

Patches of Green

EPA
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Series



Early childhood
environmental
education
in Australia:
scope,
status
and direction



Acknowledgments

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Thanks to Dr. Annette Gough and Dr. Noel Gough, Deakin University and Michelle Hocking, EEECC Vic. Inc. for their comments on the manuscript.

Published by:

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ISBN 0 7347 7551 2

EPA 2003/35

June 2003

Printed on recycled paper

Patches of Green: early childhood environmental education in Australia – scope, status and direction

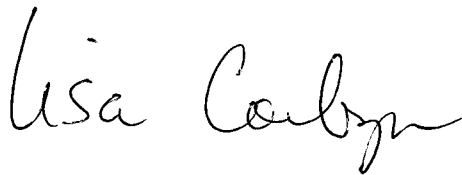
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Foreword

Early childhood environmental education is an important part of broader environmental education initiatives and an area where there has been significant progress. *Patches of Green* provides a review of early childhood environmental education in Australia. It provides useful information to enhance the status and delivery of environmental education in the early childhood education sector. The research that forms the basis for this document was commissioned by the New South Wales Environment Protection Authority and is being published as part of our Social Research Series.

There is a limited information base about what is occurring in early childhood environmental education. *Patches of Green* will be an important resource on environmental education for early childhood practitioners, resource developers, trainers and government providers implementing early childhood environmental education initiatives. In addition, it provides a summary of the findings, methodology and current status of early childhood environmental education in Australia, how children develop environmental values, environmental education needs, and puts forward conclusions, implications and directions for the future.

I trust it will be a valuable source of information for early childhood professionals in implementing environmental education.



Lisa Corbyn
Director General
Environment Protection Authority
June 2003



Summary

The main purpose of this document is to review literature and practice in early childhood environmental education in Australia and explore the links between them. As such it provides a summary of scope and status as well as a clear direction for early childhood practitioners, resource developers, trainers and government providers implementing early childhood environmental education initiatives.

The significance of the early childhood years is not generally acknowledged, and this is reflected in the paucity of references, research and resources to support early childhood environmental education. The early childhood field is as diverse as a patchwork quilt and this has implications for any environmental education initiatives.

Traditions, beliefs and philosophies about early childhood would appear conducive to the implementation of environmental education. The correlation between good early childhood practice and good environmental education practice is evident. But if the early childhood field is visualised as a patchwork quilt, then early childhood environmental education is still an emerging paradigm characterised by patches of green. The green patches are exemplary individuals, organisations and centres that share a passion and commitment about the importance of early childhood environmental education. They practise and promote early childhood environmental education in various contexts, whether caring for young children or training early childhood educators, but often do so with minimal support or resources.

The literature provides an intuitive sense that it must be good to foster environmentally responsible values from birth, but exactly how children develop these values and what are the significant influences is not yet understood. This review indicates that a multidisciplinary approach, including anthropological, developmental, constructivist and social learning theory perspectives, is required to engage these questions.

The implementation of early childhood environmental education requires support from relevant organisations and governments in the form of policy, curricula, training, resources and research. The current implementation appears to be ad hoc. If the early childhood field is to lay the foundations for future generations of environmentally responsible adults, then better planning, coordination and collaboration are required and a greater emphasis needs to be placed on this area of learning.





1. Objectives of the review

This review of early childhood environmental education in Australia was commissioned by the NSW Environment Protection Authority (EPA) in 2000 as a review of literature in early childhood environmental education in Australia and as a means of exploring current practices and possible future directions.

The overall objective of the review was to describe and critically comment on early childhood environmental education as an emergent field in Australia. This objective was carried out by:

- summarising and evaluating relevant literature, noting questions raised
- clarifying the major issues that arise from research that is relevant to practitioners
- identifying the range of resources available to practitioners
- identifying exemplary practice, sites and examples of environmental education
- linking literature with practice to provide direction for early childhood practitioners, resource developers, trainers and government providers implementing early childhood environmental education initiatives.

2. Overview of early childhood environmental education



The early childhood field can be visualised as a multicoloured patchwork quilt bound by a thread of commitment to young children. The colours and patterns of the quilt are as diverse as the contexts, policies and beliefs in early childhood. This review examines the significance of early childhood and the beliefs about early childhood education that underpin environmental education in the early years.

A summary of current practice identifies the green patches in this diverse quilt: early childhood centres, organisations and individuals whose practice may be considered exemplary. There are not many, and the links between them are tenuous. These green patches have been sewn into the quilt by passionate and committed individuals in the early childhood field who recognise the importance of environmental education. There is much scope for further resources, references, research and training and a need for coordination at national and State levels. An understanding of the development of environmental values at the early childhood level is essential for further work in this area. In this review, nature and nurture perspectives across a range of disciplines illuminate the influences from within and without that may affect the development of environmental values in young children. The hope for the future is a quilt of shades of green where early childhood environmental education is promoted and supported in all contexts and at all levels across Australia.



3. Results of literature search

The information presented in this review was located in a variety of ways. Two bibliographic databases (ERIC 92-2000 and AEI) revealed a total of seventy-eight entries relevant to early childhood environmental education. Most entries were from England, the USA and Australia over the last decade. In particular, approximately one-third of the entries were attributed to Ruth Wilson of the USA. Unexpectedly, the main current Australian publications Elliott and Emmett (1997), Gordon Community Children's Centre (1993) and Targowska (1991) were not listed. Beyond these databases, bibliographic searches were undertaken across a range of disciplines to source the necessary information.

The earliest Australian papers located were by Walsh (1984), AECA (1985) and Elliott (1988). However, early childhood environmental education can still be described as an emerging area in Australia.

There were many more publications advising practitioners about environmental education practice than about research or theory in this area. Also, predominantly, the research presented had been conducted with children beyond six years of age and focused on environmental knowledge rather than values.

Websites were of limited value in this search. Websites for some government departments, Environmental Education in Early Childhood Vic. Inc. (EEEC Vic. Inc.), the Queensland Early Childhood Environmental Education Network (QECEEN) and the Australian Early Childhood Association (AECA) were investigated.

Information about current practice was located by inviting various organisations and individuals to contribute. A total of sixty-seven invitations were sent and forty-two replies received (refer to Appendixes 1 and 2). One may speculate as to the various reasons for non-reply, but in this instance I would suggest that lack of reply is indicative that very little is happening in early childhood environmental education. The issues of nomenclature discussed in section 4 hindered the interpretation of information received from several States.

4. Defining early childhood



The early childhood years and their significance

For the purposes of this review the early childhood years are defined as the years from birth to six. This is the period of greatest development in an individual's life and also the most significant period. The early childhood years are often regarded as the foundation upon which the rest of an individual's life is constructed. From birth, young children develop socially, emotionally, cognitively and physically, acquiring the knowledge, skills and attitudes essential to their on-going development and adult life. Carson (1956 in Wilson 1994a, p1) uses the metaphor of a garden when she suggests that 'the early childhood years are the time to prepare the soil' – a fundamental step if children, like plants, are to flourish and reach their full potential. Specifically in reference to brain development, Brierly (1987) highlights the crucial importance of the preschool and early school years and describes children's 'flood readiness' with respect to the ability to learn from birth. The Jesuits also demonstrated awareness of the significance of the early childhood years in their saying 'Give me a child until he/she is seven and he/she will be mine forever'.

Greenman (1988, pp 30–31) expresses the significance of early childhood when he states 'in every culture childhood is a special time. It is perhaps the most powerful period of our lives. Our experiences form the foundation of what we become, the core of our being, our ability to learn, our sense of ourselves in relation to the world of nature, of people, of things'.

Unfortunately, understanding of the uniqueness and significance of the early childhood years is not an understanding frequently shared by professionals beyond the early childhood field or the community at large. Hence, it is not uncommon to hear phrases such as 'preschool is a preparation for school', 'the children are just playing' and 'environmental education is too complex or too abstract for young children' (Wilson, 1994a). The thrust of this review is to indicate otherwise.

Early childhood educators understand the significance of the early childhood years, but what are the implications for environmental education?

The short answer to this question is 'We don't really know'. Research in the early childhood years with respect to environmental education is meagre. Cohen and Horm-Wingerd (1993), Chawla and Hart (1988), Moore (1986), Wilson (1994a) and, as recently as 1996, Satterthwaite, have raised the issue of lack of research about the development of children's attitudes and values about the environment.

Cohen and Horm-Wingerd (1993, p105) assert that 'our knowledge of preschool and early elementary school children's experience of, as well as awareness to issues of environmental concern is limited, and to a significant degree unexplored'. The implications of the early childhood years for environmental education appear to be largely intuitively based, drawn from investigations of environmental knowledge or inferred from other spheres of research. It is this latter point that makes research in this area problematic. The threads unravelled from the



literature in section 6 attest to the multidisciplinary nature of the research questions raised about early childhood environmental education.



The following summary provides some understanding of the implications of the significant early childhood years for environmental education.



Several authors in the field of early childhood environmental education refer to the importance of the early childhood years for the quality of life for future generations and the development of environmentally responsible adults. (Elliott and Emmett, 1997; Gordon Community Children's Centre, 1993; Wilson 1994b). This is a reasonable assumption given the significance of the early childhood years, as described above. However, there is no longitudinal research to validate this assumption (Chawla, 1988). As yet, we do not know what experiences in the early childhood years are formative in terms of environmental education; we can only surmise on the basis of our understanding of young children and their development.

More specifically, Tilbury (1994, p11) states that 'the early learning years are a fundamental period for the formation of attitudes and thus of great consequence to environmental education' and Stapp (1978, p495) concludes that 'attitudes toward the environment are generally acquired very early in life'. The notion that attitudes in general are developed early in life is supported by research in the area of gender identity acquisition, which suggests that children have developed attitudes to gender by the age of four years (Honig 1983). One could postulate that other attitudes, such as attitudes to the environment, are also developed in the early years. Hoffman and Levine (1976, cited in Chawla, 1988) extend this point in the field of developmental psychology by identifying greater levels of empathic responses towards distressed animals and people among four-year-old girls than boys of the same age, and greater levels of problem-solving responses among four-year-old boys than same-aged girls. Chawla (1988, p18) summarises the implications of these findings by suggesting 'that environmental issues urgently require problem solving; but feelings for both human and the non-human world appear necessary to motivate problem solving for the good of the whole'.

Cohen (1993) and Wilson (1994b) approach the development of attitudes from a negative viewpoint. They propose that young children may develop prejudices against the environment owing to isolation from nature, and therefore fail to develop positive environmental values. The early childhood years might be a critical time for addressing prejudices.

Research in the area of significant life experiences (SLE) provides another perspective, looking back to the childhood years through the eyes of an environmentally committed adult in an attempt to uncover significant motivating experiences. In reviewing SLE research, Chawla (1998a) states that contact during childhood with natural areas outdoors was one of the most influential factors on environmental commitment in adult life. Another important factor identified was the role of significant adults as mentors or role models. However, she concludes 'that there is no single all potent experience that produces environmentally informed and active citizens, but many together' (Chawla, 1998a, p381). Sebba (1991) similarly found that a heterogeneous group of adults when asked to recall a significant place from their childhood invariably recalled outdoor places associated with natural features. Given the limitations of our understanding about how the significance of these childhood experiences is constructed, this research can only

provide implications for practice in early childhood environmental education rather than clear directives.

Several authors have lamented the increasingly urbanised and industrialised existence of young children, particularly in Western societies, that isolates young children from the natural environment (Nabhan and Trimble, 1994; Rivkin, 1995; Wilson, 1996). Rivkin (1995, p2) suggests that 'children's access to outdoor play has evaporated like water in sunshine' owing to the reduction in play areas, traffic, pollution, population density and the restriction of play time. Not only has access changed but, as Sebba (1991) suggests from research with 8–11-year-olds, we need to be alert to the possibility that children perceive the natural environment quite differently from adults. For many adults the natural environment is a backdrop to the main event, but for children the natural environment may be the main event, a total immersion in a sea of sensory stimuli. Therefore, many environmental educators ask, 'How can children demonstrate care or concern for a natural world that they do not know or have never been immersed in?' Direct contact with the natural environment in the early childhood years would appear fundamental.

Palmer's (1995) approach to research in early childhood environmental education was to investigate children's understanding of environmental concepts such as rainforests. She refers to the knowledge that preschool children have and bring to their formal schooling as 'emergent environmentalism'. While it is informative to know what concepts children may or may not have acquired, this narrow focus does not reveal anything about children's attitudes, values or feelings about the environment. Similarly, in a brief research report, Lavanchy (1993) asked children what they knew about a stone or a plant and, in Apanomeritaki's (1995) research, children aged three to five years were questioned about waste before and after exposure to a waste education program. The latter report concluded that there was an increase in understanding of waste concepts and inferred a positive attitudinal change among the children, but the research methods employed were questionable. Environmental knowledge per se is not sufficient to motivate children to act in environmentally responsible ways; the situation is far more complex and warrants further research.

Despite the meagre research in this field, early childhood environmental education has been recognised at various levels including the UN Rights of the Child (1989, cited in Satterthwaite et al 1996), the Department of Environment and Heritage Discussion Paper (1999) and the Victorian Environmental Education Council (1992). For early childhood centres, local governments and funding bodies this recognition helps to support and promote environmental education, but still does not answer significant research questions about how young children develop environmental values and what educators should be doing to foster their development.

Early childhood contexts, both home and centre based

Apart from the multidisciplinary issue noted above, the researcher in this area is also confronted by the variety of contexts in which young children from birth to six years spend their time. Active learning begins at birth and, irrespective of the context, the child will continue to learn whether he or she is at home, in an early childhood centre, at a playgroup, in a park or at the local





shopping centre. 'Environmental education should be seen as a life long process which may take place in a variety of different contexts' (VEEC, 1992, p7). There is potential for environmental education across these diverse contexts, but largely realisation of the potential will be dependent on the significant adults in each context (refer to section 6). This diversity of context is in stark contrast to the situation with older children, where the notion that learning takes place in school is embedded and the school curriculum provides an obvious starting point for research.

Home-based

In a home-based setting children are usually exposed to the domestic aspects of life – for example, shopping, cooking, cleaning, gardening – while in the care of a significant adult. They may be in their own home or a friends, relatives or caregiver's home, and the situation may involve siblings, visiting children, or other children in care. Often new mothers' groups or playgroups meet on a regular basis in each other's homes for children to play and socialise. The potential for environmental education in these contexts has not been realised to date, and resources are limited.

A few publications from England (Solomon, 1990; Stanway, 1990) and the United States (Pennybacker and Ikramuddin, 1999) alert parents to practices for a sustainable future, but these publications are not widely known. Solomon (1990) takes a chronological approach from conception to the teenage years, whereas Stanway (1990) and Pennybacker and Ikramuddin (1999) address a range of topics from pregnancy and birth to health, food and green homes. Locally, Elliott (1995) explores the potential for green parenting, suggesting that parents should be role models, set clear limits for acceptable environmental behaviour and be selective about the experiences and play materials they choose for their children.

There is scope for further Australian-produced parent-friendly resources that alert parents to the importance of environmental education in the early years

At the local level, several years ago Playgrouping Victoria produced a brochure entitled *Environmentally Responsible Playgrouping* in conjunction with EEEIC Inc Vic. In-servicing of playgroup field officers and inclusion of the brochure in the *Playgroup Manual* (Playgrouping Victoria, 1998) have supported the implementation of the practices in the brochure. The brochure created debate within the Playgrouping Association about some common playgroup practices such as the use of dyed rice (rainbow rice) as a play material. However, the ongoing promotion of environmental education would appear to be dependent on individual playgroup officers and the communities in which they work.

Various community-based groups such as Nurturing Our World (NOW) and Worldwide Home Environmentalist Network (WHEN) strive to promote environmental education, and often this filters through to the young children involved, but participation in such groups requires an environmental passion and commitment. A local community group in Tasmania, The Burnie Field Naturalists Club Inc, provides specifically for parents with young children by offering field trips twice monthly to parks, forests, lakes, rivers and beaches. The trips are described as 'a gentle introduction to the world of trees, flowers, birds, insects, rock pools and rivers through direct observation, nature walks, games and crafts' and are aimed at children aged two to five years

and babies in backpacks (Burnie Field Naturalists Club Inc, 2000). Many parents of young children may not take on such a challenge alone, but in the company of others it becomes a positive social and environmental experience.



Many parents use toy libraries for young children, and the notion of borrowing toys rather than buying to keep up with children's developmental skills and interests is environmentally sound in itself. In Alphington, Victoria, a unique community-based toy library has been developed that favours 'locally made toys from natural, re-usable or recycled materials' (Crook, 1996, p8). The service is well utilised by local parents and offers the potential to educate parents and children over an extended period of time until the children are seven years of age. When visiting this toy library one is struck by the sparseness of red, blue and yellow plastic toys and the smell of timber and beeswax; the contrast with other toy libraries becomes obvious in a very sensory way. This toy library could well serve as a model to others.



According to the Senate Employment Education and Training Reference Committee (SEETRC) Report (1996, p109), 30% of children in child care attend home-based care known as Family Day Care and until recently, this type of care has been largely unregulated. The *National Standards for Family Day Care* (Department of Community Services, 1995) has now been adopted, but it makes no comment on environmentally responsible practices or education. A national accreditation document is currently under discussion and, in a preliminary discussion paper prepared for the 1999 National Quality Forum of the Family Day Care Council of Australia, the only specific reference to the environment is under Item 3.1.7 which states that 'Children have opportunities to explore the natural environment' (Department of Family and Community Services, 1999, p11). Hence, it would appear that the responsibility for promoting environmental education would lie with the qualified coordinators employed to supervise the work of trained and untrained family day carers. At the June 2000 National Family Day Care Conference, a workshop entitled 'Developing Environmental Awareness through Play Materials' attracted more than the required quota of participants, thus demonstrating an interest in this area. Policy review and further professional development and resourcing are required if environmental education is to be promoted through family day care.

Maternal and Child Health Centre nurses supporting the development of infants and toddlers are in a position to offer information about environmentally responsible practices and environmental education to parents through individual consultation, first-time-parents' groups and visual displays. In Victoria, Program Standards (Department of Human Services, 1995) and Professional Practice Standards (Maternal and Child Health Nurses Special Interest Group, 1999) make no specific mention of environmental education. However, there are standards pertaining to safety and health promotion that could incorporate environmental education. It would appear that any discussion of environmental issues is dependent on the values and interests of individual nurses and the time available in an already information-packed consultation process (Williams and Walsh, 2000, pers. comm. 15 July). Environmental education could be facilitated if policy documents and funding bodies identified environmental education as a priority area and promotional resources were available.

The need for Maternal and Child Health Services to demonstrate greater awareness of environmental values is indicated by the establishment of an informal Earth Mothers group in



Melbourne. These mothers believed that others did not share their environmental values in their new mothers group, so they established their own group. On a regular basis they discuss issues such as environmentally responsible suppliers, home-made play materials and cloth nappy washing and visit gardens, parks and beaches with their babies (Samson 2000, pers. comm. 15 July).

In conclusion, environmental education in home-based-care contexts is not supported in any systematic way through policies, accreditation or funding bodies. Instead, it is reliant on committed individuals who take the initiative to establish groups or inspire others through their work. The contexts above provide opportunities for promoting, supporting and resourcing environmental education at the early childhood level.

Centre-based

Diversity of context in early childhood was noted previously, but it takes on a deeper meaning with respect to the centre-based context. Listing the centre-based contexts for children aged from birth to six is problematic in itself, as the nomenclature varies from State to State throughout Australia. For example, the first year of school is referred to as kindergarten in NSW, whereas in Victoria kindergarten is attended the year prior to school. Varying school starting ages and intake regimes complicate the picture even further. The SEETRC report (1996, p37) states, 'these inconsistencies ... make it difficult even to have a sensible conversation about the education of primary and preschool students'. In any attempt, to construct the national early childhood quilt or develop national initiatives for environmental education at the early childhood level, these inconsistencies need to be considered.

Centre-based contexts may include long day care, occasional care, sessional preschool, extended hours preschool or, increasingly, blends of care and education components. In an attempt to focus beyond the care and education debate and for the purposes of this review, the generic term 'early childhood centre' will be employed to refer to centre based contexts. In contrast to the home-based contexts, centre-based contexts have long been subject to State or Territory government standards. In addition to these standards, care focused settings are regularly accredited on a national basis through the Quality Improvement and Accreditation System (QIAS) (refer to section 5).

A national school curriculum document has been prepared for Prep–10, but no equivalent document has been prepared for the preschool years, despite the recommendation of the SEETRC report 1996. At the preschool level there is considerable variation across Australia with respect to State and Territory curriculum documents (refer to section 5).

A significant reason for limiting this review to age six is to avoid the further complexity that would have arisen had we included the school and out-of-school hours which children six to eight years experience. National and State or Territory curricula are in place for schools and inclusive of environmental education, but the extent of implementation, particularly in the first years of school, is another subject for debate and beyond the scope of this review.

These points provide the backdrop for the discussion in section 5, which outlines the current status of environmental education in early childhood centres throughout Australia.

Traditions, beliefs and philosophies in early childhood education – what do we believe about early childhood education and how does this inform our practice of environmental education?



The purpose here is not to review all perspectives, but to identify those that inform environmental education practice in early childhood centres. There is no consensus about *the* pedagogical approach to early childhood education, but rather approaches, philosophies and beliefs that move in and out of favour over time. Individual early childhood educators select from the array according to their underlying values, the early childhood centre community, and the development and interests of the individual children in their group. This is a characteristic of early childhood education: it is not prescribed by a 'one size fits all' curriculum document, but can be described as a curriculum that is child centred and evolves in context. By reviewing past and recent history in the early childhood field a number of elements can be identified that inform current environmental education practice.

Hands-on experience

Piaget emphasised first-hand experiences with concrete materials as being fundamental to a child's intellectual development. Piaget's constructivist theory of learning suggests that children construct their own meanings from these experiences and thus develop their understanding of the world (Morrison, 1991; Roopnarine and Johnson, 1993). References and resources for early childhood environmental education are littered with examples of concrete experiences such as exploring gardens, observing animals and construction with waste materials, from which children might construct their understandings about the environment (Cohen and Trostle, 1990; Elliott and Emmett, 1997; Gordon Community Children's Centre, 1993; Humphryes, 2000; Lewis-Webber, 1993; Shantal, 1998; Targowska, 1991; Wilson, 1995). Also, stemming from the earlier work of Dewey is the notion of real or productive experiences (Roopnarine and Johnson, 1993) that involve children in making tangible contributions such as collecting litter or making a worm farm.

There is no question that 'hands on' experiences predominate in the literature, but the early childhood educator needs to select and implement the experiences suggested with care. For example, Cohen and Trostle (1990) note the importance of developmentally appropriate practice with respect to concrete experiences, but many of the experiences they suggest for young children seem to be developmentally inappropriate for the birth to six years age group. Their reference to students and classes suggests that 'young children' can be interpreted as school-aged rather than preschool-aged children in their paper. Targowska (1991) specifically identifies the age groups for particular experiences, but at times the match seems inappropriate. For example, I wonder how a three-year-old can make a carrot-top fern with a sharp knife and what environmental learning might be constructed? To some environmental educators this would also appear to be a waste of food. Also, when considering productive experiences it is essential that the process aspects be within the grasp of children both physically and cognitively, rather than adults taking over and the end product dominating the experience.

Nature experiences are frequently emphasised in literature from the United States (Humphryes, 2000; Wilson, 1995; Bolton, 1994). Although such experiences are important, this is a very



limited view of environmental education experiences for preschool-age children in light of the publications by Lewis-Webber (1993) in Canada and Elliott and Emmett (1997) and the Gordon Community Children's Centre (1993) in Australia, which take a more holistic approach.



Furthermore, at times the nature experiences cited would concern some more committed early childhood environmental educators (refer to section 5).



Sensory experience

Assumptions about the value of sensory experiences in early childhood education can be traced to the writings of Comenius in the seventeenth century, who proposed that 'learning is best achieved when the senses are involved and that sensory education formed the basis of all learning' (Morrison, 1991, p46). Later educationalists, such as Pestalozzi, Steiner and Montessori, also supported sensory experience as a fundamental way of knowing, and today, this notion is well supported in early childhood programs. Steiner programs in particular continue to demonstrate a strong commitment to sensory experiences for children through the use of natural wooden, cotton and woollen play materials.

The connection with environmental education is clear. Children from birth to six years should be provided with a diversity of sensory experiences, particularly experiences with natural materials (Carson, 1956; Cousins, 1996; Elliott and Emmett, 1997; Humphries, 2000; Gordon Community Children's Centre, 1993; Rivkin, 1995; Wilson, 1995). Sensory experiences might include listening to the wind in the trees, holding an earthworm, rolling on grass, smelling a eucalypt leaf, or tasting a freshly picked tomato. These experiences might be all the more crucial in a sensory world dominated by synthetic materials. Elliott (1995, p24) suggests 'it is easy to imagine a baby being imprinted with plastic, from plastic nappies to plastic toys, bottles and cups'. How can any child come to 'know', if sensory input is so limited?

Signs that the sensory knowledge base is changing and moving away from natural sensory inputs is evident in the olfactory research by Hirsch (1992, cited in Rivkin 1995). For people born in the 1920s to 1950s nostalgic odours include roses, baking bread and ocean air, but this contrasts with people born in the 1960s and 1970s who recall smoke, disinfectant and hairspray. The validity of this research was borne out recently for me when a tertiary child care student could not identify the smell of a lemon leaf, but knew it smelt like 'Mum's dish washing detergent'. In a more alarming way, Immig (2000) reports on the increasing assault on children's senses and bodies by the various synthetic chemicals that are now a part of every day life. The subtleties of the relationship between environmental education and sensory awareness were demonstrated to me when a pre-verbal toddler in a centre-based program adamantly indicated to staff that she wanted to wear a disposable nappy. Staff interpreted that the toddler associated disposable nappies (as opposed to cloth nappies) with going home. I can only speculate as to the long-term implications of the positive association between disposables and the pleasure of going home.

The role of adults

Interaction with adults is considered most significant in the education of young children. Vygotsky incorporates these interactions in a social constructivist theory of learning that suggests that children construct their understandings of the world not only from concrete experiences, but

also from social interactions with others (MacNaughton and Williams, 1998). Any discussion of the role of adults in early childhood education should include parents and professionals. Morrison's (1991, p59) review of early childhood theorists led him to state 'that parents are their children's first teachers and perhaps best teachers'. This point should not to be ignored in environmental education (refer to sections 5 and 6).



Early childhood educators have variously been described as observers, guides, role models, facilitators, directors and co-constructors. In environmental education many of these functions are evident, but the function most often cited is that of role model (Chawla, 1988; Cohen and Trostle, 1990; Hungerford and Volk, 1990). At all times, whether engaged directly with children or attending to housekeeping tasks, the educator is a role model to other adults and children. More significantly, if this role modelling is to be successful it must be underpinned by positive environmental values. Cohen and Trostle (1990, p310) state that 'Thoughtful adults who respect and value the environment can provide valuable role models and guides'. Alternatively, in the words of Rachel Carson (1956, p45) 'it is not half so important to know as to feel' and it is by expressing feeling for the environment in all that they do that individual adults can be effective role models for children. There are implications for training and professional development in early childhood environmental education.

Problem-solving

Dewey believed that to promote thinking, children should be engaged in both individual and collaborative problem-solving through first-hand experiences. This process has emerged as inquiry based or discovery learning more recently, and is fundamental to early childhood education today (MacNaughton and Williams, 1998). In 1978 Stapp identified problem-solving as a significant skill in his model for instruction in environmental education, although he suggests that the affective domain rather than the cognitive and skill-behaviour domains should be emphasised in the early years. In early childhood environmental education problem-solving has been largely unexplored. Cohen and Trostle (1990) describe a range of environmental experiences as problem-solving, but the problems would appear to be adult prescribed and directed, thus not accurately reflecting Dewey's intent. MacNaughton and Williams (1998) describe a more child-centred approach to problem-solving, noting the importance of time to investigate, space to collaborate and try out solutions, a supportive adult and a variety of open-ended materials.

Gordon Community Children's Centre (1993) and Elliott and Emmett (1997) extend problem-solving to include moral dilemmas and illustrate how young children can participate in the solution of everyday environmental dilemmas. According to Edwards (1986, p170) the spontaneous and structured discussion of moral dilemmas with young children is an important way of promoting moral development: 'Young children cannot express complex positions, but they can begin to feel they have ideas and that moral positions require thought and justification'. Problem solving including the resolution of moral dilemmas is a skill to be fostered, given the daily environmental issues that individuals face.



Spirituality

Wolf (2000, p34) states that spirituality is an elusive concept and draws on a number of descriptions to elucidate its meaning. The most apt for this review states that 'spirituality calls us to a sense of awe and wonder characterised by a reverence for the earth and all its creatures and a desire to live in harmony with nature, animals and other human beings'. Spirituality is an intrinsic element of Steiner's and Montessori's approaches to education. Steiner's anthroposophical views of education gave equal emphasis to physical, intellectual and spiritual aspects of being. Montessori believed that 'the spirit of a human being developed through interactions with the environment' (Rooparine and Johnson, 1993, p14). The link between spirituality and environmental education is also elusive, but there is a sense that a link exists. One imagines that Rachel Carson (1956) was exploring this link in her oft-quoted title '*A Sense of Wonder*'. Wolf (2000, p34) states: 'if education recognises the intrinsic value of the child's personality and provides an environment suited to spiritual growth, we have the revelation of an entirely new child whose astonishing characteristics can eventually contribute to the betterment of the world'. Spirituality is also intrinsic to indigenous perspectives of the environment and informs mainstream environmental education (Gough, 1992).

Holistic approach

A holistic approach to education incorporating physical, intellectual and spiritual aspects was espoused by Steiner and continues to be essential to Steiner education today. Similarly, a holistic approach is also fundamental to early childhood education in the sense that the development of the whole child should be considered and programs should integrate a range of curriculum areas. In early childhood environmental education literature, the term 'holistic' appears in various guises and is probably more easily defined in the negative. Wilson (1993) and Dissinger (1985/86) prefer the term 'infusion', Lavanchy (1993) suggests that the 'correct' approach is global, Stapp (1978) proposes an interdisciplinary approach, and Targowska (1991) suggests an integrated approach based on concepts or themes, while the Gordon Community Children's Centre (1993) and EEEVic. Inc. (1999) employ the word 'holistic'. There are differences between these terms, but examples suggest that in practice there may be little difference. Elliott and Emmett (1997, p2) state that 'environmental education at the early childhood level is not simply a few outdoor activities exploring plants and animals' and Lavanchy (1993, p39) states that 'environmental education is more than growing beans in cotton'. A holistic approach to environmental education is perhaps obvious to early childhood educators because it is a foundation stone of early childhood practice, but this has not been the case at other levels in education. The notion that there is more to environmental education at the practical level than 'hugging a tree' has been slow to penetrate the field of environmental education in general.

Critical curriculum

Education as an agent of social change has surfaced in history repeatedly and recently has been framed as 'critical curriculum', which can be defined as 'educational processes which create a more just and wise social world' (MacNaughton and Williams, 1998, p303). Critical curriculum is about empowerment and challenging discrimination. Extending on critical curriculum in the 1980s, an anti-bias curriculum was developed for young children to address issues of

discrimination, inequity and empowerment, and there has been a very positive response to the uptake of these issues in early childhood (MacNaughton and Williams, 1998).

Although there is a lack of critical curriculum discussion in the literature about early childhood environmental education, parallels can be identified. Both equity and environmental issues are underpinned by values. The significance of the early years for value development and the role of staff in modelling values have been addressed elsewhere in this review. Included in equity is the notion of inter-generational equity, and this is reflected in the sentiments of environmental educators about balancing the needs of the current generation with those of future generations. Lastly, early childhood environmental educators are empowering children to make changes through the knowledge and skills they promote (Gordon Community Children's Centre 1993). Early childhood educators 'are creating a climate that is conducive to helping children feel empowered to take action and make changes to ensure a future on Earth' (Elliott and Emmett, 1997, p86). These parallels warrant further exploration.



Childhood and nature

Froebel, the father of kindergartens (Morrison, 1991), is credited with the nature study tradition that has permeated early childhood programs for many years. Froebel drew analogies between educators and gardeners and viewed the kindergarten as a garden of children where 'he envisioned children being educated in close harmony with their own nature and the nature of the universe' (Morrison, 1995, p54). Rousseau saw nature as one of the three sources of education and 'the natural environment as a vehicle for freeing the spirit of children' (Guttek, 1968, cited in Roopnarine and Johnson, 1993, p3). The connection with nature is strongly developed in the early childhood environmental education literature through experiences outdoors, experiences with plants and animals and the use of natural play materials (Adhemar, 2000; Elliott and Emmett, 1997; Gordon Community Children's Centre, 1993; Holt, 1989; Humphries, 2000; Lewis-Webber, 1993; Wilson, 1995). For reasons suggested in section 4 this connection is becoming increasingly crucial. Rivkin (1995, p6) summarises thus: 'E. O. Wilson and others suggest that since we evolved in natural environments, technology cannot replace but only atrophy the development of our links to nature. If this is the case, children reared apart from nature are necessarily limited'.

Play

Froebel (1887) states: 'the plays of childhood are the germinal leaves of all later life' (cited in Morrison, 1991, p54) and believed learning through play was of fundamental importance. Most early childhood educators recognise this and work to facilitate play in their programs. For early childhood environmental educators there appears to be a nexus between adult-directed, issue-focused, productive experiences, such as sorting rubbish or planting vegetables – which could be loosely called play experiences – and true play experiences that offer the potential for environmental education, such as natural materials for sorting and arranging or waste materials for creative construction. The former are more apparent in literature from North America (Cohen and Trostle, 1990; Humphries, 2000; Lewis-Webber, 1993; Shantal, 1998), whereas the latter appear in literature from Australia (Elliott and Emmett, 1997; Gordon Community Children's



Centre, 1993). Elliott and Emmett (1997) state that they deliberately avoided environmental-issue focused activities in the first edition of their publication to ensure a more holistic approach to the development of play experiences to promote environmental education. They acknowledge that specific environmentally-focused planned experiences can be used to enhance a holistic approach to environmental education.



In summary, there are many traditions, beliefs and philosophies in early childhood that have influenced the current understanding and practice of early childhood environmental education. Many of these are not conducive to the current emphasis on education for the environment and the move to a proactive, holistic and systematic perspective on environmental issues that encourage the development of attitudes, behaviours and problem-solving skills to produce responsible and committed individuals.

5. Where are we? Current status of early childhood environmental education in Australia



The information presented in this section draws on responses to written invitations to contribute (refer to Appendix 1) and anecdotal information collected over recent years at conferences and in-service and pre-service sessions, through discussion with colleagues and visits to centres.

Environmental education in practice in early childhood centres

Early childhood centre programs reflect the values and philosophies of individual practitioners and centre policies and are based on the developmental needs and interests of the children and families at the centre. The development of a program is a unique and evolving process in each centre and, as such, can be informed by curriculum documents, but not prescribed. With no national curriculum document and limited reference to environmental education in State curriculum documents to inform the implementation of environmental education in early childhood programs, the situation is very much an ad hoc affair based on the values, commitment and knowledge of individual early childhood educators. The situation is exacerbated further by infrequent inclusion of environmental education in pre-service and in-service training, limited program resources and lack of recognition of environmental education in regulatory standards. Many early childhood educators would construe environmental education as providing a traditional nature table in their program and be unaware of the potential for environmental education as outlined in current early childhood references (Elliott and Emmett, 1997; Gordon Community Children's Centre, 1993; Wilson, 1994).

Exemplary practice: 'Patches of Green'

However, there are some early childhood centres beginning to implement environmental education and some centres that could be described as exemplary.

One World Children's Centre, previously Gordon Community Children's Centre, Victoria

This centre for children from birth to six years has a holistic approach to environmental education and has published *Playing for Keeps*, which describes the aims, strategies and experiences of the program and the process of change towards an environmentally aware centre. A current centre brochure states: 'our centre aims to implement environmentally sound practices which recognise the individual's responsibility to preserve the environment. We use mostly recycled or natural materials for toys and incorporate environmental awareness into the children's program'. The centre's program is supported by an environmental policy and an environmental code of practice, which all parents, staff, students and visitors are asked to recognise and implement when possible.



Kinma Preschool, New South Wales

Staff at this centre 'use the daily program to build positive attitudes and behaviours towards the natural environment' (Nippard 2000, pers. comm. 30 July). The children's program includes contact with the outdoor environment, real work such as maintaining animals, vegetable gardens and recycling, natural sensory experiences, visiting local bushland and addressing playground issues such as sediment control. The sediment control issue led to participation in a local Stormwater Action Project. Also, the centre uses alternative cleaning agents and children are encouraged to use bicarbonate of soda to remove crayon marks from tables.

Goolwa Children's Centre, South Australia

An integrated approach to environmental education is practised. The program incorporates recycling, gardening, use of natural play materials, excursions and initiatives to revegetate and develop coastal environments. The program is supported by an environmental policy and the use of alternative cleaners. The Department for Education and Children's Services (1996) curriculum document was a starting point for change in this centre and more recently the work of this centre has been documented in a departmental publication (Department for Education, Training and Employment, 1999) (Boag 2000, pers. comm. 7 September). The Department for Education and Children's Services (1995) curriculum document has been widely used to guide the development of programs including environmental education in South Australia (Scales and Thelning 2000, pers. comm. 24 July and 14 July).

Bairnsdale Early Learning Centre, Victoria

This centre has taken environmental education beyond the usual preschool program to offer extra curricular environmental programs for children aged three to five years. The program entitled 'Woolly Wombats and Other Things' operates for six weeks each term, involving children in a variety of environmental activities such as making compost, re-cycling, investigating plants and animals and excursions to local bushland. The program has led to the children participating in local landcare projects and Nunn, the director, was recognised for these initiatives by the Victorian Australian Scholarship Friendly Group Award in May 2000 (Nunn 2000, pers. comm. 20 July).

Sources of impetus

In these exemplars, the impetus has come from innovative and committed individuals and the focus has been localised. Julie Davis (2000, pers. comm. 19 July) states that 'good programs tend to be small scale and created and maintained by committed individuals'. It is imperative that exemplars such as these are supported and that their work is more widely recognised to extend the practice of environmental education in early childhood centres.

Beyond committed individuals, there are signs of other sources of impetus emerging. A recent source of impetus for centres has been local councils. Some early childhood centres under the auspices of local councils are being encouraged to adopt more environmentally responsible practices in keeping with council environmental initiatives and policies (McMeekin 2000, pers. comm. 15 June). Also, centres need to be responsive to the families participating, and in some instances parents have initiated change or worked with staff to implement change. Over time, centres practising environmental education have become recognised in local communities and

parents may choose to enrol their children because of the environmental education emphasis in a particular centre. This can become a self-perpetuating cycle and is evident at One World Children's Centre. Particular individuals involved in training at pre-service and in-service levels and professional organisations such as EEEC Vic. Inc. and QECEEN are also cited as sources of impetus for centres.



Issues for discussion

Food

A common practice in early childhood has been the use of food for play experiences, for example: dry macaroni for threading or pasting, grain or dyed rice for sensory experiences and potatoes for printing. Some commercial suppliers of play materials even offer pre-dyed rice and pasta in their glossy catalogues. 'The use of food for play is wasteful when one considers the resources and energy required to produce food for human consumption. In providing food for play, one is also perpetuating the myth that food is so plentiful it is expendable (Elliott and Emmett, 1997, p49). In her comments about the environmental practices of her centre, Scales particularly notes that the centre does not use food as a play material (2000, pers. comm. 24 July). Holt (1989, p156) states: 'children must learn to respect and value food from the beginning and without exception. This will mean some new thinking for some adults'. Training institutions generally advise students not to use food, but it is an entrenched practice in some centres and an issue that is still to be addressed.

Natural materials

Natural materials are both open ended and sensory and offer much potential for environmental education. Early childhood practitioners vary significantly in their use of such materials. For some they may not be used beyond a nature table, for others they are incorporated into a range of play experiences such as pine cones in sand, leaves for jumping into and shells in water. However, the use of natural materials can raise environmental dilemmas. Firstly, is it appropriate to remove natural materials from the environment to use in programs and secondly, are some ways of using them inappropriate (Elliott and Emmett, 1997)?

Some early childhood environmental education references include questionable activities such as pasting pebbles (Humphryes, 2000; Petrash, 1993; Targowska, 1991). There are no easy answers to these dilemmas, but early childhood educators need to be aware of them because how we use natural materials may convey environmental messages to children. At One World Children's Centre the emphasis is on borrowing natural play materials from the environment, using them respectfully and disposing of them appropriately and thoughtfully (Gordon Community Children's Centre, 1993).

Playgrounds

Outdoor play is regarded as an integral part of early childhood programs and is not just a space to burn up some energy. Nippard (2000, pers. comm. 30 July) notes that the 'outdoor learning environment is as important as the indoor learning environment', and the space available exceeds requirements in her centre. The SEETRC report (1996) criticised the amount of space for children



in centres, particularly the amount of outdoor space. When new centres are constructed it would appear that the playground is an afterthought with less than adequate time and money spent on the design and development (Elliott and Emmett, 1997; Walsh, 1991). Also, the redevelopment of older playgrounds can be misguided. Hocking (2000, pers. comm. 30 July) commented on a centre sand pit with a natural rock edging where redevelopment involved painting the rocks red, blue and yellow! If, as Rivkin (1995, p2) states, 'children's access to outdoor play has evaporated like water in sunshine', then action is necessary to develop, maintain and extend playgrounds. Playgrounds need to be designed and developed with consideration for the needs of the users and the potential for environmental education. Several publications (Elliott and Emmett, 1997; Rivkin, 1995; Walsh, 1991) are available to assist centres to think beyond the multicoloured, fixed, commercially available structures to natural materials, organic shapes and indigenous planting.

Cleaning

This issue takes environmental education beyond the children's program to the housekeeping practices that should be regarded as an integral part of a holistic approach to environmental education, but are often put in the too hard basket. It is a somewhat contentious issue, given the requirements to maintain clean buildings and equipment for children, the community perceptions about cleanliness and emerging information about the possible health risks associated with some cleaning products.

Over recent years in Victoria, waste audits have been conducted by early childhood consultants (Elliott and Emmett, 1997) with funding from the Western Regional Waste Management Group. The audits frequently revealed 'a chemical cocktail of cleaners' in centre cupboards and practices such as the spraying of cleaners in the children's presence (Hocking 2000, pers. comm. 30 July). This contrasts with the directives from current publications (Centre for Community Child Health, 2000; NHMRC, 1996), which recommend warm soapy water for all cleaning except in the instance of body fluid spills, when a diluted bleach is required. It would appear that most cleaners are unnecessary.

The potential environmental and health risks associated with cleaners are well documented in an accessible format in two publications (Immig, 2000; Total Environment Centre and Australian Consumers Association, 1996). Further support for changing practices comes from the hygiene hypothesis outlined by Hamilton (1998). He proposes that young children's immune systems are not being stimulated sufficiently for optimal development because of our Western obsession with cleanliness and hygiene.

Recent experience suggests that there are two aspects to addressing the cleaning issue: one is the process of change itself and the second is what to change to. Elliott (1992) suggests a series of four steps – research, communication, trialing and evaluation – and policy development to facilitate change. Bos, as a parent and researcher at her child's kindergarten, attempted to introduce alternative, environmentally friendly cleaners. She found parents were generally satisfied with the cleaning practices and saw no need to change, and the issue was of low status compared to other centre issues (Bos, 2000). Some centres choose to purchase plant-based alternative cleaners (Hocking, Nippard 2000, pers. comm. 30 July) and others choose to prepare

their own from basic ingredients such as vinegar and grated soap (Gordon Community Children's Centre, 1993). Several publications are available for centres choosing to make their own cleaners (Dobson and Kibbis, 1993; Hayes, 1998; Lord, 1996; Targowska, 1991).



Beyond early childhood centres: the roles of other organisations

Professional organisations

The patchwork quilt analogy is particularly relevant to the professional organisations involved in early childhood education. With no overarching government body and significant differences between States and Territories, the variety of governmental and professional organisations tends to hinder rather than help the promotion of environmental education across Australia. Early childhood environmental educators in some States have developed their own voluntary organisations to meet their needs and promote environmental education. EEEEC Vic. Inc. was established in 1992 and QECEEN established in 1995 (Davis, 1998). Both groups offer regular newsletters, resources, professional development meetings, websites, networking and support. Topolcsanyi (1997) describes the impact of EEEEC Vic. Inc. on early childhood environmental education as significant. The SEETRC report (1996, p92) acknowledges that 'the emergence of voluntary early childhood education networks is testimony to the lack of professional advice generally provided by educational systems'. It is worthwhile noting that during the early 1990s a similar group was developing in the United States through the efforts of Ruth Wilson (Peters and Wilson, 1996).

At the national level early childhood educators have found most support beyond the early childhood field through the Australian Association for Environmental Education (AAEE). Early childhood is a special interest group within the organisation and is recognised as a regular conference theme. Also, the World Education Fellowship (WEF) has a commitment to supporting environmental education, evident in the organisational aims and recent conference proceedings (Graves, 1998). Within the early childhood field the Australian Early Childhood Association (AECA) has supported environmental education by devoting one issue of its regular journal *Everychild* to environmental education (1998). Unfortunately both QECEEN and EEEEC Vic Inc were overlooked in this publication, such is the fragmentation of the field.

At local levels various organisations have supported environmental education:

- The NSW Independent Education Union has published articles about environmental education in their journals and newspapers (Kowalski, 1997; 1999; 2000).
- The South Australian AAEE chapter has included early childhood education in professional development, conferences and newsletters (Thelning 2000, pers. comm. 14 July).
- The Victorian Free Kindergarten Association Multi-cultural Resource Centre (FKA-MRC) has been inclusive of environmental education in the development of multicultural displays of play experiences (Barnes 2000, pers. comm. 5 September).



Training institutions

Training at both pre-service and in-service levels in early childhood may occur at TAFE colleges and universities and through professional organisations or private providers. The situation with respect to environmental education can best be described as ad hoc (Davis, 1998). Again the notion of committed individuals who inspire others through the incorporation of environmental education in training programs is prominent (Topolcsanyi, 1997; Young 2000, pers. comm. 29 June).

For pre-service training at the national level there are no goals or guidelines as to what constitutes best practice for early childhood teacher training, despite recognition in the SEETRC report (1996) that this was necessary. Hence, environmental education may or may not be included according to the institute and staff involved. The national childcare TAFE courses are currently in a state of flux owing to changes from a module system to flexible delivery training packages. In the modular system several subjects were edited to be inclusive of environmental education, but the place of environmental education in the new system is yet to be interpreted (Young 2000, pers. comm. 29 June).

Some notable exemplars include the work of Davis, a lecturer at Queensland University of Technology (QUT) and McMeekin, a training manager at One World Children's Centre. At QUT one core and one elective subject are taught in the degree course, both with a strong environmental education emphasis (Davis 2000, pers. comm. 19 July). The One World Children's Centre is a private provider of nationally accredited childcare training courses. The environmental philosophy of the centre permeates the training courses, and because the training is conducted in student centres there is potential to promote environmental education further (McMeekin 2000, pers. comm. 15 June).

For in-service training the promotion of environmental education relies on the work of individuals in each State. Their work is often connected to or supported by one or more larger organisations: for example, in Queensland, Rowntree from Bunyaville Environmental Education Centre and QECEEN; in NSW, Kalucy from WEF; in South Australia, Thelning from the Department of Education Training and Employment and the AAEE state chapter; and in Victoria, Hocking from EEE Vic Inc and the Royal Botanic Gardens Education Service. This list is not exhaustive, but illustrates something of the network of connections and individuals that support in-service work. There is no coordinated plan at State or national levels. The SEETRC report (1996, p93) states: 'given the diminishing support for early childhood teachers within States and Territories, it is significant that there is no assistance at federal level'. The report further recommends that national funding be provided for professional development for early childhood practitioners. Such support is urgently needed if environmental education at the early childhood level is to become mainstream.

Government departments

The lack of a national preschool curriculum was noted in section 4, but some States have developed preschool curriculum documents. For example:

- Queensland has a state preschool curriculum for three-to-five year olds (Queensland School Curriculum Council, 1998) which identifies environmental education as a foundation area of learning. Goals, strategies and outcomes provide a sound basis for program development.
- South Australia has a similar document (Department for Education and Children's Services, 1995) but is now developing a Curriculum Standards and Accountability framework, including a band for children from birth to eight years that will be inclusive of environmental education across a number of learning areas.
- Western Australia has a relatively new Curriculum Framework (Curriculum Council of Western Australia, 2000) for the preschool and primary school years that includes Society and Environment as one of eight learning areas, and environmental education is implicit (Burns 2000, pers. comm. 7 July).
- Victoria last published a pre-school curriculum document in 1991 (Office of Preschool and Childcare, 1991). The focus is very clearly on equity and transition to school issues, and environmental awareness is signalled as an issue for future updates of the curriculum. The early childhood field in Victoria waits in anticipation.
- New South Wales has a new early childhood curriculum framework and its creator has advised that 'the importance of supporting children and other members of the children's services community to value, enjoy, preserve and enhance the environment is a feature' (Stonehouse 2000, pers. comm. 30 June).



Although the inclusion of environmental education in curriculum documents would assist in the promotion of early childhood environmental education, it should be noted that these documents usually apply only to preschools and may or may not be utilised by childcare centres.

The recently revised National Childcare Accreditation Council's Quality Improvement and Accreditation System (2001) consists of thirty-five principles, which are applied to childcare centres seeking accreditation. Reference to environmental education is confined to using 'the natural environment' as one of many examples of areas to be addressed. The most specific reference is made in the principle of fostering creative and aesthetic development, where it is stated that for standard quality accreditation 'staff talk frequently with the children about the aesthetics of the environment and encourage the children to notice and respond to beauty in nature, in the built environment and in artistic creations and performances' (National Childcare Accreditation Council, 2001, p76). This provides a starting point, but is insufficient if environmental education is to be implemented throughout early childhood centres.

A source of hope for the future is the Discussion Paper *'Today Shapes Tomorrow, Environmental Education for a Sustainable Future'* (Department of Environment and Heritage, 1999), which acknowledges the work done in the early childhood field and identifies early childhood learning as a priority for the future. The paper also reflects some issues from the broader context that are evident in early childhood environmental education, such as the lack of overall coordination and the lack of understanding that environmental education occurs outside formal school settings.



The recently released *Learning for Sustainability: NSW Environmental Education Plan 2002–05* (NSW Council on Environmental Education, 2002) includes a range of outcomes to provide strategic direction for achieving effective and integrated environmental education in NSW. One of the strategies, to 'provide and where possible expand availability of adult and community education, as well as environmental education to early childhood, school, TAFE and university students' recommends that the Office of Childcare include 'environmental education in the early childhood curriculum framework'.

Extension education services

In recent years extension education services have become aware of the potential market for their services in the preschool years. The following programs illustrate the potential.

- Pullenvale Environmental Education Centre, Queensland – *Ramble and Play*
- Healesville Sanctuary, Victoria – *Things That Go Bump in the Night*
- Centennial Park, New South Wales – *Escape and Explore*
- The Marine Discovery Centre, Victoria – *I'd Like to be Under the Sea*
- Perth Zoo, Western Australia – *Butterfly Magic*.

The programs vary in length from 45 minutes to 3 hours, and include a range of experiences, some adult directed, some play based, some concrete or sensory in focus. Beyond the direct excursion experience for children, extension education programs also inform early childhood practitioners about environmental education and play experiences for their programs. A few extension education services have developed pre- or post-visit booklets to inform practitioners. Also, it should be noted that travelling distances, early childhood centre policies precluding excursions and high adult-to-child ratios are often factors that prevent early childhood excursions.

In principle, the provision of early childhood programs is to be applauded, but it is a concern to early childhood educators that many of these programs are developed and implemented by educators not qualified in early childhood education (Hocking 2000, pers. comm. 30 July). From work in extension education Hocking (2000, pers. comm. 13 September) comments that it is not so much the experiences presented, but the ways they are presented to young children. Wilson (1994a, p53) outlines the importance of child-centred approaches and developmentally appropriate practice for environmental educators working with preschool-aged children and states: 'environmental educators inexperienced with preschool children often are frustrated with the inabilities of young children to share, wait their turn, stand in line and follow directions'. To some extent programs in extension education may also suffer from the 'watered down primary effect' as described by Davis (1999). In 1997 Topolcsanyi completed a case study about creating a network between extension education services providing early childhood programs and EEE Vic. Inc. in an attempt to address some of these issues. Despite a successful first meeting the network did not persist. It would appear that the early childhood programs at the Royal Botanic Gardens Melbourne and the Melbourne Aquarium are the only programs developed and

implemented by early childhood trained educators in Australia and such programs are to be encouraged.



Resourcing early childhood environmental education

The lack of resources to support and promote environmental education at the early childhood level has been frequently documented (Davis, 1998; Victorian Ministry of Education and Ballarat Community Education Centre, 1990), however, there are some patches of green in this area to be acknowledged.



Resource kits

The notion of resource kits specifically designed for early childhood centres appears to be a Victorian initiative.

Title	Source
Bright Eyes and Bushy Tails	Healesville Sanctuary, Victoria Ph 03 5957 2818
Frolicking Frogs	Healesville Sanctuary, Victoria Ph 03 5957 2818
Zoo Discovery Kit	Melbourne Zoo, Victoria Ph 03 9285 9355
An Octopus's Garden	Underwater World, Queensland Ph 07 7444 8088
	Marine Discovery Centre, Victoria Ph 03 5258 3344
Rainforest Galleries	East Bairnsdale Early Learning Centre, Victoria Ph 03 5152 2580

The first kit, *Bright Eyes and Bushy Tails*, was developed in 1993 by Godwin, a preschool teacher. The kit was initiated by Godwin and part of her studies in environmental science. This model has given rise to the other kits that have similar content but vary in focus. The kits usually contain puzzles, puppets, posters, books, artifacts, toy animals and games relevant to a topic and as such form a specialised collection of materials that most early childhood centres would not purchase. A number of the kits include a reference and resource book for educators, which suggests how the kit materials might be used or extended upon. Particularly for centres, where other factors preclude excursions, these kits are a vital resource for early childhood environmental education.



Adult education references

A handful of Australian references are available that inform early childhood educators about environmental education. Those by Elliott and Emmett (1997), Gordon Community Children's Centre (1993) and Targowska (1991) are the main publications, the latter being out of print. Related references include AECA (1985), Crook and Farmer (1996) and Faragher and Salter (1994). Beyond these Australian publications early childhood educators must refer to the work of Wilson (1993;1994a) and Rivkin (1995) in the USA.

Some newsletter and journal articles are published locally by organisations such as AAEE, AECA, EEEC Vic. Inc., FKA-MRC, IEU and QECEEN, but limited circulation prevents wider knowledge and accessibility.

In 1999 EEEC Vic. Inc. took the initiative to produce a training video entitled *Weaving Webs: An Approach to Environmental Education for the Early Years*, which follows a day in the life of an environmentally responsible early childhood centre. The organisation has sold just over one hundred copies, but is still to recoup costs; such is the lack of funding for early childhood environmental education projects (Hocking 2000, pers. comm. 30 July).

Children's books

The dedication in the children's literature classic *Dot and the Kangaroo* (Pedley, 1991), originally published in 1889, states 'to the children of Australia in the hope of enlisting their sympathies for the many beautiful, amiable and frolicsome creatures of their fair land, whose extinction, through ruthless destruction, is being surely accomplished'. These sentiments are still valid today and there is now an excellent range of picture storybooks and reference books that may enlist children's sympathies. The environmental relevance in these books varies from factual information about the environment, for example, *Outback Animals* (Atkinson, 1990) to overt messages about the impact of humans on the environment, for example, *'The World that Jack Built'* (Brown, 1990). A brief listing of selected recent titles is provided in Appendix 2.

Children's pictures

Pictures both large and small are frequently used in early childhood centres to inform and promote discussion. There is an abundance of pictures about animals, plants and natural physical phenomena available from organisations such as the Gould League, Australian Knowledge Resources and Reverse Art Truck (old calendars and diaries), but very little depicting environmental practices such as composting, recycling and water conservation. In 1986 the AECA Child Watch Committee produced a set of posters entitled *Children are worth the effort: Today Tomorrow and Beyond* illustrating environmental practices such as wearing sun hats and gardening, but unfortunately this set is no longer available. Some pictures are available from overseas suppliers, but often are not relevant to Australian settings. It would appear that cost is a prohibitive factor in producing local pictures appropriate to the early childhood level, yet such pictures would be most helpful when discussing environmental practices, particularly those practices that young children cannot directly experience, for example, paper and plastic recycling.

Play materials

The Alphington Toy Library, Victoria (section 4) well illustrates the potential for selecting play materials using environmental criteria. However, glossy catalogues, media advertising, poor labelling and lack of time and skills to make toys make it difficult to apply such criteria with any consistency in early childhood centres. For example, wooden toys are preferable, but it is usually difficult to identify the type and source of the wood to make an informed choice. One exception is the Plan range of wooden play materials, including dolls, trucks and baby play items, which are made from no longer productive rubber trees. Many toys are made of synthetic materials: two exceptions are Eco Toys made from cotton material, and Steiner toys, such as dolls, animals and gnomes made from cotton and wool. Local craft markets and second-hand shops are often a good source of play materials, and there are a number of books available for those wishing to make their own toys (Esdaile and Sanderson, 1987; Jaffke, 1988; Tanner, 1996). An issue of great concern in relation to play materials is the presence of phthalates in PVC toys. It is believed that these can leach out, particularly if the toy is chewed, and detrimentally effect the endocrine system (Immig, 2000).



Research

In Australia, research in the area of early childhood environmental education is almost non-existent; however, Davis (1999) reports that there are signs of research beginning. Although there may be some as yet unpublished research, only three Masters' degree research projects have been completed. Topolcsanyi (1997) completed action research case studies focusing on an extension education centre, an environmental education network and four child care centres. Bos (2000) investigated the introduction of alternative cleaners into a preschool setting from the perspective of a parent and Strode-Penny (1996) explored literature and the environment. If practice in environmental education is to improve, then research is essential.



6. Are we on the right track? How do children develop environmental values?



The breadth of disciplines, which may provide insight into these questions, is wide and the various perspectives provided here are in no sense conclusive. Some would argue from a biologically-based anthropological or developmental perspective; others would counter from a non-biologically based constructivist or social learning perspective. All of these perspectives have something to contribute to our understanding of the development of environmental values. Pearce (1977, p xi) summarises the situation by depicting childhood as 'a battleground between the biological plan's intent, which drives the child from within, and our anxious intentions pressing the child from without'. As environmental educators we are ready with our 'anxious intentions' to shape individuals who share our environmental values, but to avoid a battleground scenario we need to understand the most developmentally appropriate means to achieve our goal and satisfy children's 'drives from within'.

In the field of environmental education it would appear that terms such as values, attitudes, beliefs, ethics, dispositions, concerns and morals are used inconsistently with little reference to meaning. To investigate the perspectives outlined above, the term 'value' is chosen and its meaning clarified as follows. Rohan (2000) acknowledges that the definition of values is problematic, but she defines values as underlying or organising attitudinal or behavioural decisions, decisions that enable the best possible living. In this context, best possible living is interpreted as living in an environmentally responsible way. Rohan (2000) also notes that each individual has personal and social values and that the prioritising of these values creates individual value systems that retain some plasticity throughout life.

From a biological basis, is it nature?

Children and nature connected – an anthropological perspective

Anthropology is the study of humans, including their biology, culture and society (Treffry, 1998) and would appear to be the most appropriate term to encompass the various studies that attempt to explain the links between childhood and nature. Cobb's (1977) early autobiographical work about the childhood of great thinkers identifies middle childhood (five or six years to eleven or twelve years) contact with nature as a crucial, life-long resource for creativity and for a sense of connectedness with nature. During these years 'the natural world is experienced in some highly evocative way, producing in the child a sense of profound continuity with natural processes and presenting overt evidence of a biological basis of intuition' (Cobb, 1977, p123–4). Cobb's work is frequently cited by others, including Tuan (1978, p9), who questions whether this 'innate kinship with nature' is universal. He argues that it is feasible, but that further research is needed. If we accept that this innate link exists, to what is it attributable? Nabhan and Trimble (1994) suggest that children's behaviour and personalities, including their predisposition to natural history, is genetically based, with the proviso that genes do work in context. In contrast, an evolutionary basis is proposed by E.O. Wilson (1993 cited in Rivkin, 1995) and Partridge (1984). E.O. Wilson (1993 cited in Rivkin, 1995, p6) hypothesises about 'a human need, fired in the crucible of evolutionary development, for deep and intimate association with the natural

environment particularly its living biota'. Partridge (1984, p126) speculates that 'human beings retain a neurological and even a psychological need for the natural environments in which they evolved'. Genetic and evolutionary factors might be significant, but as Tuan (1978, p11) cautions, 'if human beings have an innate capacity to appreciate nature, it can nonetheless be rendered ineffectual. Cultural conditioning is often all-important'.

The complexities of research in this area are evident and we can only speculate that genetic and evolutionary factors contribute in some way to the values that children may express about the environment. It appears that most research focuses on the more easily accessed and actionable developmental aspects of environmental values.



Ages and stages – a developmental perspective

Child development can be defined as 'age changes in children's characteristics that are systematic rather than haphazard, and successive rather than independent of earlier conditions' (Lerner 1986 cited in Berndt, 1997, p5). The complexities of child development theory and issues of continuing debate, including nature versus nurture, are clearly outlined by Berndt (1997); the purpose here is to identify developmental domains that have import for the understanding of how children develop environmental values.

Prior to identifying specific domains it is pertinent to discuss the notion of 'windows of opportunity'. A number of diverse aspects of child development include windows of opportunity, and these can be defined as crucial or sensitive times for particular experiences to occur in the lives of young children. The following three examples are pertinent to environmental education. Hamilton (1998) promotes the hygiene hypothesis, namely that the current epidemic levels of asthma and autoimmune diseases are the result of lack of stimulation of the immune system during infancy. The hypothesis further states that infants should be exposed to the natural environment, and not a purportedly germ-free house, to ensure that their immune systems function effectively in the long term. Hendrik (1988) identifies a critical period, from four to six years, for the development of creativity in young children. Elliott and Emmett (1997) link creativity to environmental education as a goal of early childhood environmental education programs. Ayres (1979 cited in Sebba, 1991) identifies three to seven years as a crucial period for sensory integration, a period for the reception and organisation of sensory experience. In the light of these examples, it seems reasonable to speculate that although environmental values might vary throughout life, there are developmental windows of opportunity when environmental values are most likely to be fostered (Wilson, 1996).

Sensory, cognitive, affective and moral development would appear to be the developmental domains most relevant to early childhood environmental education.

Sensory development

Sensory development begins before birth and is significant during infancy, often described after Piaget as the Sensory Motor Stage (birth to two years). Through touching, observing, listening, tasting and smelling, infants are exploring the world and experiencing a vast repertoire of sensations. As the infant becomes mobile the repertoire increases and the young child actively explores and interacts with his or her surroundings. Ayres (1979 cited in Sebba, 1991) suggests



that this process of sensory integration continues until ten years of age, driven by a biological urge for body awareness and sensory system equilibrium. The sensory perception of children is quite different to that of adults (Sebba, 1991) (refer to section 4).



Cognitive development



Cognitive development can be viewed as a progression from the need to manipulate and act on concrete materials to the ability to mentally manipulate or work in the abstract. This simplified view might explain why, when Palmer (1995, p34) provided pictures of rainforests for discussion, 'four year old children would frequently fail to understand the way that the natural world works and the impact of changes and forces upon it'. The same children, given concrete materials to manipulate, may not have failed. Lavanchy (1993), in questioning children on what they knew about various items, including a stone and a plant, noted that the children drew strongly on personal concrete experiences. Chawla and Hart (1988) acknowledge that ecological thinking is dependent on abstract thought and ecological cycles are not available for direct manipulation or perception by children.

Cognitive development also involves a change from an egocentric world view where the needs of self are paramount to a more reciprocal world view where a concern for others is evident. Chawla (1988) notes several research reports focusing on environmental concerns among primary and secondary school age children that correlate with this progression.

Animism, realism, centration and inability to transform are also characteristic of Piaget's pre-operational stage child aged two to seven years. Young children will often assign animal-like qualities to inanimate objects; for example a five-year-old might suggest that we break the branches off a tree if it is naughty. Chawla and Hart (1988) speculate that animism may well be the basis of empathic feelings towards the natural environment, despite the refinements in categorisation of animate and inanimate that result from cognitive development. Berndt (1997) cites more recent research suggesting that animism is not as evident as Piaget believed and is influenced by culture and language. Realism refers to the child's ability to differentiate between reality and fantasy, which for preoperational children may be difficult. They perceive the mind as a place for thoughts, dreams, remembering and reading, but do not understand that the brain controls our physical functions as well (Berndt, 1997). Centration refers to the child's tendency to focus on one aspect of a situation or object; for example, a toy green animal may be identified as a frog because of its colour and the dinosaur shape ignored. The inability to transform refers to the child's tendency to focus on states rather than the transformation process; hence processes such as ice melting to form water and fruit peelings decomposing require much discussion and hands-on exploration.

In summary, the cognition of young children is qualitatively different from that of older children and adults, and this has implications for the environmental values they may hold and the research that seeks to identify these values.

Affective and cognitive development

The link between cognitive and affective developmental domains in relation to the environment was first explored by Cobb (1977) and is noted by both Chawla (1988) and Sebba (1991) as an



area for further research. Chawla (1998b, p383) sees it as 'entirely fitting' that environmental education should be inclusive of both domains. The cognitive developmental imperative to investigate and make sense of the world, understates the awe, wonder and passion that often accompany childhood's explorations. Searles (1960 cited in Chawla, 1988) suggests that the wellbeing of individuals, and the world depends on the degree to which people can integrate their ability to think abstractly with secure bonds of affection for particular people, animals, places and things. One surmises that this process begins in early childhood and underpins the development of environmental values. Wilson (1994b; 1996) explores the balance between these two domains and concludes that at the early childhood level the affective domain should be emphasised over the cognitive domain.



Moral development

There seems to be no consensus about moral development, but a range of theories is available to review (Berkowitz and Grych, 2000; Berndt, 1997; Damon, 1999; Kagan and Lamb, 1987). Damon (1999) contends children are born with some innate moral responses, such as empathy, and as they grow construct their moral understandings from their daily experiences. Kohlberg (cited in Berndt, 1997) suggests that there are six stages of moral development organised into three levels. The early childhood years are regarded as the pre-conventional level, meaning that social norms are not part of their moral decision-making and egocentrism is strong. Hence, moral development, perhaps more so than other developmental domains, is the result of nature and nurture.

Edwards (1986) suggests that behaving morally appears to involve three steps: interpretation of the situation, decision-making and action to follow through. The ability to independently engage in these steps has been strongly linked to cognitive development, but more recently the influence of emotional development has been acknowledged (Berkowitz and Grych, 2000). In discussing the role of cognition Edwards (1986) suggests that by age four or five children are able to interpret simple causality sequences, and that prior to age seven children are able to take only one perspective (usually their own) in interpreting a situation. The impact of emotions on behaving morally are particularly significant for very young children, who are developmentally unable to manage their emotions (Berkowitz and Grych, 2000).

De Vries and Zan (1994) describe young children as 'moral realists' who interpret, decide and act based on what they directly observe or experience. One implication of this description is that children's expressions of morals or values are likely to be very changeable and context driven (Damon, 1999). De Vries and Zan (1994) state that this is an extension of Piaget's conservation theory into the realms of feelings, interest and values. 'Young children's feelings, interests and values are labile and tend not to be conserved from one situation to another. The young child only gradually constructs a more stable affective system of feelings and interest that acquires some permanence or conservation' (de Vries and Zan, 1994, p44). There are implications here for research about children's environmental values.



Development of an ecological self

Development across all of the domains contributes to the development of the ecological self, a construct first devised by Naess (1988). The ecological self can be defined as ‘an individual’s connections with and attitudes toward the natural environment’ (Wilson, 1996, p121). In childhood this connection is experienced in a unique way and provides the foundation for the development of an ecological self. Light (1984, cited in Wilson, 1996, p122) identifies six basic levels for the development of environmental ethics or maturity: ‘avoidance of injury or discomfort, seeking rewards, seeking approval of wildlife, nature/human contract, discovering and abiding by the laws of nature and universal ethic’. These levels are provided as a guide for mentors, thus suggesting that nurture is more significant than nature in the development of an ecological self.

The preceding discussion identifies biological imperatives that cannot be ignored in attempting to understand the development of children’s values about the environment. Tuan (1978, p8) states that ‘culture cannot suppress the imperatives of biology’ and perceives nature and culture to be inextricably linked.

From a non-biological basis, is it nurture?

Although children are born with a unique genotype, which drives their biological development, they are born into a culture of particular practices and values that significantly influences their behaviour and values. In her review of the development of children’s dispositions about the environment, Chawla (1988) concludes that social learning and direct contact are the most salient points in shaping the environmental values of young children. These points form the basis of the following discussions. However, Chawla (1988, p19) also identifies limitations in society and the theoretical framework of psychology for investigation of children’s values. ‘Our society has not been structured to admit that nature may provide more-than-material necessities. This blindness is reflected in developmental psychology’s lack of a vocabulary, theoretical framework or research agenda to deal with children’s experience of nature’.

Children construct values in a social cultural context – a constructivist perspective

‘Young children learn the most important things not by being told, but by constructing knowledge for themselves in interaction with the physical world and with other children – and the way they do this is by playing’ (Jones and Reynolds, 1992, p1). Piaget proposed that individuals construct their own knowledge through direct interaction with the world. This interaction involves both the mind and the body (Dockett and Perry, 1996). Extending on Piaget’s work, Vygotsky suggested that this interaction was embedded in, and significantly influenced by, the social context (hence the term social constructivism).

How do children construct their environmental knowledge? Is social interaction or direct interaction with the world more significant in this process, or are they each catalysts of the other? Chawla (1988), noting Western children’s limited direct experience with the natural and physical systems and the lack of immediate feedback from these systems, suggests that social interactions involving peers, adults and media are most significant in the development of



environmental knowledge and concern. Although it is plausible that environmental concern is socially constructed, the notion that environmental knowledge is developed in a similar way appears contradictory to earlier discussion about the significance of direct concrete experiences (sections 4 and 5). Furthermore, Significant Life Experiences research invariably rates direct experiences in the natural environment during childhood as more influential than social factors in determining environmental concern in adulthood (Chawla, 1998a). To support the notion of social construction of environmental knowledge Chawla (1988) cites the research of Kates and Katz (1977), who interviewed four- to six-year-old children about the hydrologic cycle. The children commonly described two unlinked cycles: the natural and domestic one. Although the children's knowledge of the domestic water cycle might have been constructed from direct experience, their knowledge of the natural cycle and in particular, their inability to link it with the domestic cycle, suggests that the knowledge of the natural cycle was second-hand or socially constructed. Perhaps there is a case to be made here for two types of environmental knowledge: one that can be directly experienced by the child, such as the smoothness of a stone, the smell of gum leaves and the sound of parrots, and one that cannot be directly experienced in totality and is too abstract to grasp, such as the natural water cycle, the greenhouse effect or salinity.



Support for the social constructivist approach to the development of environmental concern, morals or values is evident in the work of De Vries and Zan (1994, p2). They applied constructivism to moral development, stating that 'children must construct their moral understandings from the raw material of their day to day social interaction'. To extrapolate to the construction of values, children might construct environmental values from their experiences and then modify them in the light of social testing or construct environmental values from social interactions. For example, does a child value a tree because she has independently hugged the tree and received affirmation from others for her behaviour or because she has listened to, observed and participated with others in their relationship with the tree? I suspect that both explanations are plausible.

De Vries and Zan (1994), citing the work of Piaget, describe 'interest' as fundamental to constructivist learning theory. 'Without interest in what is new to him or her, the child would never modify reasoning or values' (De Vries and Zan, 1994, p63). If environmental values are to be developed it seems to me that interest is paramount. Many early childhood educators are well aware of the interests among the children they work with and plan experiences to extend interests in developmentally appropriate ways.

Children and significant others – a social learning perspective

This section extends on the notion of social constructivism raised above, but the emphasis here is not on the child's construction process per se, but rather on the role of the significant others in the child's social sphere who contribute to the child's emerging environmental values. Chawla (1988, p17) states: 'in determining the final shape that early impulses will take, it is likely that the example and teaching of others is as important to environmental learning as it is to social learning'. The significant others in a young child's life could be parents, siblings, peers, other relatives, friends, carers or teachers and are variously described in the environmental education literature as mentors, role models, guides and nurturers (Cohen and Trostle, 1990; Hungerford



and Volk, 1990; Nabhan and Trimble, 1994; Wolf, 2000). SLE research suggests that after direct contact with the environment, significant others are most influential in the development of environmental values. However, Chawla (1998a) cautions that the adult reflecting on childhood constructs the significance of particular individuals, but the child's perception of who might be significant others can only be surmised.

What do significant others do that contributes to the development of positive environmental values?

'Modelling is a process through which children learn how to behave by copying (modelling) the behaviour of others. Staff can teach children how to behave "appropriately" through presenting them with examples (models) of the dispositions, attitudes and values which the adults around them consider to be appropriate behaviour' (MacNaughton and Williams, 1998 p95). This definition highlights the importance of role modelling in a social sense, and the relevance to environmental values is evident. From the perspective of early character development, Berkowitz and Grych (2000, p61) state that modelling is a significant influence and 'teachers should be aware that they are always on the stage'. Further, MacNaughton and Williams (1998) cite the work of van Kleeck et al (1996), which indicates that from as early as six months babies learn from the modelling of adults; hence positive environmental modelling should begin early.

A common thread underpinning the notion of significant others is the sensitivity, awe and wonder that significant others share with children (Hungerford and Volk, 1990; Nabhan and Trimble, 1994; Wilson, 1994b). Wilson (1994b) suggests that facts about the environment are not as important as the sensitivity to the environment that the teacher shares. In the early childhood years, this sensitivity would appear crucial in supporting affective over cognitive development. However, incorporating sensitivity into an early childhood curriculum framework, policy or tertiary training curriculum document could be problematic. Carson (1956, p45) encapsulates this thread in her statement: 'If a child is to keep alive his inborn sense of wonder...he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in'.

Some authors suggest that significant others have an interpretive role to play (Chawla, 1998a; Nabhan and Trimble, 1994). Tuan (1978, p25) states that 'nature is an inarticulate teacher – or one might say that its messages are too subtle to be understood by the immature mind. Children have to be taught by adult human beings'. Interpretation can be defined as the clarification or explanation of meaning, and in the early childhood setting this could range from using appropriate words or physical representations in context with a young baby to verbally explaining observations of a phenomenon with a five-year-old.

In environmental education interpretation is more than clarification or explanation of meaning – it is the subtle messages about environmental values that are also conveyed through interpretation. In reviewing SLE research, Chawla (1998a) concludes that children who have had recreational experiences in the wild are not only experiencing direct contact with the environment, but also experiencing a socialisation into the interpretation of nature in positive and meaningful ways. Interpretation by significant others provides a source for social learning about environmental knowledge and values.

Significant others may reinforce children's behaviour in ways that provide Piaget's social testing ground for children's emergent values. Hungerford and Volk (1990) and Elliott and Emmett (1997) identify reinforcement over an extended period of time as a strategy for promoting positive environmental behaviour. Reinforcement is a strategy well understood by early childhood educators.





7. Where are we going? A brief for the future



Conclusions from the literature

The significance of the early childhood years is well documented, but not well understood beyond the early childhood field. It would appear that the beliefs in early childhood fit comfortably with approaches to environmental education. Wilson (1994a) draws parallels between best practice in early childhood and best practice in environmental education and supports this position. Research to inform and support practice is very limited. Most research focuses on children's knowledge about the environment or draws on autobiographical reflections. Chawla (1988) suggests that the lack of research about children's connections with nature is indicative of the lack of an appropriate vocabulary, theoretical framework or research agenda in developmental psychology.

The meagre number of publications to support environmental education, together with the green patches of exemplary practice noted and lack of consistent policy support suggest that environmental education is still an emerging paradigm in the early childhood field. Furthermore, it is mainly the passion and commitment of a few geographically dispersed individuals that is fuelling any progress in early childhood environmental education. Although such efforts are to be commended, there is no sense of coordination or long-term goals, but an ongoing need to be heard and for issues in early childhood environmental education to be addressed.

Unravelling the threads that influence children's development of environmental values is a cross-disciplinary task, complicated by a lack of consensus about values, beliefs, ethics, concerns and attitudes. It would appear that both nature and nurture have a role to play in the development of environmental values.

Implications – relating the literature to current practice

There appears to be a tendency in the literature and in practice to fall into 'activity mode' and quantify environmental education in terms of the variety of hands-on or productive experiences children may engage in, particularly nature experiences. To some extent this neglects the holistic approach that is essential to good early childhood practice and good environmental education practice.

Early childhood practitioners should be alerted to the factors that influence the development of environmental values. In an increasingly urbanised and technology-based society, practitioners must work against the tide to nurture the innate and unique connection between young children and the environment. Such a connection may provide the foundation for the construction of environmental values. At the same time, developmentally, children are realists needing concrete materials, responding according to what they see or experience in particular contexts and reacting emotionally. It is these real ongoing interactions that provide the raw material for the construction of environmental values, not necessarily the specific planned experiences.

Social learning theory highlights the role of significant others in nurturing children's values by modelling, sensitivity, interpretation and reinforcement. It would appear that participation in

environmental experiences is not enough: adults must convey value messages, both physically and verbally, in their work with children. Pre-service and in-service training, policy and curricula need to incorporate the more subtle roles of the adults.



Directions for the future

The grass roots passion and commitment that have initiated, promoted and supported environmental education in recent years are to be acknowledged, but much more could be achieved to support the implementation of environmental education.

The development of policy, standards and curricula inclusive of environmental education would provide significant motivation and guidance for the implementation of environmental education in the early childhood field.

Professional organisations and training institutions could contribute by taking a proactive role in areas of pre-service and in-service training, research, resource development and publication. Progress in this area would be dependent on individual initiatives and funding.

Coordination at national and State levels would facilitate communication, collaboration and a sense of direction for the future. There is scope for locating this coordination role within an existing organisation such as the recently established National Environmental Education Council.

If environmental education at the early childhood level is to become 'mainstream not marginal' in the new millennium (Davis, 1999), then action is necessary at all levels. The few patches of green identified in this review must be supported as exemplary models for the early childhood field and beyond. With support from policies, curricula, resources and training there would be no excuse for any early childhood educator or centre not to embrace environmental education.

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Glossary

AAEE	<i>Australian Association For Environmental Education</i>
AECA	<i>Australian Early Childhood Association</i>
AEI	<i>Australian Education Index</i>
Early Childhood	<i>For the purposes of this review early childhood is defined as the years from birth to six.</i>
Early Childhood Centre	<i>A centre that conducts sessional, long day or casual programs for children aged birth to six years.</i>
EEEC Vic Inc	<i>Environmental Education in Early Childhood Vic Inc</i>
FKA-MRC	<i>Free Kindergarten Association – Multicultural Resource Centre</i>
IEU	<i>Independent Education Union</i>
QECEEN	<i>Queensland Early Childhood Environmental Education Network</i>
QUT	<i>Queensland University of Technology</i>
SEETRC	<i>Senate Employment Education and Training Reference Committee</i>
SLE	<i>Significant Life Experiences</i>
VEEC	<i>Victorian Environment Education Council</i>
WEF	<i>World Education Fellowship</i>

Appendix I

List of individuals and organisations that provided contributions

National

Australian Early Childhood Association

Victoria

Anne Stonehouse, Centre for Community Child Health, Royal Children's Hospital

Department of Human Services, Children's Services Branch

Michelle Hocking, Environmental Education in Early Childhood Vic. Inc.

Free Kindergarten Association – Multicultural Resource Centre

Gordon One World Children's Centre

Healesville Sanctuary Education Service

Jo Nunn, East Bairnsdale Early Learning Centre

Lorraine Williamson, Dept Human Services Maternal and Child Health

Marine Discovery Centre, Queenscliff

Melbourne Aquarium

Melbourne University

Melbourne Zoo Education Service

Moonee Valley City Council Children's Resource Centre

Playgrouping Victoria

Royal Botanic Gardens Melbourne Education Service

Sue Walsh, Fairfield Maternal and Child Health Centre

Swinburne University

Uniting Church Early Childhood Services Unit

Victoria University

NSW

Centennial Parklands

Eileen Kalucy, World Education Fellowship

Helen Nippard, Kinma Preschool

New South Wales Department of Education and Training

Susan Kowalski, Independent Education Union

Taronga Zoo Education Service

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Queensland

Fae Barber, Writer, Environmentalist

Jerry Maroulis, University of Southern Queensland

Julie Davis, Queensland University of Technology

Lyn Bower, University of Southern Queensland

Noeleen Rowntree, Bunyaville Environmental Education Centre

Queensland Early Childhood Environmental Education Network

Suzanna Gulikers, Pullenvale Environmental Education Centre

Barbara Jensen, Teacher

Tasmania

Philippa Ray, Teacher

Nel Smit, Landcare Education

Tasmanian Department of Education

Western Australia

Education Department of Western Australia

Perth Zoo Education Service

South Australia

Adelaide Zoo Education Service

Kath Thelning, Dept of Education and Children's Services

Mary Scales, Lady Gowrie Children's Centre

Jenny Boag, District Co-ordinator, (Childrens Services), Fleurieu District

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