

The State of Environmental Education in the Australian School Curriculum

Debbie Heck[†]

Griffith University

Abstract The first review of environmental education in Australia was undertaken by Linke (1980) in 1973/4. The Curriculum Corporation on behalf of the Government Department of the Environment and Heritage undertook a second national review in 2002. The purpose of the review was to provide evidence for the development of future national initiatives in environmental education and as advice for environmental education practitioners. Curriculum documents were reviewed to identify the existence of 147 indicators of environmental education within outcomes and objectives of curriculum documents in the compulsory years of schooling through to senior secondary. The similarities between the two reviews are evident in the identification of Science and Social Science in the compulsory years of schooling as having direct references to environmental education. Geography at the senior secondary level also had significant explicit reference to environmental education. However, there were differences. The 2003 review identified environmental studies as a new secondary level subject that has environmental education objectives. It also identified a broader range of learning areas including Arts, Health and Physical Education, English and Technology which provided opportunities for the development of environmental education.

Introduction

As part of the Commonwealth's National Action Plan "Environmental Education for a Sustainable Future" the National Environmental Education Council was established in July 2000 (Department of the Environment and Heritage, 2000). The purpose of this Council was to provide advice to the Minister of the Department of the Environment and Heritage on the development of environmental education in Australia. One of the first activities undertaken by the National Environmental Education Council was to commission a review of school curriculum documents within Australia¹. The purpose of this review was to provide a snapshot of environmental education curriculum across the nation. This would have two benefits. First the mapping would assist the National Environmental Education Council in achieving the following terms of reference in relation to schooling:

- maintaining an overview of national environmental education programs and materials;

[†]Address for correspondence: Dr Debbie Heck, Faculty of Environmental Sciences, Griffith University, Nathan, Queensland 4111, Australia. Email: d.heck@griffith.edu.au

- identifying priority environmental education issues for national action;
- providing strategies advice on the environmental education activities of the Environment and Heritage Portfolio; and
- providing annual reports to the Minister with recommendations for further implementation of the National Action Plan.

Second it would make public the findings of this curriculum mapping so that those engaged in the development of environmental education curriculum, materials and policy could make use of the review findings in their work.

It was considered timely to undertake a review of the status of environmental education within curriculum documents as the last review of environmental education in Australian schools was undertaken in 1973/74 by Linke (1980). The findings of Linke's review were based on a definition of environmental education as education about the importance of environmental management and conservation. Teachers in primary and secondary schools identified the key objectives of environmental education as cognitive and affective in the areas of science and social studies as they related to environmental management and conservation. There has been a significant shift in the definition of environmental education over time and the 2003 review sought to identify the extent to which Australian curriculum explores a sustainable future rather than the more limited environmental management and conservation focus of the previous "Linke" review.

The Curriculum Corporation successfully tendered to undertake the environmental education curriculum review. Dr Brian Sharply led the project along with a review team consisting of Howard Brown, Shirley Sharply, Emma Tunley, and Michael Walsh. The review was funded by the Australian Government Department of the Environment and Heritage and undertaken in conjunction with a national reference team and in consultation with the Australian Government Department of Education, Science and Training.

This paper provides an overview and commentary on the curriculum review to achieve the second purpose of the review, making the findings available to environmental educators. Hence, this paper summarises the historical development of the status of environmental education curriculum in Australia and details the 2003 curriculum review process, findings and implications for environmental education practitioners and researchers.

Environmental Education in Australia the 1970s

The US Environmental Education Act provided the predominant view of environmental education in Australia in the 1970s. The act stated that environmental education "is intended to promote among citizens the awareness and understanding of the environment, our relationship to it, and the concern and responsible action necessary to assure our survival and improve the quality of life" (Linke 1980:26). It was within this context that the first review of environmental education was undertaken in Australia. A review at the national level was significant as education in Australia is the responsibility of each of the seven states and territories rather than the federal government. The influence of the federal government in Australia with regard to education was only evident in 1963 when the Prime Minister Robert Menzies appointed John Gorton as Minister in charge of Commonwealth Activities in Education and Research under the Prime Minister (Department of the Parliamentary Library, 2001).

Linke's (1980) review of environmental education, commenced in 1973/4, encompassed education in the public sphere and formal education at the primary,

secondary and tertiary level. The study involved an analysis of the environmental emphasis of environmental studies as well as other subject areas. Content analysis was the research methodology used to undertake Linke's study with a focus on an analysis of textbooks and course materials in secondary science and social studies. The review rated texts according to eight indicators including: environmental emphasis, environmental perspective, conservation approach, emotive intensity, quantitative emphasis, pictorial emphasis, reader involvement (intellectual activities) and reader involvement (practical activities).

There were three key findings of this content analysis. The first related to the level of emphases on environment within the texts. The findings indicated that the reference to human environment relationships were significantly different depending on the year level and topic of study. Senior physics and chemistry had little focus on the environment. While geography at all levels was considered to have a moderate to high level focus on the environment. Junior level science and social studies had a moderate level of emphasis with some texts demonstrating no focus on the environment while others illustrated a significant focus. There were some subject specific topics identified with science exploring issues such as: crop productivity, water pollution and mineral resources, while social science focussed on population, urban development and agricultural production. The second finding was the lack of focus on the need for conservation or preservation of the environment within the texts even though many texts suggested this as one of the objectives. The third and final finding of the text analysis related to the language and presentation of texts. The materials featured non-emotive language, the use of large amounts of quantitative data, frequent use of illustrations and discussion questions along with some practical activity. These references to the environment within the text were incidental rather than explicit.

It was also during this era that Lucas (1979) identified three different classes of environmental education: education *about* the environment, education *in* the environment and education *for* the environment. These three classes or orientations to environmental education are commonly referred to and discussed in the environmental education literature (Fien & Gough, 1996). Annette Gough has described the status of environmental education in Australian schools in the 1970s as emerging. This was evident because examples of good practice provided to the Curriculum Development Centre in the mid to late 1970 represented knowledge *about* the environment rather than education *for* the environment (Greenhall, 1987). It was clear that during the 1970s there was little focus on the development of the "responsible action necessary to assure our survival and improve the quality of life" (Linke, 1980, p. 26) as identified in the US definition.

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The major shifts in education were the result of the Federal government seeking to achieve a national consistency of education outcomes as a way of ensuring that young people no matter where they live have a common set of educational experiences. The report, "Strengthening Australia's Schools" (Dawkins, 1988), and the Australian Education Council (consisting of all state territory and commonwealth education ministers) led to a set of "Common and Agreed Goals of Schooling" (Australian Education Council, 1990) and agreement on an annual reporting process against the identified goals. This process led to the development of National Statements and Profiles for eight key learning areas: Studies of Society and Environment, Science, Mathematics, Arts, English, Technology, Health and Physical Education and Foreign Languages. The final outcome of this process was agreement among the states, territories and the federal government to work towards national outcomes and

standards frameworks within individual states and territories (Dudley & Vidovich, 1995).

Following the development of the National Statements and Profiles, environmental education was identified as being predominantly located within two of the eight key learning areas Science and Studies of Society and Environment. However, there were identified opportunities for the development of environmental education in other key learning areas such as the Arts, Technology and Health and Physical Education (Gough, 1997).

Within the context of the development and implementation of national curriculum documents within the states and territories, the results of research from the 1990s indicated that there was still a focus in schools on education *in* and *about* the environment rather than education *for* the environment (Spork, 1992, p. 163). Fien and Gough have also noted with concern that while environmental education content within schools may have increased, very little relates to the development of the action component that is the basis of education *for* the environment (Fien & Gough, 1996, p. 212). In line with the increasing levels of environment within the curriculum there is also an expansion of the traditional subjects where environmental education is studied to include the Arts (Greenhall Gough, 1990).

At an international level Australia has been part of a number of international meetings and declarations that have identified the way forward for environmental education. The first major declaration being the Tbilisi Declaration that encompassed five objectives for environmental education - awareness, knowledge, attitudes, skills and actions (UNESCO-UNEP, 1978, p. 3). It was the 1992 Earth Summit that heralded the shift from environmental education towards education for sustainability. The Australian government signed off on the 27 principles to guide nations towards sustainability. Thus, environmental education has become a federal issue mainly with the Government Department of Environment and Heritage.

The need to focus on environmental education in Australia as a result of the international trends and lobbying by the Australian Association for Environmental Education led first to a discussion paper titled "Today Shapes Tomorrow" (Department of Environment and Heritage, 1999) and later a National Action Plan with bipartisan support for the development of environmental education focussed on achieving ecological sustainability. The definition of environmental education identified within the "Environmental Education for a Sustainable Future: National Action Plan" (2000) was the basis for the 2003 review of primary and secondary school environmental education. The National Action Plan states that environmental education "should be defined in its broadest sense to encompass raising awareness, acquiring new perspectives, values, knowledge, and skills, and formal and informal processes leading to changed behaviour in support of an ecological sustainable environment" (Department of the Environment and Heritage, 2000, p. 3).

The environmental education indicators developed for the review of Australian curriculum documents mirror the objectives identified from Tbilisi. Hence, five categories were identified:

1. information about the environment;
2. studies of humans and the environment;
3. skill, problem solving and competencies;
4. attitudes, values and viewpoints; and
5. action.

The following paragraphs provide detail of the categories, subcategories and indicators identified for this curriculum review according to the five groups above. Two

mechanisms were used to develop this range of indicators. The first was through an exploration of the literature including the various environmental issues and processes considered within the forty chapters of the Rio Earth Summit report (UNCED, 1992) as well as recent research on young people's attitudes towards the environment (Yencken, Fien & Sykes, 2000). The second mechanism was review by both the project team and the panel of experts to revise the indicators in line with the literature, best practice and the findings from a sample review of curriculum outcomes and objectives (Sharpley, 2003b).

Information about the environment encompassed 29 indicators within three sub-categories. The first sub-category ecosystems identified four different scales of ecosystems from local through to global with specific mention of natural systems. The second sub-category involves 16 ecological principles including carrying capacity, cycles of matter and species diversity. The final sub-category is titled energy and resources. This group of nine indicators covers information about resource use such as renewable resources, production, consumption and energy conservation.

Studies of humans and the environment consisted of four major sub-categories. The first was humans and the environment. This group consisted of 13 indicators including agricultural sustainability, poverty, mass transit technologies and urban sprawl and urbanisation. The second sub-category political and economic issues covered 18 indicators such as citizenship, media, lobbying, intergenerational equity and ecological footprint. The third sub-category identified eight different types of pollution for example solid waste and noise pollution. The final sub-category titled issues recognised 17 different environmental issues such as acid rain, land degradation, salinity and desertification.

Skills, problem solving and competencies were one large category with 25 indicators. These indicators included skills such as measuring, auditing, mapping, collecting, analysing and organising information, communicating ideas and information, writing and listening. Problem solving includes decision-making, using future tools/forecasting, evaluating assessing and critical thinking. Competencies that were suggested included: environmental leadership and working with others and in teams.

Attitudes, values and viewpoints included 15 indicators. These indicators encompassed spirituality, ethics, values clarification, social justice, respect for living things, care of the environment, respect for other cultures and the importance of individual action.

The final category action consists of 11 indicators. These indicators include specific actions that students can take such as litter reduction in school/local areas, school environment improvement projects, water and energy conservation, waste minimisation and reducing harmful chemical use. Most of these actions relate specifically to the school or students home environment. There were also examples of community based projects and involvement in government initiatives such as Landcare and Waterwatch. Two additional indicators were suggested within this action category: environmental citizenship and turning knowledge into action.

Information about the environment and studies of humans and the environment address the knowledge and awareness objectives identified from the Tbilisi Declaration. The remaining three Tbilisi objectives are mirrored in the titles of the remaining three categories: skills, problem solving and competencies, attitudes, values and viewpoints and action. The full list of 147 indicators is available at the following web page, <http://www.deh.gov.au/education/nap/council/indicators.html> (Sharpley, 2003a).

How was the Review Undertaken?

Once the initial set of indicators were developed in the five broad categories identified above, a review was undertaken of the Victorian curriculum. This included curriculum documents in Science, Studies of Society and Environment, Technology, Health and Physical Education, English, Mathematics and the Arts for the compulsory years of schooling. It also included senior subjects including Biology, Physics, Chemistry, Environmental Science, English, Geography and Outdoor and Environmental Studies. It was during this process that the national reference group provided advice on both the mapping process and finalised the indicators. Once this process was agreed members of the review team analysed the curriculum documents for all states and territories in Australia. Curriculum documents that were not considered as part of this study included those from the Northern Territory, Tasmania (K-10) and Queensland Mathematics and English curriculum documents as these documents were being re-evaluated at the state/territory level. A summary of the review of each of the states and territories curriculum documents according to the indicators are available from the following web page <http://www.erin.gov.au/education/nap/council/summary-1.html#download>. The unit of analysis for the curriculum documents was outcomes for the compulsory years of schooling and outcomes or objectives depending on the terminology for senior secondary documents.

What did the Review Reveal?

Environmental education is evident in the Australian curriculum in the compulsory and senior years of schooling. Table 1 illustrates the environmental education orientations of outcomes within the Science and Social Science curriculum for the compulsory years of schooling. This table categorises outcomes as either direct or opportunities. An outcome is categorised as direct if it relates explicitly to environmental education. While an outcome is categorised as opportunity if it is possible for teachers to make use of environmental education to achieve the outcome identified. This demarcation is significantly different to the research undertaken in 1973/74 where only explicit reference to environmental education was considered (Linke, 1980). Table 1 demonstrates that the emphasis on environmental education within these curriculum documents differs for different states and territories. However, the findings clearly assert that environmental education has a place within these two curriculum areas as identified previously in the literature.

Analyses of outcomes indicate that there was an emphasis on the development of environmental education skills and values in both the science and social science curriculum documents reviewed. These findings are illustrated in Table 2 and Table 3. These tables also illustrate the lack of emphasis within the curriculum on the action component of environmental education. Action was most commonly located within the Social Science curriculum area, however, it was evident in one Science curriculum document. The most notable finding from this analysis was that in Victoria neither the Social Science nor the Science curriculum provided direct opportunities for students to explore the action component of environmental education.

While environmental education is largely located within the curriculum areas of Science and Social Science within the compulsory years of schooling there is evidence to support the development of environmental education in other curriculum areas such as Technology, the Arts, English, Health and Physical Education and Mathematics (Sharpley, 2003b). However, in most cases there are frequently opportunities for the development of environmental education rather than a direct or explicit reference to it within the curricula. This finding contributes to the conceptualisation of environmental

TABLE 1: Curriculum outcomes related to environmental education for science and social science in the compulsory years of schooling (Sharpley, 2003b)

	% Outcomes	Victoria	NSW	QLD	SA	WA
Science	Direct	15	18	18	58	31
	Opportunities	20	46	5	0	8
Social Science	Direct	46	43	23	37	35
	Opportunities	2	11	0	5	0

TABLE 2: Number of science outcomes directly related to environmental education in the compulsory years of schooling (Sharpley, 2003b)

	Victoria	NSW	QLD	SA	WA
Skills	9	7	7	6	7
Values	10	5	2	6	3
Action	0	0	0	2	0

TABLE 3: Number of Social Science outcomes directly related to Environmental Education in the compulsory years of schooling (Sharpley 2003b)

	Victoria	NSW	QLD	SA	WA
Skills	10	6	24	17	14
Values	3	4	15	11	11
Action	0	3	9	0	4

education as a cross-curricula area of study. The research also identified the importance of environmental education being considered in a holistic manner where careful consideration of activities outside of the formal curriculum is required.

At the senior levels of schooling there was evidence of environmental education. In summary when looking nationally there is an emphasis on the development of knowledge about the environment and human interaction with the environment. This is especially true of subjects such as Physics, Chemistry and Earth Science. Biology in some states and territories places some additional emphasis on the development of skills and consideration of values in relation to environmental education.

Of the senior curriculum materials reviewed only two subject areas at the senior level addressed the action component of environmental education. These were Environmental Studies and Geography. Of these two courses Geography presented the strongest forum for the development of the action objectives of environmental education in Queensland and South Australia. Environmental studies in South Australia and Victoria provided some examples of action (Sharpley, 2003b).

What did the Review Recommend?

The review made recommendations in two major areas; policy and teaching and learning at the national level. These findings will be useful as the federal government reviews its approach to the upcoming Decade for Sustainability and Australia's contribution to the Rio Declaration from the Earth Summit (UNCED, 1992). In terms of policy the review recommends the development of a nationally agreed Environmental Education Policy

(Sharpley, 2003b). This recommendation aligns strongly with the review finding that environmental education has been developed differentially across the country. This would provide an excellent opportunity for the environmental education community, both researchers and practitioners, to develop an agreed statement to address the issue of just what environmental education is.

In terms of teaching and learning the review makes three recommendations.

1. The development of materials that:
 - promote exemplary teaching of environmental education;
 - provide examples of how to make use of environmental education opportunities within curriculum documents; and
 - introduce aspects of environmental education currently not considered in the curriculum;
2. Establishment of set of criteria for the evaluation of environmental education materials nationally; and
3. A national program of professional development to support the development of environmental education in schools (Sharpley, 2003b).

The third of these recommendations is the least problematic as most environmental education researchers and practitioners would agree that more professional development for teachers is required. This notion is well supported in the literature internationally (Gayford & Dillon, 1995; Robertson & Krugly-Smolka, 1997; Grace & Sharp, 2000). The second of these recommendations, the development of a set of guidelines for the evaluation of curriculum materials would further advance the work undertaken in the United States (NAAEE, 1996). However, given the nature of the state/territory-based responsibilities for education the process of developing an agreed list for all of Australia on environmental education would no doubt be a difficult task. It is the first of these recommendations that proves the most contentious as there is little support from the literature for the development of more materials in environmental education.

What Does This Mean for Environmental Educators?

Three similarities between the reviews of environmental education in 1973 and 2003 are clearly evident. First, environmental education is still occurring largely in science and social science during the compulsory years of schooling as well as in geography at the senior secondary level. Second, the pattern of focus on knowledge, attitudes and values is evident in both 1973 and 2003. Third, the pattern of limited opportunities for the exploration of mechanisms for action and social change for sustainability are evident in both studies.

The differences between the 2003 and 1973 are threefold. First, environmental education is evident within the newer area of environmental science where it is offered at senior secondary school level. Second, there are opportunities for environmental education within a wider range of key learning areas Technology, the Arts, Health and Physical Education, Mathematics and English. Third, there is acknowledgement that environmental education cannot be confined only to the formal curriculum and further exploration of the contribution of extra curricula activities need to be developed.

Educators need to keep working on developing curriculum policy as well as classroom practice that supports environmental education across the curriculum. We need to focus on the development of education *for* the environment and that means considering how we can address knowledge, skills, values and actions within the curriculum. To achieve this aim we need both more research and more practice in environmental education to illustrate how education contributes to a sustainable future. Armed with the information that this review provides, researchers and practitioners need to embark

on exploring the type of environmental education that happens in practice and the role of extra curricula activities as mechanisms for environmental education.

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Endnote

1. The full details of the work of the National Environmental Education Council is available at the following site <http://www.erin.gov.au/education/nap/council/index.html>