A Chasm in Environmental Education:
What primary school teachers 'might' or 'might not' know

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Abstract

Over the past thirty years, it has often been stated that primary school education should endeavour to improve and protect the environment through producing an 'environmentally informed, committed and active citizenry'. To this end, environmental education has been incorporated into the existing discipline 'Studies of Society and Environment'. However, research shows that the implementation of environmental education in primary schools is problematic and has had limited success. The reasons for these shortcomings are far from clear, with present research merely speculating about barriers to effective implementation.

This chapter presents a detailed discussion and analysis of the existing literature concerning environmental education in the primary school years. In so doing, the chapter identifies a perceived gap within the field of environmental education research and literature. This field has neglected studies of Australian primary school teachers' knowledge and beliefs about environmental education as a factor affecting the capacity of schooling to achieve environmental education goals. We conclude that this omission is a significant factor limiting environmental education theory and practice.

Introduction

Since the 1960s there has been a growing understanding that the continued economic, environmental, social and technological developments instigated by human beings have

changed the biosphere. There are substantial concerns among some scientific experts that the limits of the earth's capacity to provide for human existence are within sight (see Merchant, 1992; Starke, 1998; Suzuki, 1993, Suzuki & Dressel 1999; World Commission On the Environment Development, 1987). These concerns have led many researchers, including the above-mentioned pundits, to re-examine prevailing cultural norms about the nature of the earth as an infinite resource for human exploitation, and to promote moves to more sustainable patterns of development.

To these ends, environmental education has been identified at the international policy level, by the 'United Nations Educational, Scientific and Cultural Organisation' (UNESCO) and the 'United Nations Environment Programme' (UNEP), as an important change agent for sustainable development. The focus upon environmental education has resulted in efforts being made over the past three decades, once again initiated by UNESCO and UNEP, to incorporate environmental education into national and state education policy and curriculum documents. In the case of Australia, efforts have been made to incorporate environmental education into state curriculums and policy documents, although education departments have been slow to take-up environmental education and, consequently, implement it into schools systems. Quite critical for this chapter, in Queensland, environmental education is predominantly incorporated into the recently developed 'SOSE' syllabus (Queensland School Curriculum Council, 2000a) and associated policy documents.

At the policy and theoretical level, three approaches to environmental education have been developed and consequently dominated the field, namely, education *about* the environment, education *in* the environment and education *for* the environment. In the past two decades education *for* the environment has been identified as the

preferred approach for environmental education. However, in recent times, the requirements of this approach have been the focus of much debate, with many critics suggesting that the field of environmental education is characterised by vagueness, complexity and contradictions. This is coupled by limited evidence of the practical implementation of 'education *for* the environment', or other forms of environmental education in schools systems. Thus, little is known regarding the effectiveness of either the dominant or subsidiary environmental education approaches in the teaching and learning of environmental education. This is particularly so in the case of primary schools.

There has been limited research about the effectiveness of environmental education practice in primary schools. In particular, there have been no Australian studies investigating primary school teachers' personal beliefs about the environment, or their base-line knowledge of environmental issues. As such, little is known about what primary school teachers know or believe about the environment or environmental education.

In these ways, there are theoretical and empirical 'gaps' in environmental education research that require further investigation. In order to elaborate upon this agenda we now substantiate the above-mentioned claims by reviewing the arguments.

Environmental education: Policy directions and premises

In 1992 the Union of Concerned Scientists, representing more than sixteen hundred senior members of the scientific community, including 102 Nobel Prize recipients, warned that:

> *Human beings and the natural world are on a collision course. Human activities inflict harsh and often irreversible damage on the environment and on critical resources. If not checked, many of our current practices*

*put at serious risk the future that we wish for human society and the
plant and animal kingdoms, and may so alter the living world that
it will be unable to sustain life in the manner that we know.... We
the undersigned, senior members of the world's scientific community,
hereby warn all humanity of what lies ahead. A great change in our
stewardship of the earth and the life on it is required, if vast human
misery is to be avoided and our global home on this planet is not to
be irretrievably mutilated* (cited in Suzuki, 1993, p. 4)

These concerns reflect an abundance of research
indicating that human activities are presently contributing
to severe and potentially irreversible changes to the
biosphere. Among the environmental issues giving rise to
these concerns are:

- Climatic changes and altered weather patterns (see
  Agarwal and Narain, 1992; International Union for the
  Conservation of Nature, 1980; Middleton, O'Keefe and
  Moyo, 1993; Pickering and Owen, 1994; World
  Commission On the Environment Development, 1990;
  Wright, 1993);

- depletion of the ozone layer (see Milbraith, 1989; Suzuki
  and mcConnell, 1997; Washington, 1991; World
  Commission On the Environment Development, 1987;
  Wright, 1993);

- desertification and degradation of agricultural land
  (International Union for the Conservation of Nature,
  1980; Middleton et al., 1993; Pickering et al., 1994;
  Suzuki, 1993, 1999, 1997; UNEP, 1983; World
  Commission On the Environment Development, 1990;
  Wright, 1993);

- depletion of forests (see Beale & Fray, 1990; Orr, 1992;
  Pickering et al., 1994; Starke, 1998; UNEP, 1983; World
  Commission On the Environment Development, 1987;
  Wright, 1993);

- loss of species habitat and loss of biodiversity (see Beale et al., 1990; Carson, 1965; Ehrlich & Ehrlich, 1991; Middleton et al., 1993; Starke, 1998; Suzuki, 1993, Suzuki & Dressel, 1999; UNEP, 1983; World Commission On the Environment Development, 1990; Wright, 1993); and
- pollution of the atmosphere, waterways and oceans (see Beale et al., 1990; International Union for the Conservation of Nature., 1980; Starke, 1998; UNEP, 1983; UNESCO-UNEP, 1997; World Commission On the Environment Development, 1987; Wright, 1993).

Complementing the body of scientific research identifying environmental changes, there is a growing body of literature that identifies the present pattern of technological, economic, environmental and social developments by human beings as the primary cause of what some coin an 'environmental crisis' (see Carson, 1965; Durning, 1992; Ehrlich, 1986; Evernden, 1989; Gore, 1992; Hillcoat, 1999; Milbraith, 1989; Orr, 1992; Schumacher, 1973; Suzuki & Dressel, 1999; Weston, 1994, 1999). There are predictions that the current pattern of development is causing critical, irreversible changes to the biosphere. In turn, jeopardising the earth's capacity to sustain human life as presently known. As such, a view has been put forth which asserts that the human race is not only witnessing, but giving rise to an environmental crisis.

It must be noted that the existence of an environmental crisis is not universally accepted, with commentators such as Kahn et al. (1976), Manes (1990) and Ray et al. (1992) contending that the predictions of catastrophe arising out of research identifying changes to various environmental indicators are ill-conceived and overly pessimistic.

Whatever the debates, and despite conflicting views about the existence of a crisis, 'public concern for the environment is at unprecedented levels throughout the world' (Fien, 1995, p.1). In turn, it has been proposed that:

What is needed is a fundamental transformation of people's attitudes and practices... Only a new world view and morality can change the basic relation of people to the earth. People's behaviour is a matter of choice based upon values ... The need for a world ethic of sustainability – an ethic that helps people cooperate with one another and nature for the survival and well-being of all individuals and the biosphere – could not be greater (IUCN, UNEP & WWF, 1990, cited in Fien, 1993a, p. 4-5).

Initially, the concept of 'sustainable development', also referred to as 'sustainability', was a catch-all idea for future development (UNESCO-UNEP, 1992). However, sustainable development is a fluid concept, encompassing a range of technological perspectives as well as a range of ecological perspectives. Technological perspectives of sustainable development promote the view that advances in technology and the operation of free market economic forces will be sufficient to remedy the effects of an environmental crisis. In contrast, ecological perspectives of sustainable development promote radical world-views towards more fundamental, transformative cultural changes (O'Riordan, 1981). O'Riordan (1981, p. 377) states that ecological perspectives promote a 'humble and humane approach of harmony with ecological processes and a sense of true association with the earth...' which in turn requires 'a fundamental change of attitude away from a sense of technological hubris'. This theoretical divide has given rise to much conflict between and among academics, environmental groups, governments, educators and the like with regards to determining the preferred sustainable development model for future development.

Notwithstanding the debates, coupled with the endorsement of sustainable development, at least since the United Nations Conference on the Human Environment held in Stockholm in 1972, there has been strong support 'for the development of environmental education as one of the most critical elements of an all-out attack on the world's

environmental crisis' (UNESCO-UNEP, 1976, p. 2). This same support is reiterated in the recent discussion paper written by Environment Australia (1999, p. 13) which asserts that: 'It is widely agreed that education is the most effective means that society possesses for confronting the challenges of the future. Indeed, environmental education will shape the world for tomorrow'. The foundation of this support, particularly during the 1990's, primarily lies with the search for sustainable methods of development and living (World Commission On the Environment Development, 1990). In this regard, Agenda 21, a lengthy blueprint for global implementation of sustainable development, particularly emphasised the role of education as an agent of change for sustainable development:

> *Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues.... It is critical for achieving environmental and ethical awareness, values and attitudes, skills and behaviour consistent with sustainable development and for effective public participation in decision-making* (UNESCO-UNEP, 1992, p. 2).

Numerous environmental education definitions have been developed which reflect this definition in whole or in part. Due to the changing nature of environmental problems and solutions, environmental education conceptions change with each generation and, thus, so too does its definition. Disinger (1983) claims that environmental education definitions all contain common ground and therefore differences in the definition of environmental education need not hinder the progress and implementation of environmental education. In contrast, Jickling (1994) claims that environmental education has a 'definitional problem' which is quite problematic for future environmental education theory and practice. To these ends, it is noted that no clear and universally accepted definition for environmental education exists.

Whatever the debates, environmental education is viewed as a lifelong process encompassing all levels of education, both within and beyond the formal school system (see Abraham, 1990; Queensland Department of Education, 1993; UNESCO-UNEP, 1976, 1978, 1988, 1995, 1996). Thus, environmental education at primary, secondary and tertiary levels has an important role to play in the development of students who are capable of understanding and who are motivated to respond to the issues which give rise to an environmental crisis (see Abraham, Lacey & Williams, 1990; Fien 1996; Queensland Department of Education, 1993; UNESCO-UNEP 1989). Central to this argument, it is considered that the primary school years have a particular importance as:

> ... young learners develop most of their final adult physio-neurological capacity quite early in life, and therefore learning, especially of attitudes and values so important to imaginative action in environmental problems, is vital and needs to be considered carefully early in these sequences of lifelong learning (Fien, 1996, p. 41).

As might be expected, there are a variety of disparate views about the proper role of environmental education (see Clacherty, 1993; Fien, 1992, 2000; Gough, 1997; Jickling, 1998; Orr, 1992; Rossen, 1995; Walker, 1997). In this vein, a number of approaches have been developed and often are the subject of many debates in the environmental education field. These approaches include: education *about* the environment, education *in* (or *through*) the environment and education *for* the environment. More specifically:

> Learning how to care for our environment involves understanding concepts about the environment, developing sensitivities through (in) the environment and fostering values that commit us to acting for the environment. This last aspect is perhaps the most important; knowledge about and experience of the environment have limited value unless they are accompanied by a desire to actively care for the Earth, other people and ourselves
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> (Queensland Department of Education, 1993, p. 5).

For the past two decades, education *for* the environment has been identified by authorities in the environmental education field as the preferred approach (Fien, 1988, 1992, 1993, 2000, 1996; Huckle, 1991; Queensland Department of Education, 1993). Fien (1992) claims that education *about* the environment and education *in* the environment should play a subsidiary role insofar as providing the necessary skills and knowledge to support education *for* environment. To this extent, it is often argued 'that it is only when the overall intention is education *for* the environment that real environmental education is actually taking place'(Board of Teacher Registration, 1993, pp. 23-24). In recent times, this contention has been the centre of much debate. Jickling and Spork (1998) recently critiqued education *for* the environment and suggested that education *for* the environment indoctrinates students into one specific way of knowing and believing. Jickling and Spork (1998, p. 319) maintained the argument put forth in an earlier paper written by Jickling (1991, pp. 154-155) stating that students should participate 'as intelligent individuals in the constant re-examination and re-casting of society'. As such, they concluded that education *for* the environment 'is conceptually and linguistically flawed and that we may not need, or want, the structures that it imposes' (Jickling, 1998, p. 309). The works of Gough (1987) also echoed similar conclusions, as did Walker's (1997, p. 155) study which concluded that 'if environmental education is to become important in school education a more adequate theory is required'.

Thus, in recent times, it has been suggested that the field of environmental education is characterised by vagueness, complexity and contradictions. However, in the debates, there is little evidence of the take-up of 'education *for* the environment', nor any other forms of environmental education, in schools systems. In this way, I interpret such findings to mean that little is known regarding the

effectiveness of dominant and subsidiary environmental education approaches in the teaching and learning of environmental education. It can be seen that a study of environmental education practice is timely and essential if the field is to evolve with respect to bringing clarity and direction to environmental education. Thus, this chapter is a contribution to the endeavours outlined by such research and we now review the various debates.

Environmental education in primary schools

'The world's teachers...' are said to 'have a crucial role to play' in bringing about the extensive social changes needed to address an environmental crisis (World Commission On the Environment Development, 1987, p. xiv), yet little is known about the extent to which environmental education has been incorporated into school systems. In Australia, in particular, there have been few studies examining environmental education teaching practice in school systems. Despite the rising levels of support for environmental education, the evaluation studies that have been conducted indicate that policy expectations are rarely met (see Gough, 1997; Greenall, 1981; Linke, 1980; Murdoch, 1989; Phipps, 1991; Spork, 1990, 1992; Walker, 1995).

In 1973 and 1974, Linke (1980) conducted a national study in Australia, utilising both quantitative and qualitative methodologies, concerning the take-up of environmental education content and pedagogy in all levels (primary, secondary and tertiary) of education. Linke's (1980) study indicated that environmental education teaching practice was limited in Australia and most often taught through curriculum domains such as science and social studies. The implications of this shift to other disciplines is yet to be fully explored.

Like Linke (1980), Robottom et al. (2000) also found in a case study of five schools, that environmental education is

most often incorporated into subjects such 'Studies in Society and Environment'. They also reported that, in some cases, 'environmental education curriculum has moved out of the school and into the community' (Robottom, 2000, p. 146). In short, Robottom et al. (2000, p. 157) concluded that 'behind every successful environmental education program is a committed teacher'.

Stapp and Stapp (1983) also conducted a qualitative study which listed over one hundred issues and recommendations for the improvement of environmental education in Australia. However, this study was limited in that neither primary or secondary teachers' knowledge, attitudes and practice of environmental education were thoroughly investigated.

Other than Linke's 1973/4 (1980), Robottom's et al. (2000) and Stapp and Stapp (1983) studies, only small-scale regional (see Clark, 1997; Cutter, 1998; Phipps, 1991; Skamp, 1996; Spork, 1990, 1992; Walker, 1995) and state (see Education Department of Victoria, 1981; Greenall, 1981) investigations have been carried out.

All of these studies (see Cutter, 1998; Education Department of Victoria, 1981; Greenall, 1981; Phipps, 1991; Spork, 1990, 1992; Walker, 1995), save Skamp (1996) and Clark and Harrison (1997), claim that environmental education practice, with regards to its take-up in primary schools, is inadequate in that it does not achieve the outcomes communicated in policy documents. In contrast, Skamp's (1996) and Clark and Harrison's (1997) New South Wales regional studies suggest that teachers are practising environmental education action components. Clark and Harrison (1997, p. 34) hypothesise that 'many Australian primary schools are addressing environmental education, although they might not call it that'

Nonetheless, Spork (1990; 1992) claims that primary school teachers consider environmental education to be an important

learning area, but seem to lack the skills and knowledge to teach successful environmental education. Similar statements have also been echoed in the works of Cutter (1998), Gough (1997), Greenall (1981), Murdoch (1989), Phipps (1991) and Walker (1995). To date, Spork's (1990) study remains to be the only Queensland study, since Linke's (1980) national study, of primary school teachers take-up of environmental education content and pedagogy. Therefore, her study is particularly significant for Queensland, and we now briefly recount the conclusions of Spork's (1990) investigation.

The 'Queensland' case

Spork (1990; 1992) randomly selected and surveyed 300 state primary school teachers from the Brisbane north region and achieved a 76 percent (228 teachers) response rate. The purpose of her study was to determine the extent of environmental education practice particularly in relation to education *about* the environment, education *in* the environment and education *for* the environment. As such, she found that the practice of education *for* the environment among the primary school teachers in question was relatively low even though the research and literature argues that education *for* the environment is central to environmental education. Similarly, it was noted, in relation to teachers' beliefs about the different levels of importance of education *in*, *about* and *for* the environment, that the sampled teachers considered education *in* and *about* the environment to be of more importance than education *for* the environment. However, the sampled teachers conveyed positive attitudes towards environmental education as a whole.

Consequently, this sample had received relatively little professional preparation to teach environmental education. Only 4.9% of these teachers received pre-service environmental education training and only 6.6% received such in-service training.

Among the reasons offered for low levels of environmental education practice are a perceived lack of teacher training in environmental education and time and resource constraints for teachers (Spork, 1990, 1992). As a consequence of this study and the other studies indicated earlier, environmental education research has tended to conclude that the problems of effective implementation of environmental education are due to a perceived lack of adequate pre-service and in-service environmental education training. Thus, the provision of further or restructured teacher education has been identified as the 'priority of priorities' for environmental education (Tilbury, 1992).

However, such propositions tend to be based on both a lack of empirical evidence and a theoretical presumption that the 'content' of environmental education is unproblematic. Spork's (1990, p. 101) study has contributed to this phenomenon through her recommendation that more teacher-education was warranted because teachers possess inadequate 'knowledge of how to do environmental education or what environmental education is'. However, her study was not a dedicated study of teachers' environmental education knowledge. Her questionnaire only questioned teachers about general concepts in the three different approaches, particularly education *for* the environment. Environmental education consists of many concepts and varied forms of pedagogy which Spork (1990) failed to include in her research design. Further, Spork (1990) did not pay heed to the problematic nature of 'education *for* the environment', nor environmental education for that matter. Thus, it appears that her conclusions about primary school teachers and what they might or might not know about environmental education requires further and deeper investigation .

In this respect, Walker (1997, p. 160) also recognised the problematic nature of education *for* the environment and

environmental education and concluded that poor environmental education practice can be directly related to 'a difference, or 'gap' between theories held by policy makers, curriculum developers and educational researchers and the theories held by practitioners'. Thus, we interpret this research to mean that there are many inconsistencies about what the various individuals and groups consider environmental education to be. Therefore, a better understanding of these inconsistencies appears to be necessary which will hopefully lead to a more inclusive and defined form of environmental education.

Conclusion

In this chapter, three points have been established. Firstly, it has been established that there is a growing belief that development instigated by human beings has changed the biosphere. There are concerns that such development is in turn limiting the earth's capacity to provide for human existence. The idea of an environmental crisis has gained popularity and so too has the concept of the earth as an infinite resource for human exploitation come into question. This has, in turn, promoted calls for more sustainable patterns of development. However, sustainable development is a fluid concept, embracing both technological and ecological perspectives, which has resulted in a theoretical divide in the field as to which ought to be the preferred method for sustainable development.

Secondly, environmental education has been identified at the international policy level as a potential change agent for sustainable development. The focus upon environmental education over the past three decades has led to environmental education being included into national and state education policy and curriculum documents. Three dominant approaches to environmental education have been developed, namely, education *about* the environment,

education *in* the environment and education *for* the environment. For the past two decades education *for* the environment has been identified as the preferred approach for environmental education. However, in recent times, this approach has been the centre of much debate. Thus, leading to the conclusion that the field of environmental education is characterised by vagueness, complexity and contradictions.

Whatever the debates, there is little evidence of the take-up of 'education *for* the environment', nor other forms of environmental education, in schools systems. In this way, we interpret such findings to mean that little is known regarding the effectiveness of dominant and subsidiary environmental education approaches in the teaching and learning of environmental education. Thus, it can be seen that a critique of environmental education practice is timely and essential if the field is to evolve with respect to bringing clarity and direction to environmental education.

Thirdly, there is limited research about environmental education practice, with regards to pedagogy and content, in primary schools. However, this limited research does suggest that environmental education practice is inadequate. Explanations for this situation have consisted of: lack of teacher training; theoretical inconsistencies between teachers, researchers, policy writers and curriculum developers; and conceptual problems with environmental education theory. It is identified that these explanations have not been thoroughly investigated and require further discussion and critique. Thus, these issues form the impetus and basis of the research (PhD) which is currently in process.

References
Abraham, J., Lacey C., & Williams, R. (1990). *Deception, demonstration and debate: Toward a critical environment and development education.* Great Britain: World Wildlife Foundation & Kogan Page.

Agarwal, A., & Narain, S. (1992). 'The fridge, the greenhouse and
    the carbon sink'. *The New Internationalist* (230), 10-11.
Beale, B., & Fray, P. (1990). *The vanishing continent: Australia's
    degraded environment*. Sydney: Hodder and Stoughton.
Board of Teacher Registration. (1993). *Environmental education: An
    agenda for preservice teacher education in Queensland*. Toowong:
    author.
Carson, R. (1965). *Silent Spring*. Canada: Penguin Books and Hamish
    Hamilton.
Clacherty, A. (1993). Environmental literacy and the technicist
    worldview: Towards a new conceptualisation. *The International
    Journal of Environmental Education and Information, 12*(2), 107-120.
Clark, J., & Harrison, T. (1997). Are educational outcomes relevant
    to environmental education addressed by primary school
    teachers. *Australian Journal of Environmental Education, 13*, 27-
    36.
Cutter, A. (1998). *Integrated pre-service environmental education: The
    abandonment of knowledge*. Unpublished Honours Thesis, Griffith
    University, Gold Coast.
Disinger, J. (1983). *'Environmental education's definitional problem'*.
    Ohio: ERIC.
Durning, A. (1992). *How much is enough? The consumer society and
    the future of the earth*. London: Earthscan Publications.
Education Department of Victoria. (1981). *Environmental education:
    Statewide survey report*. Melbourne: author.
Ehrlich, P. (1986). *The machinery of nature*. New York: Simon &
    Schuster.
Ehrlich, P., & Ehrlich, A. (1991). *Extinction: The causes and consequences
    of the disappearance of species*. New York: Random House.
Environment Australia. (1999). *Today shapes tomorrow: Environmental
    education for a sustainable future*. A Discussion Paper. Queensland:
    author.
Evernden, N. (1989). Nature in industrial society. In I. Angus, &
    Hally, S, J. (Ed.), *Cultural politics in contemporary America*. (pp.
    151-164). Great Britain: Routledge.
Fien, J. (1988). *Education for the Australian environment*. Canberra:
    Curriculum Development Centre.
Fien, J. (1992). *Education for the environment: A critical ethnography*.
    Unpublished Doctoral Thesis, University of Queensland,
    Brisbane, Australia.

Fien, J. (1993). *Education for the environment: Critical curriculum theorising and environmental education.* Geelong: Deakin University.

Fien, J. (1995). Teaching for a sustainable world: The environmental and development education project for teacher education. *Environmental Education Research, 1*(1), 21-33.

Fien, J. (2000). 'education for the environment: A critique' - an analysis. *Environmental Education Research, 6*(2), 179-192.

Fien, J., & Tilbury, D. (1996). *Learning for a sustainable environment: An agenda for teacher education in Asia and the pacific.* Bangkok: UNESCO.

Fien, J., & Trainer, T. (1993). Education for sustainability. In F. J (Ed.), *Environmental education: A pathway to sustainability.* Geelong: Deakin University.

Gore, A. (1992). *Earth in Balance.* Boston: Houghton Mifflin.

Gough, A. (1997). *Education and the environment: Policy trends and the problems of marginalisation.* Melbourne: The Australian Council for Educational Research Ltd.

Gough, N. (1987). Learning with environments: Towards an ecological paradigm of education. In I. Robottom (Ed.), *Environmental education: Practice and probability* (pp. 49-67). Geelong: Deakin University Press.

Greenall, A. (1981). *Environmental education in Australia: Phenomenon of the seventies: A case study in national curriculum development.* Occasional paper No.7. Canberra, Australia: The Curriculum Development Centre.

Hillcoat, J. (1999). *Beyond the commodity: Meaning-making, sustainability and the self.* Unpublished Doctoral Thesis, Queensland University of Technology, Brisbane, Australia.

Huckle, J. (1991). Education for sustainability: Assessing pathways to the future. *Australian Journal of Environmental Education, 7,* 43-62.

International Union for the Conservation of Nature., N. R., The United Nations Environment Programme & World Conservation Foundation,. (1980). *World conservation strategy: Living resource conservation for sustainable development.* Gland, Switzerland: International Union for the Conservation of Nature and Natural Resources.

Jickling, B. (1991). Environmental education, problem solving and some humility please. *Trumpeter, 3*(3), 153-155.

Jickling, B. (1994). Why I don't want my children to be educated for sustainable development. *Trumpeter, 11*(3), 114-116.

Jickling, B., & Spork, H. (1998). Education for the environment: A critique. *Environmental Education Research, 4*(3), 309-327.

Kahn, H., Brown W., & Martel, L. (1976). *The next two hundred years.* New York: William Morrow.

Linke, R. (1980). *Environmental education in Australia.* Sydney: George Allen & Unwin.

Manes, C. (1990). *Green rage: Radical environmentalism and the unmaking of civilization.* Canada: Little Brown and Company Ltd.

Merchant, C. (1992). *Radical ecology: The search for a livable world.* New York: Routledge.

Middleton, N., O'Keefe P., & Moyo, S. (1993). *The tears of the crocodile: From Rio to reality in the developing world.* London: Pluto Press.

Milbraith, L. (1989). *Envisaging a sustainable society: Learning our way out.* Albany: State University of New York Press.

Murdoch, K. (1989). Environmental education in primary schools. *Investigating APSJ, 3*(2), 6-9.

O'Riordan, T. (1981). *Environmentalism.* London: Pion Limited.

Orr, D. W. (1992). *Ecological literacy: Education and the transition to a postmodern world.* Albany: State University of New York.

Phipps, S. (1991). *Towards excellence in environmental education: An investigation into teacher preparation as environmental educators.* Unpublished Honours Thesis, University of Wollongong, New South Wales, Australia.

Pickering, K. T., & Owen, L. A. (1994). *An introduction to global environmental issues.* New York: Routledge.

Queensland Department of Education. (1993). *P-12 environmental education curriculum guide.* Brisbane: Publishing Services for Studies Directorate.

Queensland School Curriculum Council. (2000a). *Studies of society and environment: Years 1 to 10 syllabus.* Brisbane: The State of Queensland (The Office of the Queensland School Curriculum Council).

Ray, D. L., & Guzo, L. (1992). *Trashing the planet: How science can help us deal with acid rain, depletion of the ozone, and nuclear (among other things).* New York: HarperCollins.

Robottom, I., Malone, K., & Walker, R. (2000). *Case studies in environmental education: Policy and practice.* Geelong: Deakin University Press.

Rossen, J. (1995). Conceptual analysis in environmental education: Why I want my children to be educated for sustainable development? *Australian Journal of Environmental Education, 11,* 73-81.

Schumacher, E. (1973). *Small is beautiful.* London: Abacus.

Skamp, K. (1996). Environmental education: Implementation in a NSW department of school education region. *Australian Journal of Environmental Education, 12,* 61-70.

Spork, H. (1990). *The classroom practices, professional preparation, attitudes and concerns of state primary classroom teachers in Brisbane north region, Queensland, regarding environmental education.* Unpublished Masters Thesis, Griffith University, Brisbane.

Spork, H. (1992). Environmental education: A mismatch between theory and practice. *Australian Journal of Environmental Education, 8,* 147-166.

Stapp, W. B., & Stapp, G.L. (1983). A summary of environmental education in Australia. *OZEENEWS: Australian Association of Environmental Education* (12), 4-6.

Starke, L. (1998). *Vital signs: The environmental trends that are shaping our future.* London: Earthscan Publications.

Suzuki, D. (1993). *Time to change.* Canada: Allen & Unwin Pty Ltd.

Suzuki, D., & Dressel, H. (1999). *Naked ape to super species: A personal perspective on humanity and the global eco-crisis.* St Leonards: Allen & Unwin.

Suzuki, D., & McConnell, A. (1997). *The sacred balance: Rediscovering our place in nature.* Sydney: Allen & Unwin Pty Ltd.

Tilbury, D. (1992). Environmental education within pre-service teacher education: The priority of priorities. *International Journal of Environmental Education and Information, 11*(4), 267-280.

UNEP. (1983). *The state of the environment.* Nairobi: author.

UNESCO-UNEP. (1976). The Belgrade charter. *Connect, 1*(1), 1-9.

UNESCO-UNEP. (1978). The Tbilisi declaration. *Connect, 3*(1), 1-8.

UNESCO-UNEP. (1988). *International strategy for action in the filed of environmental education and training for the 1990's.* Moscow, Paris and Nairobi: author.

UNESCO-UNEP. (1992). Unced: The earth summit. *Connect, 17*(2), 1-8.

UNESCO-UNEP. (1995). Environmental education: Quo vadis?*. *Connect, 20*(2), 1-4.

UNESCO-UNEP. (1996). Teaching for a sustainable world: Environmental education for a new century. *Connect, 21*(4), 1-2.

UNESCO-UNEP. (1997). The oceans: Diminishing resources, degraded environment and loss of biodiversity. *Connect, XXII* (3/4), 1-33.

Walker, K. (1995). The teaching and learning of environmental education in NSW primary schools: A case study. *Australian Journal of Environmental Education, 11*, 121-129.

Walker, K. (1997). Challenging critical theory in environmental education. *Environmental Education Research, 3*(2), 155-162.

Washington, H. (1991). *Ecosolutions: Environmental solutions for the world and Australia.* New South Wales: BooBook Publications.

Weston, A. (1994). *Back to earth: Tomorrow's environmentalism.* Philadelphia: Temple University Press.

Weston, A. (1999). *An invitation to environmental philosophy.* New York: Oxford University Press.

World Commission On the Environment Development. (1987). *Our common future.* Oxford: Oxford University Press.

World Commission On the Environment Development. (1990). *Our common future: Australian edition.* Melbourne: Oxford University Press.

Wright, L. (1993). *Update: Environmental systems and human impact.* Great Britain: Cambridge University Press.