

The Australian-ness of Curriculum Jigsaws: Where Does Environmental Education Fit?

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Abstract This paper reviews Australian Government actions related to environmental education, particularly in the past decade, and examines the actions forthcoming from two national action plans (Environment Australia, 2000 and DEWHA, 2009), the implementation strategy for the Decade of ESD (DEWHA, 2006) and developments related to the Australian Curriculum. This analysis is inspired by the Australian-ness of the metaphor of the curriculum as a jigsaw puzzle suggested by Robottom (1987), the seemingly constant battle for survival in the formal curriculum that environmental education has faced since the 1970s (Fensham, 1990; Gough, 1997), and the ongoing tensions between science education and environmental education in Australia's formal school curriculum.

Introduction

In recent years there has been growing recognition that action is needed *now* if Australian society, and global society, is to have a sustainable future. Numerous reports¹ over the past two decades from international and Australian government bodies have agreed that a holistic approach towards sustainable development – *development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (World Commission on Environment and Development, 1987, p. 8.) – is needed. Such sustainable development encompasses the interconnectedness of social, economic and environmental issues, rather than just focusing on environmental protection.

These reports have also acknowledged the importance of education at all levels in achieving a sustainable future:

Education is critical for promoting sustainable development and improving the capacity of the people to address environment and development issues... It is also 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. (United Nations, 1993, *Agenda 21*, paragraph 36.3)

This education for sustainability (or sustainable development) is the means by which Australian schools and communities can (and should) work towards creating a sustainable future.

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In this paper I review how the Australian government has responded to these developments, with a particular emphasis on the past seven years – that is, since the announcement of the implementation plan for the United Nations Decade of Education for Sustainable Development (UNESCO, 2004) – and with particular reference to the governmental structures to support the development of environmental education and specific developments in formal education sectors.

I also highlight a key tension in the implementation of environmental education in school curriculum over the past three decades. This tension continues as the National Curriculum proposes “Earth and Environmental Science” as a separate subject at Year 11 and 12 levels (National Curriculum Board, 2009), while also incorporating sustainability across the curriculum, consistent with the *Melbourne Declaration on Educational Goals for Young Australians* (MCEETYA, 2008, p. 9). That this tension remains unresolved is part of the Australian-ness of environmental education.

Over two decades ago Ian Robottom (1987, p. 95) postulated that “if the conventional curriculum is a jigsaw puzzle made up of subject ‘pieces’, then environmental education may be a piece of a different puzzle altogether”. As I discuss in this paper, it may be that environmental education is more than just part of a different jigsaw puzzle. As Fensham (1987, p. 22) noted with respect to the characteristics of Australian environmental education as he saw them in 1977, “we were not to see ourselves as apart from but integrally part of the Australian environment(s)” and “action and learning were seen as being symbiotic aspects of environmental education in all its stages – a very different pedagogical view from that which prevails in much of substantial learning”. Thus not only does environmental education imply a non-conventional curriculum for Australian environmental educators, it also implies a different pedagogical view, and different worldviews – and, more than two decades on, government actions in environmental education curriculum in Australia indicate that the question as to which jigsaw puzzle(s) environmental education belongs remains unresolved.

The jigsaw is a powerful metaphor for environmental education in that it “is at once a force of nature, a natural phenomenon, and the by-product of some supernatural plan. Nature creates its own puzzles and we imitate them” (Drabble, 2009, p. 273). However, the jigsaw puzzle(s) of which environmental education is/are a part is/are not confined by the safety of a frame, “of knowing that all the pieces will fit together in the end. But where is the frame of the evolving city? Or of an expanding universe? Where are the boundaries?” (Drabble, 2009, p. 169). The answers are not simple.

Background

The first national conference specifically focused on environmental education was convened in April 1970 under the auspices of the Australian Academy of Science. Here the chair of National Committee for the International Biological Program, Sir Otto Frankel, noted that the deterioration of the environment threatened to engulf the whole world and concluded that this “is now perhaps the most pressing and most important aspect of education for the coming decades” (Frankel, 1970, p. 8).

At this time, environmental problems were often seen as scientific problems which science and technology could solve, but increasingly even the scientists themselves were arguing that science and technology were not enough. For example, at the Academy conference Stephen Boyden (1970) saw educational institutions as being at the top of the list of key groups to be involved in environmental education, and charged them with providing students with an awareness of the threats to the human species and stimulating thinking and discussion on the social and biological problems of mankind while avoiding “the implication in teaching that all the answers to any problems that

man may have lie simply in further intensification of scientific and technological effort” (1970, p. 19).

In the years following the Academy of Science conference the Australian Government responded to the calls for action on environmental education by designating it as a priority area for curriculum materials development by the national Curriculum Development Centre and through participation in the UNESCO and UNEP conferences and workshops on environmental education (such as those held in Belgrade in 1975 and Tbilisi in 1977) which helped shape the movement (Gough, 1997).

The Curriculum Development Centre published Australia’s first national statement on environmental education for schools (Greenall, 1980), which all state and territory education authorities endorsed. This attempted to move environmental education from being a piece in a conventional curriculum jigsaw puzzle into a new “orientation in the curriculum” puzzle. Developments were then low key at many levels for several years, although the school curriculum became an area of focus for a period (Greenall, 1987; Gough, 1997).

The Department of the Environment and Heritage published the second national statement on environmental education in 2005. This suggested a different, “whole school approach”, jigsaw for environmental education, consistent with that of the Australian Sustainable Schools Initiative, which sees a curriculum only focus as inadequate: successful implementation of environmental education requires action across the whole school: “whole-school approaches are advocated as best supporting the implementation of Environmental Education in a way that reflects the goals, aims, and purposes of this area... Whole school approaches also appear to be most successful when they build on the existing culture, priorities, and values of schools and their communities” (Bolstad, Baker, Barker, & Keown, 2004, p. 95). This is a different jigsaw puzzle from either a conventional curriculum or an orientation in the curriculum.

The first national action plan for environmental education was released in 2000 by Environment Australia and the second in 2009 by the Department of the Environment, Water, Heritage and the Arts. These developments are discussed later in this paper. That these significant documents about environmental education were developed for environment rather than education agencies is part of the *Australian-ness* of Australian Government action in environmental education

National Actions for the Development of Environmental Education in Australia

In Australia, both education and environmental management are the responsibility of the states according to the Constitution. However, over past decades, the national government has assumed responsibility for various aspects of both education and environmental management using a range of external affairs powers and budgetary measures.

With respect to environmental education, both national and state governments undertake a range of activities, but I will generally confine discussion to the national level.

The federal environment ministry; currently known as the Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) manages education for sustainability (EFS) activities at the national level. This Department’s responsibilities include implementation of the UN Decade of Education for Sustainable Development in Australia (see www.environment.gov.au/education/decade/index.html#strategy), which was launched in July 2005 and encapsulated in the Decade Implementation Plan (Department of the Environment and Heritage, 2006). Since this time there has been a continuation of existing or already intended activities – such

as the Australian Sustainable Schools Initiative (AuSSI) – and the release of a new National Action Plan (DEWHA, 2009) and the National Sustainability Curriculum Framework (DEWHA, 2010) as significant contributions to Australia’s participation in the Decade. According to the Department’s Decade Implementation Strategy website (www.environment.gov.au/education/decade/strategy.html):

In line with the UNESCO Implementation Scheme, the Australian Government will be looking to opportunities for building capacity and the mainstreaming of Education for Sustainability considerations through strategies such as:

- developing and expanding existing Australian Government policies and programs in education for sustainability;
- promoting and sharing successful Australian initiatives and expertise in education for sustainability²;
- inviting national and international partnerships to strengthen and re-orientate policies and programs; and
- undertaking a gap analysis and evaluation of work to date.

Government initiatives specifically mentioned on this webpage are the Australian Sustainable Schools Initiative (AuSSI) and the National Environmental Education Council (NEEC) – however the latter, re-named the National Council on Education for Sustainability in 2009, seems to have last met on 17 July 2007 (according to a non-current page on the DSEWPC website) but there was a first meeting under the new name in April 2009 (Rose, 2009). This now seems to be a lost jigsaw piece.

Other initiatives mentioned on the Sustainability Education webpage (www.environment.gov.au/education/index.html) are:

- ARIES - Australian Research Institute in Education for Sustainability;
- Education for Sustainability Grants Program;
- National Action Plan;
- National Education for Sustainability Network (previously National Environmental Education Network (NEEN)); and
- Sustainability Curriculum Framework – a guide for curriculum developers and policy makers.

Key elements of these Government initiatives are discussed below.

Although it has previously supported environmental education activities – particularly through the Curriculum Development Centre in the 1970s and early 1980s – the current national education ministry, the Department of Education, Employment and Workplace Relations (DEEWR), has no obvious involvement with education for sustainability. This may be a surprise to some, but a recent search of their website (www.deewr.gov.au) for “environmental education”, “education for sustainability” or “sustainability” elicits the error message “Error displaying site content. Please contact site administrator to notify regarding the issue.”; the main educational responsibility for environmental/sustainability education rests with the Australian Curriculum, Assessment and Reporting Authority (ACARA) which is an independent authority responsible for the national curriculum.

National Action Plan

In July 2000 the Australian Government released its statement *Environmental Education for a Sustainable Future: National Action Plan* (Environment Australia, 2000). This document established the need to link Australia’s overall environmental education effort with the nation’s environmental priorities and that environmental education (or education for sustainable development, an alternative which was implied

but not discussed in this statement) was a political (environmental) priority rather than an educational one. The National Action Plan outlines some fundamental principles of sound environmental education and establishes a number of mechanisms aimed at improving the national approach.

A key element in the National Action Plan is a move from an emphasis on awareness raising to an emphasis on providing people with the knowledge, values and skills to actually make a difference to the protection and conservation of Australia's environment. (Environment Australia, 2000, p. 5)

The Australian Government moved quickly to implement many of the initiatives contained in this National Action Plan.

- The National Environmental Education Council (NEEC) was established in July 2000. Its purpose is to raise the profile of environmental education and provide expert advice to the Australian Government on environmental education issues, in particular on how Australians can move beyond environmental awareness to informed action.
- The National Environmental Education Network (NEEN) was established in May 2001. It comprises of representatives from Commonwealth, State and Territory environment and education agencies. Its purpose is to promote better coordination of education activities.
- The Australian Environmental Education Foundation, renamed the Australian Research Institute in Education for Sustainability (ARIES), was established at Macquarie University in December 2003 to undertake an applied environmental education research program.

Two additional activities were funded and associated with the National Action Plan:

- A pilot Sustainable Schools program was implemented in Victoria and New South Wales in 2002 and 2003, followed by the national Australian Sustainable Schools Initiative in 2004.
- The development of *Educating for a Sustainable Future: A National Statement on Environmental Education for Australian Schools* (Department of the Environment and Heritage, 2005) was agreed to by the Directors-General of Education in all States and Territories in May 2004.

The latter was the only curriculum related initiative in the National Action Plan and its development was undertaken through the Curriculum Corporation. As it required the agreement of all States and Territories its wording was cautious to allow for liberal interpretations across jurisdictions.

The Australian Sustainable Schools Initiative (AuSSI) has been one of the longest lasting and most impressive actions from the first National Action Plan. It was given a central role in the Australian implementation strategy for the UN Decade (DEH, 2006) and in the second National Action Plan (DEWHA, 2009, p. 11) where its effectiveness is highlighted:

This is a successful example of how a partnership between the Australian Government, the states and territories can lead to systemic change. The initiative entails a whole-of-school, action learning approach to sustainability which is generating measurable social, educational, financial and environmental outcomes.

Primary schools across Australia are involved in AuSSI which has been a vanguard in the previously mentioned shift to a whole-school approach to environmental education.

In April 2009, the Department of the Environment, Water, Heritage and the Arts published its new National Action Plan, *Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability*. This Plan builds on the foundation of the earlier plan and is a significant contribution to Australia's participation in the UN Decade. It includes a review of actions to date on education for sustainability and the issues to be addressed in the future. It also sets out the Plan's "vision and mission, with strategies and actions to achieve the plan's objectives" (2009, p. 2).

The actions are designed to support four strategies:

- Demonstrating Australian Government leadership;
- Reorienting education systems to education for sustainability;
- Fostering sustainability in business and industry; and
- Harnessing community spirit to act.

The categories of actions contained in the Plan under these four strategies are summarised in Appendix A.

For example, schools are one of the action areas under "Strategy 2: Reorienting education systems to education for sustainability" of this Plan (DEWHA, 2009, p. 24). Here the specific areas for action are:

- Growing the Australian Sustainable Schools Initiative – whole-of-school approaches to education for sustainability;
- Improving systems support for sustainability in schools;
- Coordination of school-based programs;
- Professional development for teachers;
- Embedding sustainability in curricula; and
- Early childhood education.

Specific actions include a research project to look at the role of education for sustainability in the early childhood sector and embedding sustainability in the national curriculum. The recognition of the importance of early childhood education changed the dimensions of the curriculum jigsaw puzzle – or creates a new one. The *Sustainability Curriculum Framework* (DEWHA, 2010) attempts to put sustainability education into a cross-disciplinary curriculum jigsaw puzzle for Years K-10, while at the same time the Australian Curriculum proposes a separate subject/jigsaw puzzle on "Earth and Environmental Science" for Years 11 and 12. This tension is discussed below.

In regard to early childhood education there have been some significant developments. The *National Quality Framework for Early Childhood Education and Care and School Age Care* (COAG, 2009) and *Belonging, Being & Becoming: The Early Years Learning Framework for Australia* (DEEWR, 2009) are currently being implemented in early childhood settings around Australia, and the latter includes in Outcome 2: "children are connected with and contribute to their world" that "Children become socially responsible and show respect for the environment" (DEEWR, 2009, p. 29). If early childhood educators implement these actions then there will be a sound basis for further environmental education occurring in primary schools, but the linking of the early childhood curriculum jigsaw to the primary one will be a challenge. Will they be seen as part of the same puzzle, or will children be required to move to a different curriculum jigsaw?

In addition, in 2010 DEWHA published a *Sustainability Curriculum Framework: A guide for curriculum developers* to provide information and guidance to curriculum developers and policy makers on how education for sustainability may be effectively

incorporated into curriculum. The document is not intended to specify how education for sustainability will be taught across the curriculum, and to date there is little evidence of it having been considered in the development of the National Curriculum. However, it is a useful reference document for teacher educators and others.

Both National Action Plans have included curriculum actions – the National Statement (DEH, 2005) and the Curriculum Framework (DEWHA, 2010) – which have proposed environmental education to be part of a different jigsaw puzzle from the conventional curriculum one.

National Goals and National Curriculum

At a different, “super”, level of government, the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) – the meeting place for all Education Ministers from the states, territories and national government – in December 2008, released the *Melbourne Declaration on Educational Goals for Young Australians*. This Declaration includes, as one of its goals, one that relates to environmental sustainability as well as others that relate to social and economic sustainable development (MCEETYA, 2008, p. 9).

Goal 2: All young Australians become successful learners, confident and creative individuals, and active and informed citizens

- act with moral and ethical integrity
- appreciate Australia’s social, cultural, linguistic and religious diversity, and have an understanding of Australia’s system of government, history and culture
- understand and acknowledge the value of Indigenous cultures and possess the knowledge, skills and understanding to contribute to, and benefit from, reconciliation between Indigenous and non-Indigenous Australians
- are committed to national values of democracy, equity and justice, and participate in Australia’s civic life
- are able to relate to and communicate across cultures, especially the cultures and countries of Asia
- work for the common good, in particular sustaining and improving natural and social environments
- are responsible global and local citizens.

This goal is particularly relevant as it opens up new opportunities for curriculum development to support environmental education in classrooms – a task that has been taken up as part of the development of the Australian Curriculum as both a cross-curriculum priority and as a separate subject.

The Australian Curriculum is currently being developed and schools have been invited to register their initial interest in participating in a pilot program in 2011 that would focus, in particular, on the validation of the Australian Curriculum achievement standards. This new curriculum will eventually cover all school years from Foundation to Year 12. Curriculum for the first four subjects – English, mathematics, the sciences and history – for Foundation to Year 10 is currently being validated. There have been proposals for the Years 11 and 12 versions of these subjects. The areas of Geography, Languages Other Than English and The Arts are currently under development, and there have been no announcements about the inclusion of other subjects in the national

curriculum, although there are submissions from areas such as Home Economics (Home Economics Victoria, 2009) and Outdoor Education (Martin & Hewison, 2010).

Ecological sustainability is referred to in the paper which helped guide the writing of the Australian science curriculum K-12, where the key term “contemporary science” includes many aspects of what we would call environmental education (National Curriculum Board, 2009, p. 5):

Contemporary science involves new and emerging science research and issues of current relevance such as energy resources and technology, climate change and adaptation, mining and minerals, biodiversity and ecological sustainability, materials science and engineering, health and prevention and treatment of disease.

However, the Rationale for the Australian Curriculum for Science from Foundation to Year 10 (ACARA, 2011) has moved away from specifically mentioning these issues and instead refers to “scientific literacy” in these terms:

Students can experience the joy of scientific discovery and nurture their natural curiosity about the world around them. In doing this, they develop critical and creative thinking skills and challenge themselves to identify questions and draw evidence-based conclusions using scientific methods. The wider benefits of this “scientific literacy” are well established, including giving students the capability to investigate the natural world and changes made to it through human activity.

The curriculum statement has the “Science Understanding” strand broken down into the traditional science areas of biological sciences, chemical sciences, earth and space sciences and physical sciences – even though there is a proposal for “Earth and Environmental Science” at Years 11 and 12. Applying the cross-curriculum priority of “sustainability” elicits some very questionable associations of these traditional sciences in “Science Understanding”, and in “Science as Human Endeavour”, with sustainability supposedly being developed through content such as:

- Objects are made of materials that have observable properties;
- Science involves asking questions about, and describing changes in, objects and events;
- The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence; and
- Sudden geological changes or extreme weather conditions can affect Earth’s surface.

It would seem that the National Curriculum for science has returned us to the conventional curriculum where the jigsaw puzzle does not readily fit with environmental/sustainability education and the new puzzle promised in the Science framing paper (National Education Board, 2009) was but a dream. Rather than seizing the challenge and developing a new contemporary science jigsaw puzzle which was relevant to students, the authors of this National Curriculum have stuck to an old puzzle and not embraced the Australian-ness of environmental education curriculum. As Margaret Drabble (2009, p. 169) writes, “The pieces of the jigsaw scatter and are recombined in a new pattern that does not always strive to work from a lost template. (Is that because there is no fixed state, no frame, no archetype? The model may be evolution, not rediscovery).”

The elaboration of sustainability as a cross-curriculum priority in the National Curriculum has also been a concern for the Australian Association for Environmental Education (AAEE). In their submissions to ACARA on each of the draft curriculum

statements, AAEE has drawn attention to the deficiencies in encompassing sustainability. For example, in the draft Mathematics curriculum the only reference is “The cross-curriculum dimension of commitment to sustainable living... provides an engaging and rich context for mathematics learning” (Smith, 2010a, p. 1). Similarly, the draft History curriculum only makes limited reference to “human use of the environment” rather than the broader context of “how humans see the environment, how human societies have shaped or impacted on the environment, and how the quality of the extant or resulting environment has impact on the shape of societies” (Smith, 2010b, p. 1). AAEE also criticised the draft English curriculum for not linking “the transformative practices of literacy to sustainable futures” (Smith, 2010c, p. 2). AAEE’s response to the draft Science curriculum was the most detailed, and concluded that “AAEE recommends that ‘science, citizenship and policy making’ be included as content descriptor for all Year levels of the Science as Human Endeavour strand and as a key element of scientific inquiry” (Smith, 2010d, p. 7). This recommendation has not been heeded in the current version of the National Curriculum: Science (ACARA, 2011) and it would seem that AAEE has a different curriculum jigsaw in mind from that being developed by ACARA.

Unfortunately AAEE has not published its submission to ACARA on the proposed Year 11 and 12 “Earth and Environmental Science” curriculum, so the Association’s position on this separate subject approach is unknown.

Curriculum Tensions: A Separate Subject or a Cross-Curriculum Perspective?

The tension that is evident in the National Curriculum around environmental education as a cross-curriculum perspective (Foundation to year 10) or separate subject (Earth and Environmental Science in Years 11 and 12) has been played out in Victoria for decades.

Environmental education has a long (but not necessarily successful) history at the senior secondary level in Victoria (Gough, 2007). It was introduced as a separate subject in the curriculum at the senior secondary level in 1975. Initially entitled *Agricultural and Environmental Science* it became *Environmental Science* in 1977. In 1991 it moved from the “Science” to the “Earth Studies” field of study (and subsequently to the SOSE key learning area) and was re-titled *Environmental Studies* (Board of Studies, 1994). Around the same time, the State’s Ministerial Policy on Environmental Education (1990) promoted environmental education across the curriculum.

In 1997 the Board of Studies reviewed the VCE and recommended changes in the environmental education offerings. *Environmental Science* was to replace the low enrolment subject Science in the Science Key Learning Area, taking a similar multidisciplinary approach to science and complementing government environmental priorities (Mitchell, personal communication). The merging of *Environmental Studies* with *Outdoor Education* was intended to give an academic orientation to complement the perceived skills basis of the *Outdoor Education* study design (Gervasoni, personal communication; Gough, 2007).

Since 2001 there have been two environmental education subjects at the senior secondary level – *Environmental Science* (a science subject, Board of Studies, 2000a; VCAA, 2004) and *Outdoor and Environmental Studies* (a health and physical education subject, Board of Studies, 2000b; VCAA, 2005a).

The course outlines of *Environmental Science*, and its predecessor *Environmental Studies*, are multidisciplinary in their approaches. *Environmental Studies* drew on both natural and social sciences to develop an understanding of different environments and to provide a context for investigating strategies for conservation management

(Board of Studies, 1994; Mitchell, 1999). *Environmental Science* is a broadly based science subject that draws on the traditional disciplines of biology, chemistry and physics and applies their concepts in environmental contexts. It focuses on developing an understanding of natural ecosystems and human impact upon them as well as the application of environmental science to ecologically sustainable development and environmental management (Board of Studies, 2000a; VCAA, 2004). The discourses of the *Environmental Science* document have been regulated so that there is a greater likelihood that the subject will be acceptable to scientists and science teachers whereas the study design for *Outdoor and Environmental Studies* (Board of Studies, 2000b; VCAA, 2005) has been allowed to be more holistic in its approach, while aiming to be acceptable to outdoor educators.

Since its inception, *Environmental Science* has been a marginalised subject within the senior curriculum. Although accepted for entry purposes as a science subject by the major universities in Victoria in the 1980s (such status was removed when the subject changed to *Environmental Studies* in 1991), the subject never reached anywhere near the level of enrolments of any of the traditional senior science subjects and, indeed, declined in enrolments during the 1990s (Gough, 2008).

Fensham (1990) and Mitchell (1999) have documented various aspects of the seemingly constant battle for survival that environmental education as a separate subject in the senior secondary curriculum has faced in Victoria since the late 1980s. The arguments for abolishing it have had two main themes. Firstly, there have been attempts “to hoist environmental education on its own petard... there is a weakness in a sectional and optional subject approach” (Fensham, 1990, p. 18). Instead of Environmental Science/Studies being a separate subject others have argued that the environment should be included as a dimension of other subject areas. Supporters of a separate subject have countered that, until the ideal of an environmental ethic over-arches “the whole curriculum and indeed the life and practice of the school and educational system... environmental subjects need to exist to exemplify what environmental education is” (Fensham, 1990, p. 18). If this is the path chosen, then the challenge is to raise the level of acceptability of separate environmental subjects and bring them in from the margins.

The second argument focused on the overlap of subject matter between Environmental Science and other subjects such as Geography and Biology and some of the other sciences. As Fensham (1990, p. 23) notes, “except for Psychology which at this point is very individually oriented”, Physics, Chemistry and Biology “quite explicitly refer both to the importance of the sciences for solving social and environmental problems and to the problems that the application of science in the form of various technologies have caused”. However, the focus in these subjects is on education *about* the environment rather than *for* the environment, i.e. on facts and concepts rather than the values, cognitive tasks and social skills that characterise environmental education.

These tussles around the place of environmental education as a separate subject in the curriculum have continued into the National Curriculum where the proposed “Earth and Environmental Science” subject was more geology and biology than environmental science, with a closer resemblance to the New South Wales HSC subject *Earth and Environmental Science* (Board of Studies, 2009) than the VCE *Environmental Science* (VCAA, 2004).

Conclusion

This short review of government action in environmental education illustrates some of the Australian-ness of the approaches being adopted. Australian environmental educators see themselves as “integrally part of the Australian environment” (Fensham,

1987, p. 2) but the government actions often struggle to realise this and create tensions across the actions proposed as a result. Yet these tensions are uniquely Australian as is the separation of responsibilities for environment and education across the Commonwealth and states under the Constitution.

In this review I have used the metaphor of a jigsaw puzzle to analyse the various government actions, particularly around environmental education curriculum, but, like Margaret Drabble (2009, p. 337), “I ask myself: do I believe in a jigsaw model of the universe, or do I believe in the open ending, the ever evolving and ever undetermined future, the future with pieces that even the physicists cannot number, although the physicists say they cannot be infinite?”. Environmental education cannot and should not be confined by a conventional curriculum jigsaw frame – the jigsaw needs to evolve as the field continues to evolve and our understandings about the environment and sustainability evolve. Keeping an open ending is what is needed, and that there are still Australian environmental educators doing this is part of what makes the Australian-ness of our practices.

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Keywords: curriculum; policy; environmental education; education for sustainability; action plan; national goals.

Endnotes

1. See, for example, in chronological order, World Commission on Environment and Development (1987) *Our Common Future*. United Nations (1993) *Agenda 21: Earth Summit: The United Nations Programme of Action from Rio*. United Nations (2002) *Report of the World Summit on Sustainable Development: Johannesburg, South Africa, 26 August-4 September 2002*. Beeton, Buckley, Jones, Morgan, Reichelt. & Trewin (2006 Australian State of the Environment Committee) (2006) *Australia State of the Environment 2006*. Stern (2007) *The Economics of Climate Change: The Stern Review*. Garnaut (2008) *The Garnaut Climate Change Review: Final Report*.
2. This statement is particularly revealing: that there was a belief in the Australian-ness of Australian initiatives and expertise in education for sustainability.

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Author Biography

Annette Gough is Professor of Science and Environmental Education and Head of the School of Education at RMIT University in Melbourne, Australia. She has been working in the fields of science and environmental education for over three decades. In 1984 she was the first female president of the Australian Association for Environmental Education and in 1992 was awarded a life fellowship of the Association for her contribution to the field of environmental education. She is currently working with the UNESCO Jakarta Office on science and sustainability education in higher education and teacher education. Annette has written over 120 books, reports, chapters, articles and curriculum materials in science and environmental education and related areas.

APPENDIX A: Categories of actions under the strategies of Living Sustainably: The Australian Government's National Action Plan for Education for Sustainability (DEWHA, 2009)

STRATEGY	OBJECTIVES	ACTION AREAS
<p>1. Demonstrating Australian Government leadership</p>	<p>1.1 The Australian Government provides national leadership on education for sustainability 1.2 Sustainability outcomes are taken into consideration in developing and implementing Australian Government policies, programs and operations. 1.3 Australia is acknowledged as a constructive contributor to the education for sustainability activities of other countries, particularly in the Asia-Pacific region.</p>	<p>1.1 Australian Government leadership (7 actions) 1.2 Integration with Australian Government policies, programs and operations (3 actions) 1.3 International cooperation (2 actions)</p>
<p>2. Reorienting education systems to education for sustainability</p>	<p>2.1 The vocational education and training sector incorporates sustainability in all national training packages; and implements sustainable campus management. 2.2 Education for sustainability is integrated into all university courses/subject areas and campuses are managed in a sustainable way. 2.3 Whole-of-school and whole-of-system approaches to education for sustainability, including campus management, are adopted through widespread uptake of the National Environmental Education Statement for Australian Schools¹ and implementation of the Australian Sustainable Schools Initiative.</p>	<p>2.1 Vocational education and training (6 actions) 2.2 Universities (4 actions) 2.3 Schools (6 actions)</p>
<p>3. Fostering sustainability in business and industry</p>	<p>3. Australian business and industry are acknowledged leaders in moving towards sustainability through innovation and improvement to management and operations.</p>	<p>3. Business and industry (5 actions)</p>
<p>4. Harnessing community spirit to act</p>	<p>4.1 Communities around Australia are empowered to work effectively towards sustainability by having the information and resources to enable them to act. 4.2 Community education for sustainability practitioners are supported in their work by having access to the appropriate knowledge and tools to enable them to operate effectively. 4.3 The role that education plays in promoting sustainability is widely acknowledged. 4.4 There is a better understanding of the drivers and issues that need to be considered in implementing effective community education for sustainability.</p>	<p>4.1 Tools and resources (2 actions) 4.2 Capacity building for practitioners (2 actions) 4.3 Raising the profile (2 actions) 4.4 Understanding the issues through research (3 actions)</p>

¹Educating for a Sustainable Future: A National Statement on Environmental Education for Schools (DEH, 2005)