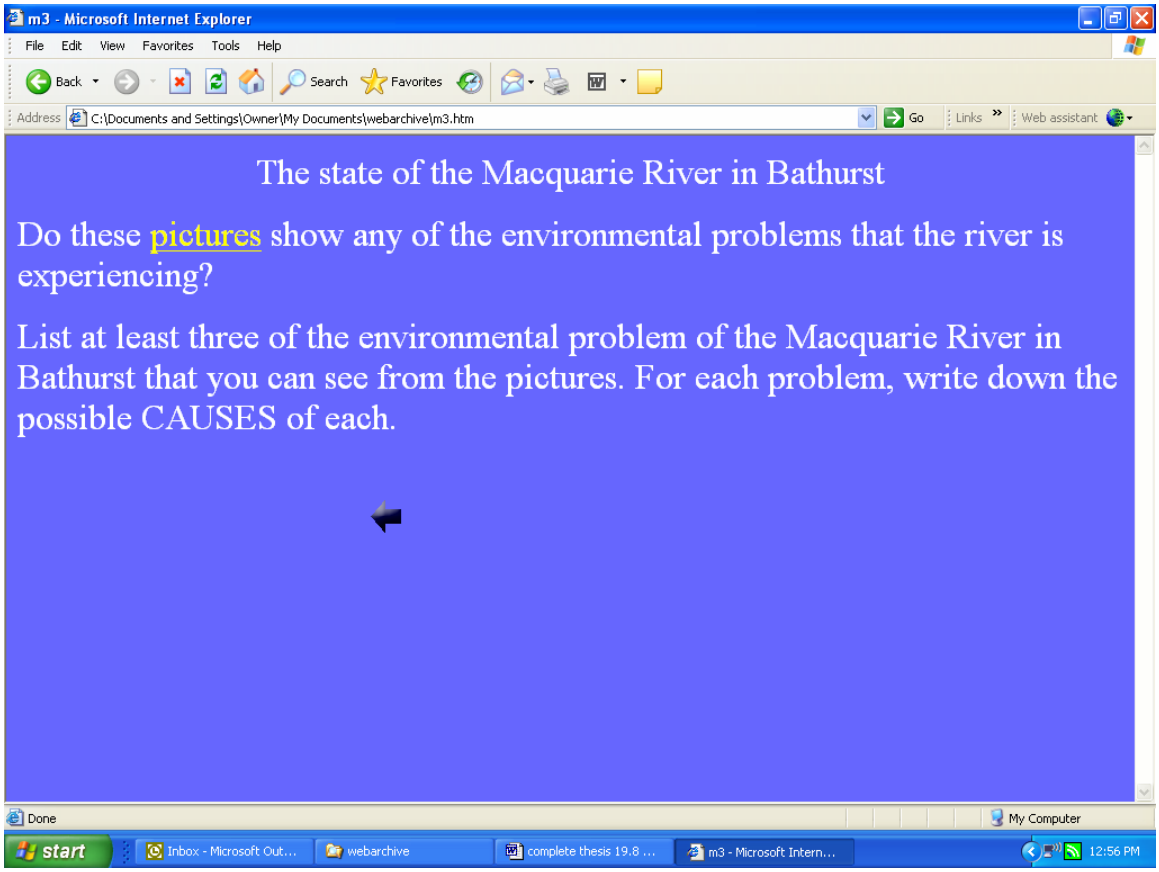
APPENDIX J: MACQUARIE RIVER WEBQUEST

ACTIVITY TWO

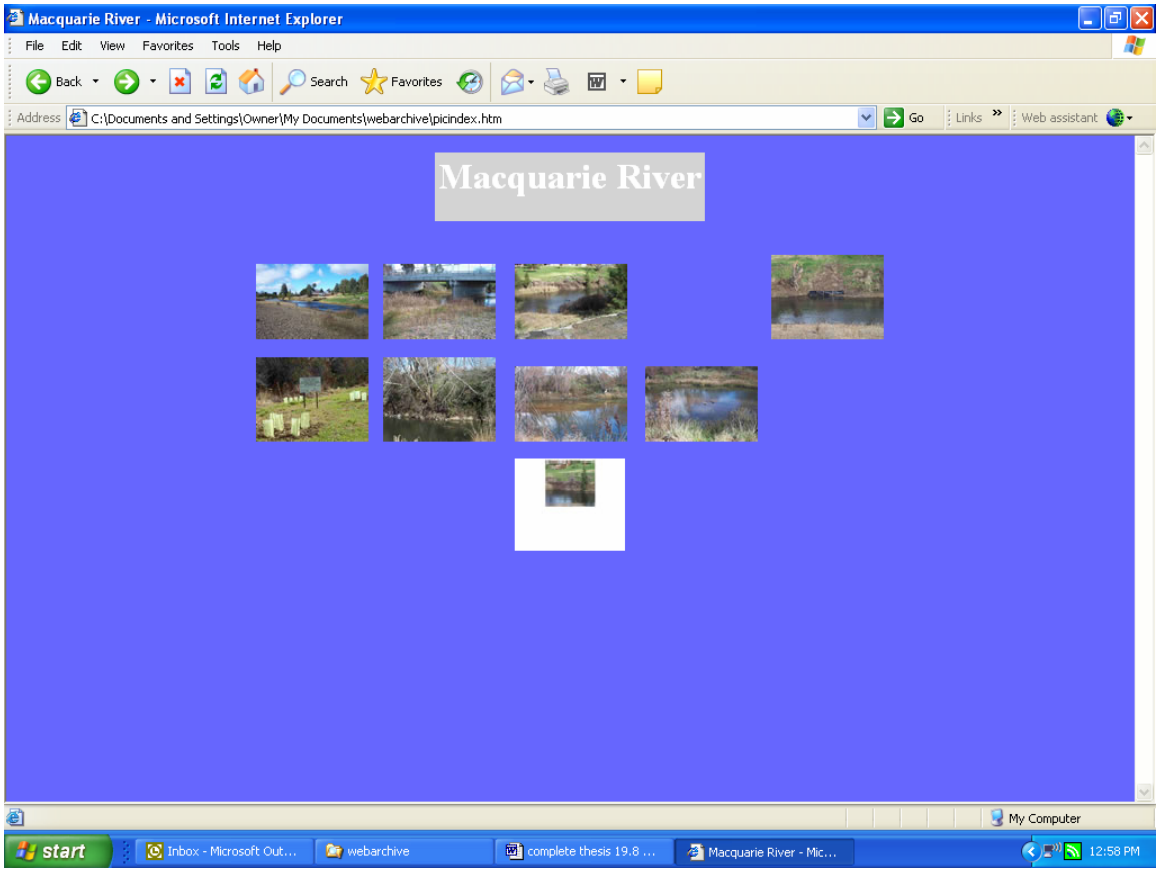


APPENDIX K: MACQUARIE RIVER WEBQUEST

ACTIVITY THREE



APPENDIX L: MACQUARIE RIVER WEBQUEST IMAGES PAGE



APPENDIX M: MACQUARIE RIVER WEBQUEST

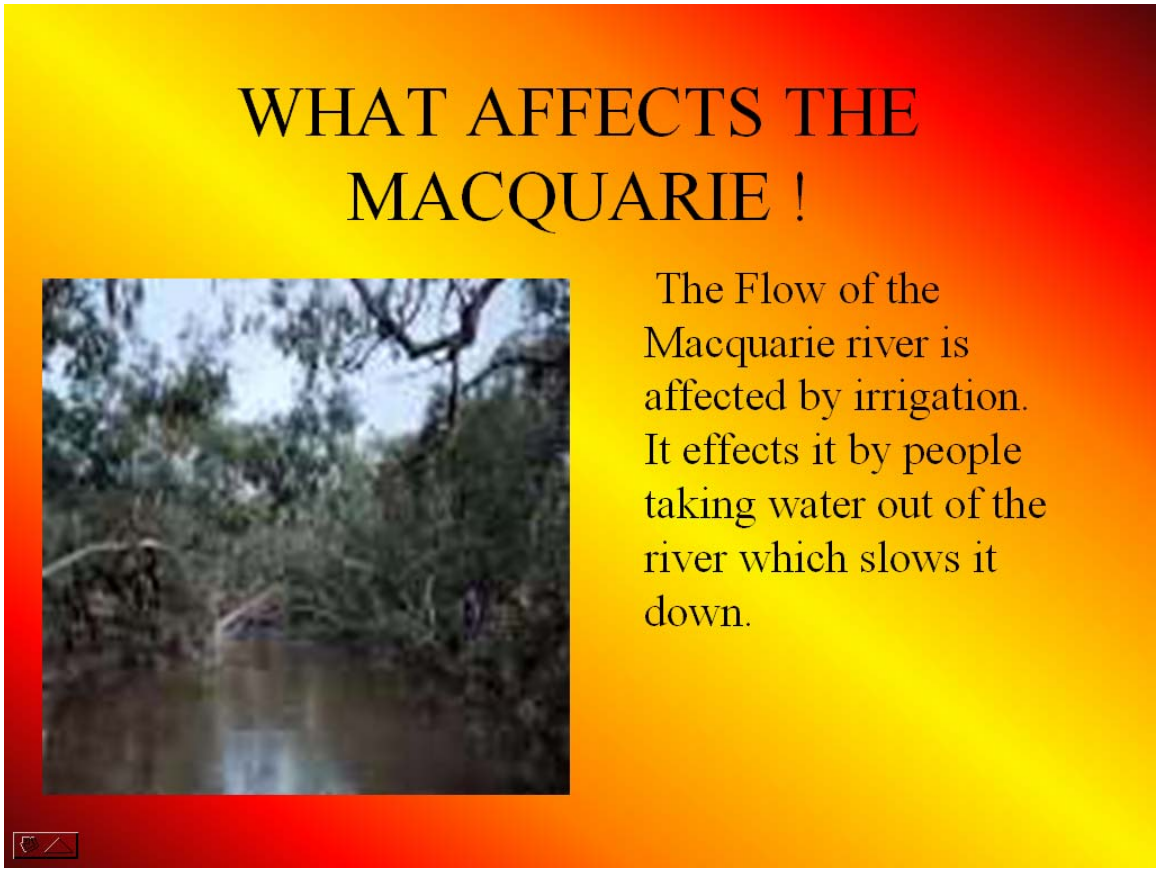
STUDENT PRESENTATION SCREEN ONE

Where does the Macquarie River begin and end?

- The Macquarie River begins where the Fish River meets the Campbell River. This is just south-east of Bathurst. It ends where the Castlereagh River and the Barwon River meets to the north of N.S.W.

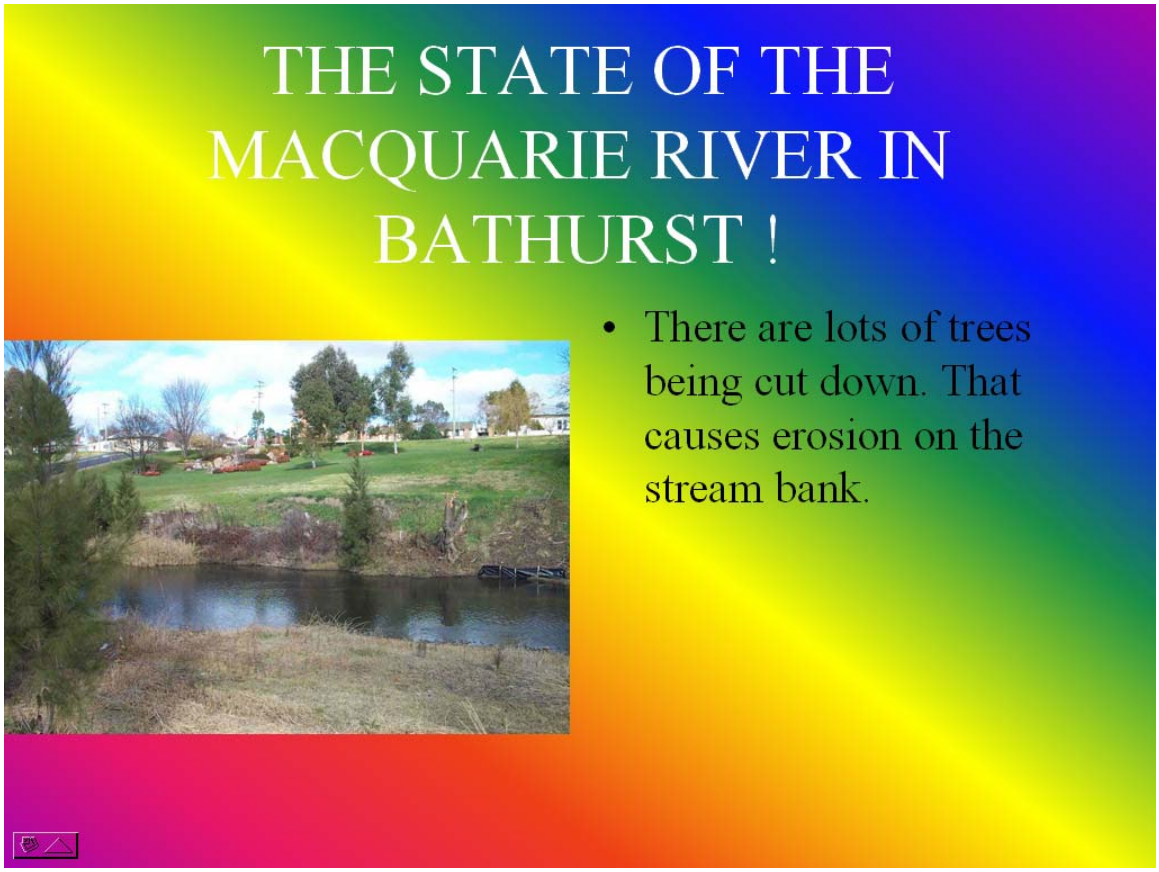
APPENDIX N: MACQUARIE RIVER WEBQUEST

STUDENT PRESENTATION SCREEN TWO



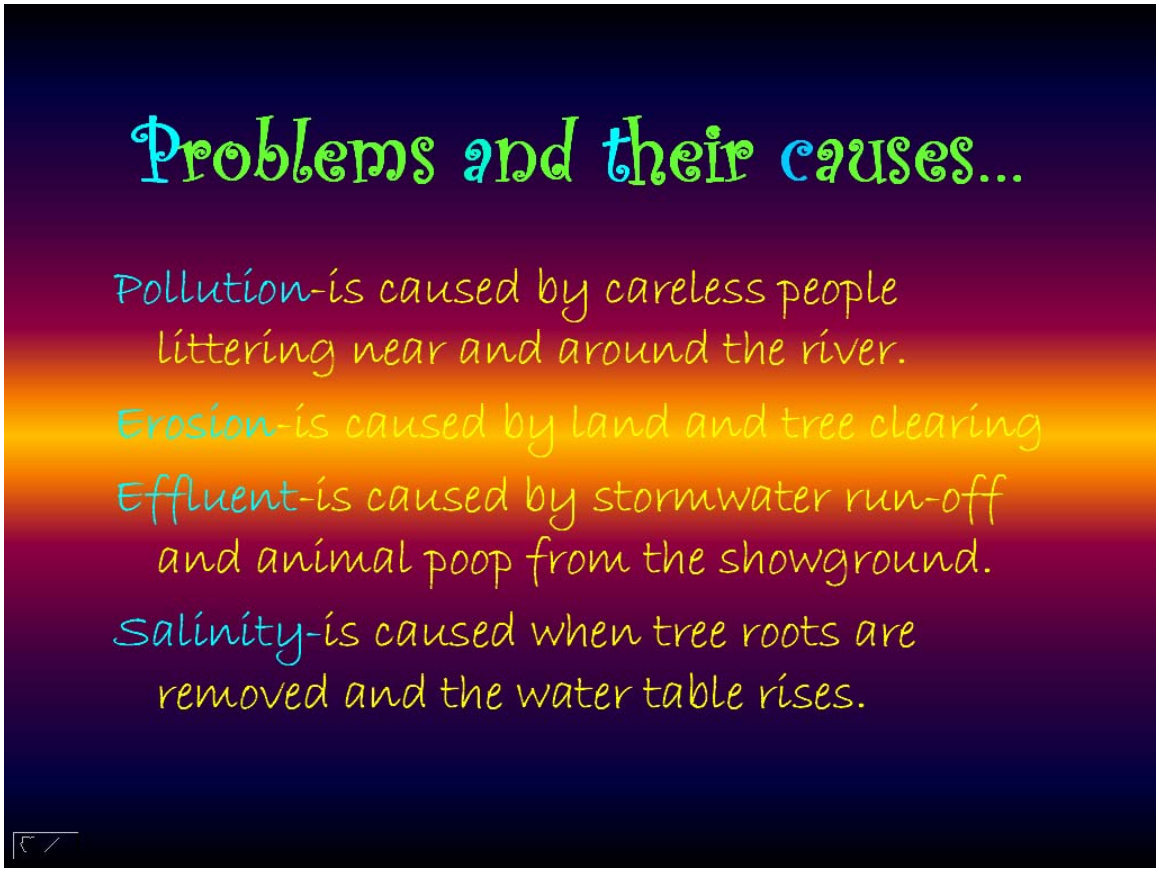
APPENDIX O: MACQUARIE RIVER WEBQUEST

STUDENT PRESENTATION SCREEN THREE #1



APPENDIX P: MACQUARIE RIVER WEBQUEST

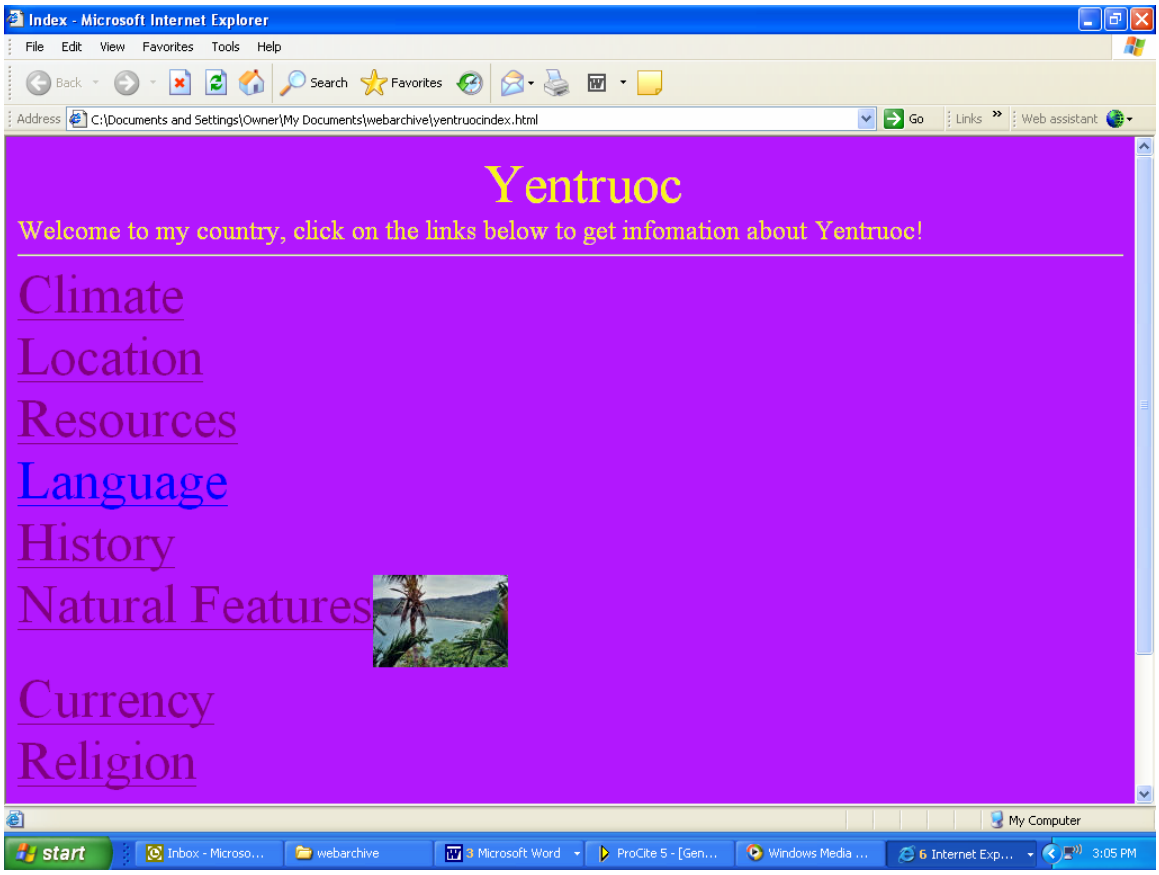
STUDENT PRESENTATION SCREEN THREE #2



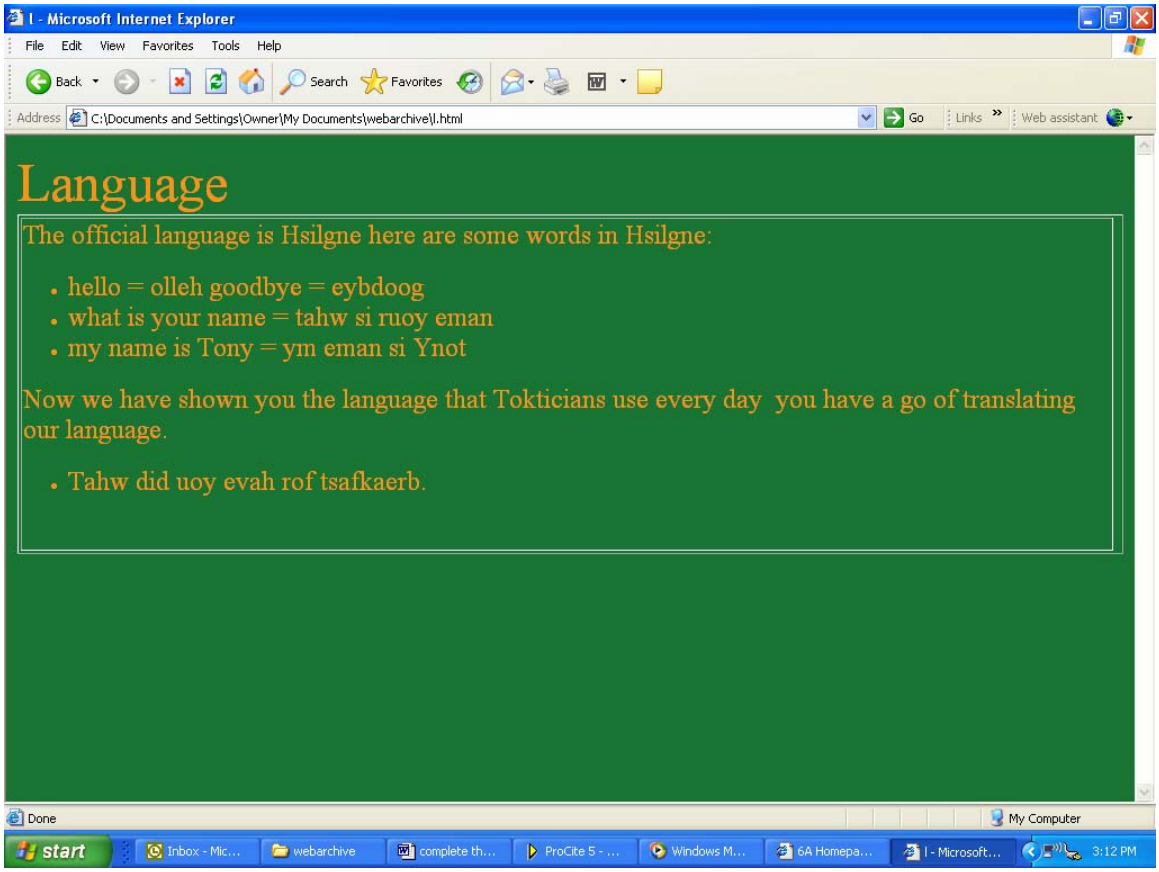
APPENDIX Q: JUNK SCULPTURE UNDER CONSTRUCTION

APPENDIX R: JUNK SCULPTURE IN PLACE

APPENDIX S: CREATIVE COUNTRIES-‘YENTRUOC’



APPENDIX T: CREATIVE COUNTRIES- 'TOKTIC' LANGUAGE PAGE



APPENDIX U: SAMPLE TRANSCRIPT FROM PHILOSOPHICAL INQUIRY LESSON

Transcription 24/5/02

Tony:…. Marsden's using rabbits as a metaphor?

Student: I think that was Chantell.

Tony: Can you remember?

Student: Chantell.

Student: Chantell.

Tony: She's away?

Student: Yep, she's away.

Tony: Okay, Chantell's away. Who would like to start the discussion on why did Marsden use rabbits as a metaphor for this book? Thank-you.

Student: Me? Um, well he might of used it as a metaphor because, because he liked rabbits or that (unclear).

Tony: That's one point of view. Your point of view.

Student: Well my point of view is that rabbits, because some rabbits are white and if you mean like white man and black man well then they could have used the white rabbits as a metaphor for the white man.

Tony: Okay, so why, why is he using white rabbits to mean white man? Why would he put that in the book?

Student: Because they”re both white and like rabbits are kind of like contagious and so are we because like we keep on spreading around everywhere and stuff, so.
Student: He could of used it because their sort of like white people because they invade and everything.

Tony: So what do rabbits do that’s similar to white people. Let’s explore that idea. Why are rabbits contagious like white people?

Student: Um, well they move across the oceans in boats and stuff with man and then they spread across all countries and everything and that’s what we”re doing we”re taking over countries that belong to Aboriginals and stuff, so.

Tony: That’s a big fair analysis over the book, thank-you.

Student: Its like it said in the story it said no fence, no hill or no river could stop them. Because we have all this technology that we can get over those sorts of things and keep going.

Tony: Does anyone want to enter in to this rabbits stuff? Its good to build on, just think, Tyler that discussion in general, if someone says something its good to build on their response. It means that you”ve listened to them and said that’s a good idea, I”ve got a point of view that will extend that idea or somehow relates to it. Does anyone want to say anything more about why he used rabbits as a metaphor? You can have another go.

Student: Okay. Well, Courtney said like we”ve got the equipment and stuff well we do and then they”ve got funny machines and stuff. So, like they its just like the stolen generation because we stole the black kids and their stealing their kids so that’s like another metaphor and then like people are just saying that rabbits are like us and they are in truth.

Tony: So we”ve got points of similarities here with the metaphor. Rabbits, there’s no boundary for rabbits, they”ll get under fences, they landed in Geelong and spread

across the country very quickly, in about five or ten years. They live in all climates; it doesn't matter where in Australia they seem to spread very quickly. What other similarities are there between the rabbits and the white people? Who's going to use that argument? Can we get any more out of that, I"m just curious? Do you want to join in on that idea Seb?

Student: Oh yeah their population just keeps getting bigger and bigger and not smaller and smaller like just the same as people like most animals they just stay like kind of the same and like have the same area that they were born in where as rabbits just blah, blah, blah, blah, blah keep moving and moving.

Tony: Do you want to join in on that idea Jessie?

Student: Oh, I have no idea what he's talking about because I wasn't here.

Tony: Oh, right, sorry.

Cal: He didn't read the book.

Tony: Um, yep.

Student: I think um the rabbits are like are people because like we cut down trees and wreck the environment and um rabbits are the same because they like eat farmer's crops and grass and stuff.

Tony: But rabbits have been stopped by a couple of viruses haven't they?
Myxomatosis and what was the most recent virus, colicee virus.

Student: Was that (unclear) or something? It was a little, little bug and gets inside their ears…

Tony: That was myxomatosis. Myxomatosis, when the rabbits spread after the war there was a story that the rabbits were that thick that the people used to go on rabbit drives and kill them and there"d be like three hundred rabbits in the corner of the

paddock and you couldn't even see the ground cause they just ate everything absolutely anything. So there was no cure until the CSIRO it was in the 50s myxomatosis, they got this little flea that spread the virus and the flea went from rabbit to rabbit and decimated most of the population. But they found that the flea didn't work as well in some of the dry areas I think that's why scientists developed the colicee virus which is passed from rabbit to rabbit and that's reduced the population again. But nothing seems to reduce white people's population, as Seb said, we just keep going and there's absolutely no obstacle to us. Todd.

Todd: Um, maybe the um author was trying to see what the Aboriginal people liked like kind of show what had happened, what they (unclear) when the white people came and took over Australia.

Tony: So, that goes back to that question last week "Who's telling the story?" Did we have that question, did someone ask that? Who's narrative is it?

Student: Yeah, we had that one.

Student: We don't really know if um Marsden is an Aboriginal or a white person. Do we?

Tony: We, anyone done any research on John Marsden here? Anyone read any other of Marsden's books, 'staying alive in year five"? That's an excellent book. Then there's, Marsden's got a whole lot of books that you might read as you go to high school, can't think of the other titles, so he writes a fair bit. Some of you guys will probably hear of Marsden. Look in your school library, he's a fairly popular author.

Cal: (Unclear).

Tony: Yeah, that's Marsden isn't it? Go for it.

Student: Well, me and Chantell looked at the book and there's all these other animals and the rabbits and when the rabbits would like take over other animal's hiding, habitation or something and then and then they like go back to their house and then

they wipe out some more because like their just used to it and no climate can stop them because they just get used to it. It's like us, we just wear clothes to stop the heat and move on.

Tony: Interesting comparison, think of putting up with humans using technologies for the climate. Um think of any other animal living across the globe, what animal can live in the South Pole, in the temperate zone, live in the tropics, lives in the North Pole.
Student: The whale.

Tony: In the oceans, that's a good point, what does the whale have that helps them live?

Student: Blubber.

Tony: Anyway, we can have one more. Wendy do you want to add to this rabbits thing?

Student: Like what Zoe said about like humans can stay in any climate really and humans can also wipe out, like if there's something that like a snake or something that's on a that they think is going to harm them then they will probably kill it. When really that is a mat, what-do-ya-call-it, they also have a (unclear), they have to put up with that in (unclear) so why can't we?

Tony: That seems to make a difference in the rabbits, we had points where we are similar and that came up in the argument about we spread very quickly and we can live in all climates, the population increases. It seems that the rabbits don't actually pick up a stick and kill something, pick up gun can they? You want one more point on the rabbits there Tyler?

Tyler: About the penguins live all around the place and they live in the North Pole and the South Pole and they live in zoos.

Tony: Yeah but they"ve got to artificially, I shouldn't have brought that question up because now you"re mind's flicking over about which animals, you can get back to me next week or you could e-mail me on that one. But I could pursue the penguin one definitely. Let's have a look at those questions. Why, was that the question or was that rubbed off or I think it was something similar to that. Why did there have to be an invasion. Does anyone remember asking that question?

Student: I think Tyler did.

Tony: All right so thinking of the book, the rabbits came in? You want to start the discussion on that Tyler?

Tyler: Um, I just said that like why did the rabbits take over the thing?

Tony: There's no easy answer to that, that's why it's a very good discussion question.

Student: Why didn't they make like a deal?

Tony: Thanks Seb.

Seb: They might have invaded them because like Belinda said they thought it might harm them so they thought, oh we better kill them off and invade them all, maybe.

Tony: Yeah, that's and excellent contribution to what Tyler said why didn't they make a deal or something. Yeah, that's excellent Seb. Um, someone else who hasn't said anything today, who wants to have a turn if you have not had a go yet. One of the people who has not had a go and is feeling a bit shy.

Megan: Ah like they didn't, like us, we didn't care if we just looking for more land and stuff. Like so were the rabbits they were just looking for land like we were looking for land for the convicts when we came here (unclear)

Tony: If I could just, Megan.

Student: Miss Abbott, its Mick's birthday so we should sing happy birthday to him.

Cal: Yeah can we do it later?

Tony: We don't want to sing happy birthday on the tape. It's being recorded now. Megan's point, lets think of the discussion. Megan said the rabbits just keep on taking up more land its like if I can hear you correctly, were they, rabbits don't intentionally try to invade they just do it?

Megan: Yep, they just, they don't care what other people think they just invade.

Tony: But the rabbits might not see it as an invasion in itself.

Megan: Yeah, it's like we, when we came here we didn't care where we took over the land and killed all these people off we just did it because we needed more land. We didn't think about them.

Cal: Can you say that again Megan I don't think Tyler was listening.

Megan: We didn't care when we came here and killed all these people off, we didn't care we just did it, for the land just so we didn't think about it.

Tony: Birthday boy, are you going to say something?

Student: Well they just, we probably just treated them like animals and sort of, thought oh well they don't really use the land so why don't we take it and use it.

Student: Um, we just like took the land and parts of land like we wanted it to be in our ownership like "cause we wanted it to be ours and not theirs because like they weren't really using it and stuff.

Tyler: Well, when Captain Cook came and to the black people he didn't really care if they wanted it because the black people started throwing spears at him. Maybe the

black people came to him and actually invade maybe people started off shooting at them or something.

Student: Um, going off Megan's point, we didn't come and steal the black people's land but we did need more and it was there and such like we needed the land more than they did.

Tony: Why did we need the land? Why did we, back to Megan's point. What's your name?

Student: Jody.

Tony: Jody. So Megan, Jody has said that point, we needed the land more. Why do white people and the rabbits need more land?

Courtney: I don't reckon that's right because everybody has the right to have something they want and its not like, oh, we need this more than you because we have more people than you. That's just not fair (unclear).

Tony: It's an interesting proposition put up by Courtney. Boys if you"re listening to that, it's everyone has the right to anything they want, is that your proposition that you put up?

Student: Yep.

Tony: That's and interesting topic to think about. You"ve got so many people, 18 million people in Australia at the moment and the proposition is we all have the right to anything we want. That's a pretty worthwhile discussion. Does anyone want to join in on that point, topic that was made, another viewpoint but still building on that one? Thank-you.

Student: Um well I going off Courtney's point because if, it wasn't really our land and the black people were here before us and like we just sort of came and invaded them off our land and that's the rabbits that's what they did to the black people.

Tony: Does anyone want to build on the responses? Who hasn't had a turn, thank-you.

Student: Um, cause like its (unclear) land, not just the rabbits like (unclear) kilometres like even it, sort of.

Tony: How would you possibly even it up?

Student: Like, put a big fence in the middle of Australia or something like that.

Tony: Anyone who hasn't had a turn yet today, Adam?

Adam: It's like chess, white goes first and black goes last and things.

Tony: It's an interesting metaphor isn't it? If you"re thinking philosophical discussion and you"re thinking of the discussion and you"re thinking metaphors for thinking like Marsden used rabbits, what if Australia was like a chessboard and there were white and black pieces? Excellent bit of thinking Adam. Thank-you.

Student: Maybe we needed the land more than the Aborigines do because we have more population and we needed more room to live than them because they didn't have nearly so many Aborigines.

Student: Um, I was thinking, going off (unclear) and Courtney's point, its just like one person having dinner then someone else comes and takes their dinner and then starts eating it because its just, but that's not right.

Tony: Geoffrey's been waiting very patiently, thank-you Geoffrey.

Geoffrey: With the black people and that they were there first and since I don't agree with Captain Cook landing his boat here and starting shooting them all because they if its our land by the time they finish fighting the land will be wrecked anyway so it doesn't really matter. They should have just left them alone and went somewhere else.

Tony: That's a very hard point for us to discuss Geoffrey because if we say that the rabbits should have never came you and I wouldn't be sitting here. We wouldn't have existed. So that's why discussion, it's very hard to discuss that point but its worthwhile thinking about. Who hasn't had a turn for a while? I"m getting hard to referee, Miss Abbott, I"m not sure.

Cal: Brendan.

Student: Um, well the white people come to the black people and like they should have stayed where they were like they didn't have to go and take all the black people's land.

Tony: Hmm. Interesting point from Ashley is it?

Student: Sarah.

Tony: Oh, sorry I"m terrible with names, my brain's too old. Its interesting to say where, if we put a fence across Australia, you said white people could stay where they are and black people stay where they are and Courtney's point about everybody's got a right to have whatever they want. But it's seen that the rabbits do something different. Now they can't stay in one spot because they need more and more space. Okay, Seb.

Seb: Um they probably would have conquered the land because they think that they"re more important and oh who cares about the black people that we don't need them and so that is probably why they might of invaded them because they just thought oh yeah we"re more important than you so we probably need the land more. You don't matter.
Tony: That's a good point, thank-you.

Student: Um. I"m going off Sarah's point because like they, didn't they try to put a fence in the middle of Australia for the rabbits?

Student: That's the rabbit proof fence.

Tony: Yeah, there's a dingo fence and its funny they put a rabbit proof fence up and they just went underneath and came put the other side. There is a dog fence.

Student: It was the black land, the black people's land and why couldn't they just share it out and say youse have this half and we"ll have this half.

Tony: Could I just get to the point in the discussion that it's got to Brent? We"ve got to the point where some people are saying that we didn't have to come in and be like the rabbits we could have shared it out. But the point of the discussion is now, is that possible. If the white people are like rabbits and they need more and more land how would you go about doing the sharing perhaps? Maybe that's the point we need to work around. Who will I pick now, Tyler.

Tyler: Um, well when Geoffrey said Captain Cook kept firing on them, Captain Cook didn't come to shoot them they just like came for some land and found land and the Aborigines started throwing spears in the air.

Tony: Belinda.

Belinda: Um, well they like also just came and they just killed all of the Aboriginals who they see and all their stuff for games like you know how (unclear) well that's what they really did.

Tony: So, for sport. Yep.

Student: Why couldn't Captain Cook just let them throw spears at him?

Tony: Tyler, the point that needs to be cleared up. Captain Cook came and books say that say that it was discovered, it wasn't Captain Cook. Captain Cook said, he was a white person coming from Tahiti, he thought he discovered New Zealand, he thought he discovered Australia, like the east coast. He went back and told people in England in the 1770s and as a result, England had no, England couldn't send their convicts to

America after the war of independence of 1776, so in 1788 they decided to send convicts to Australia.

Cal: Captain Cook had very brief encounters with Aboriginals. Quite positive ones.

Tony: And then Captain Philip who had the first colony had Benalong and a few other indigenous people and his policy was peace. And that was all right until we got over the mountains and we wanted to spread far and wide.

Cal: Can we talk about terror nullius.

Tony: You can talk about terra nullius.

Cal: I was just wondering because we are saying why did they do that, why did they treat the Aborigines that way, there was an attitude that the land was unoccupied that's why they said terror nullius , there's lun, Latin for land and null is obviously nil. There was no people, no one owned this land, there had to be some indigenous people but they didn't take ownership of it, so it was the white people went there's this whole slab of land here, no one owns that, let's go down there and we"ll take that one. James' claimed that in England's name so it's a free for all. So when they go there it was just taken for granted that the Aboriginal people didn't own the land, there were no fences, there were no title deeds.

Tony: There were no occupations, there were no occupied settlements.

Cal: Hmm, so it was an assumption that we can lay our laws and start from scratch and we"ll just come in and impose our laws upon these people which is what happened, with disregard to the consequences.

Tony: It comes from Seb's point about attitudes. It is important, like Seb said, well they thought that black people didn't matter. That's a fair analysis. Now who's had their hand up for ages and their hand is getting sore from holding it up? Jody.

Jody: Well, why can't you just share the land like we are now?

Tony: Now that's a big point. Everyone is saying that but you need to associate that with the practicalities of it.

Student: They"d have to have big sky-rise buildings like now, why can't they just keep it like that and have sky-rise buildings.

Geoffrey: The Aboriginals are still whingeing now about like how a hundred million years ago and how he parked his boat in the sea and came over and started shooting them all and their still whingeing about all these land rites and that oh youse did this to us that long ago and that's like 100 years ago and their still whingeing about it. And we"re letting them live in a free country and their still whingeing about us, not treating them right.

Tony: Does anyone have a response to that? Brendan.

Brendan: Maybe all the white people shouldn't be here at all, maybe we should be in America or somewhere. Maybe this isn't our world.

Student: White people can live on Mars. I"ll pay for the ship to get them up there.

Student: How do we actually know that, um, James Cook came and started to shoot them? The Aboriginals didn't try to attack him first?

Student: If, um, the white people didn't come then the Aboriginals wouldn't" have had any like….

Tony: Hold on, hold on, Tyler if you talk we can't have a discussion. Sorry Sarah.

Sarah: Like, if, I go off Geoffrey's point because if the house was, like they have like skin over there people would and like if like white people never come in we wouldn't have any houses or anything and like gardens or anything like that.

Tony: Jody.

Jody: Um like how do we know that Captain Cook came and he started shooting the blacks. “Cause we weren’t here when Captain Cook was.

Cal: We have Captain Cook’s diaries and logs which are very, very interesting Um and I don’t think that they did come out and shoot. There were some incidents, um, like mostly they were positive and interested in each other. That wasn’t really the point of conflict at that time.

Student: They just went and planted the flag in the thing and then the Aboriginals got angry and started throwing spears and then he started shooting.

Student: Yeah, but they”d never seen white people before and they thought they were aliens or something.

Student: Um, well how did they move because when (unclear) split in half because we sent out all these ships and Matthew Flinders like (unclear) together. But how could James Cook and that like...

Tony: He discovered the east, didn’t he?

Cal: Mapped it.

Tony: He mapped the east coast and then Flinders had to go down the whole lot and the coast of Dampier was discovered as well. So, they didn’t know, terra nullius to them was, or Australia, australis, terra australis was the south that’s where Australia came from, they thought that there was this great big land down there and they knew that that land to them meant money as well. So they came down, so when they got here they sent Flinders round the bottom to find out what else was there. Who wants the last point for this?

Cal: Can we just have a point from Danny.

Danny: With Sarah's point about if the white people didn't come then they wouldn't have all guns and stuff, well the Aboriginals were like living anyway so that wouldn't change anything, because they"d still be able to live. Because they were living with spears and so they would keep using them.

Tony: Thank-you

Student: Well, when we were black and white when the white invades they would have brought all the spice crates and stuff from Sydney.

Student: That's where they landed.

Student: Up from Botany Bay they could look at all the houses.

Student: The houses!

(Laughter)

Tony: No, don't laugh. Brent, they would have noticed occupation by Aboriginal people, they would have noticed fires. They would have said that they saw fires from inland places. Brent, can you hit stop for me?