Effective approaches to connect children with nature

Principles for effectively engaging children and young people with nature

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Cover photo:

'They need to be outside. They need to explore, get dirty, find stuff—they need to have fun.'

Caption and caption. Photos: DOC.

The Department of Conservation's National Education Strategy[7] emphasises the importance of children and young people connecting with nature, and developing conservation knowledge, values and skills to enable them to get involved and make a difference. To assist with implementing this strategy, this paper outlines the key principles for effectively engaging children and young people with nature, based on a review of relevant research and literature. The paper then provides some insights from research findings on the most effective approaches for engaging with different age groups. Finally, the paper reviews the role of participative, active arts education as a tool for facilitating and effectively connecting children and nature.

> They need to be outside. They need to explore, get dirty, find stuff—they need to have fun.[1]

Research shows that empathy with, and love of, nature grows out of children's regular contact with the natural world[2,3,4,5,6]. Frequent, positive early childhood experiences with nature have a major impact on the healthy growth of a child's mind, body and spirit[7]. Hands-on, informal, self-initiated exploration and discovery in local, familiar environments are often described as the best ways to engage and inspire children and cultivate a sense of place and a 'sense of wonder'[2,8,9].

Studies suggest that frequent, unstructured experiences in nature are the most common influences on the development of lifelong conservation values[10]. Work with environmentalists to explore life paths into effective environmental education, for example, found that 'childhood is the foundation for relationships with the environment'[11]. The special places where people first formed a bond with the natural world are always part of the regular rhythm of daily life.[11]

1 Best practice principles for connecting children with nature

Literature suggests that it is the combination of multiple experiences and influences in nature, rather than one single life-changing experience, that helps to produce environmentally informed and active citizens.[12,13] The following best practice principles, based on a review of relevant literature, provide a useful framework for initiatives to develop these connections with nature, and therefore encourage a lifelong involvement in conservation.

It is important to note that while these principles provide guidance for experiences and actions in nature, specific approaches adopted need to address the vastly different needs of all individuals (e.g. culture, context and personalities).[14]

Make it relevant to everyday life

> Learning only happens if the subject-matter is perceived by the child or learner as having relevance to them.[15]

Effective environmental education programmes need to be personally relevant to the everyday lives of children and youth, and what is in their 'own backyard'.[16] It is important that programmes are directly related to the local context and give learners a chance to 'explore and experience what's around them'.[17]

> Environmental educators need to reintroduce learners to their local area by exploring and experiencing it, by learning about it and celebrating it. By doing so, environmental educators help learners develop a sense of wonder and a sense of place.[17]

As discussed in section 2 of this paper, what is relevant to children and young people will change as they get older; beginning with their intimately known local natural area, and extending into their school and community.[18]

What is relevant to their own lives can also be culturally specific, including local Māori indigenous knowledge, kaupapa and te reo Māori, for example, which can provide relevant learning to connect Māori to their local environment.[19] In relation to Pasifika peoples, researchers argue that in order to foster learning it is important to first understand children's everyday cultural context.[20]

Caption. Photo: Diamond Harbour School.

Include families, communities and role models

The importance of family role models and mentors is mentioned frequently in research.[5,21] Having parents, teachers, whānau and other role models who show an interest in nature can 'predispose people to take an interest in nature themselves and later work for its protection'.[18] Research suggests that children are more likely to participate in environmental initiatives if their parents are also active in this way, or give them approval and encouragement to take part.[18]

> Family ties are strengthened, a sense of community is nourished, and a sense of place is cultivated. All in all, nature is good for children and their friends and family too![22]

Research with Māori children also highlights the importance of including whānau and suggests that Māori often prefer to learn in conditions where whānau is the focal point (rather than individualistic approaches to learning), with whānau being described as the key foundation for Māori education.[19,23] Similarly, research also suggests that including Pasifika parents and communities in education initiatives is a 'prerequisite to learning'.[20]

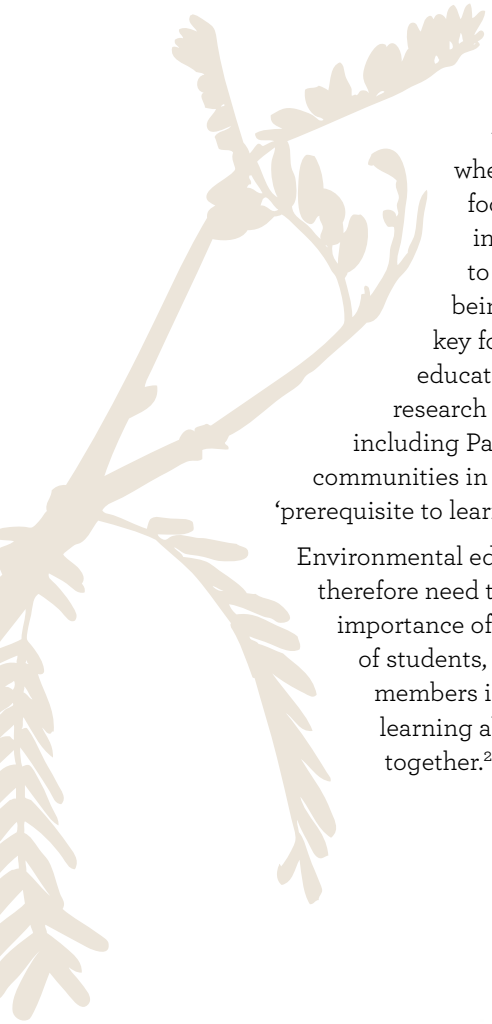
> Environmental education programmes therefore need to emphasise the importance of the active involvement of students, parents or community members in experiencing and learning about the environment together.[24]

Provide opportunities for social connections

Many authors highlight the importance of children and young people socialising and having fun when connecting with nature. Young children naturally engage in learning about the environment through informal, spontaneous, unrestricted play with others.[2] For older children, the chance to socialise and build friendships may be a key motivator for engaging with nature and the environment.[5] Research suggests that for many young people, the friendships they make and the opportunities to have fun are significant outcomes of participation and are 'valued ends in themselves'.[18, 25]

Research studies have highlighted the importance of providing opportunities for peer group interaction. One study with 10–12 year olds showed that opportunities to play and socialise with a large group of friends is a key reason that many children value being outdoors.[26] Another study with primary-aged children found that the social aspects and being able to be outside and roam freely with their friends were the key reasons that many children valued being outside.[27]

Research with young people also highlights the significant role that friends play in influencing engagement in environmental action.[5] There is a body of literature on the role of young people as mentors and enablers that can encourage other young people to connect with nature. The literature highlights the need to create spaces and networks where young people can share information and learn from each other.[28]



'All in all, nature is good for children and their friends and family too!'

Promote direct experiences

> It is important that children and young people are outside and using all their senses to actively explore, experience, make sense of their environment, and have a sense of independence.[26] Research with environmentalists found that 'most significant school memories featured opportunities to take action, rather than passive classroom learning'.[11] Studies have found that most programmes that show gains in young people's reported environmental behaviours or their stated intention to protect the environment also include an action component.[18]

In the context of formal school-based learning, it is important to combine classroom learning with experience-based learning strategies:

> The best results will be obtained when teachers are able to integrate learning in the natural environment with classroom learning strategies, and develop partnerships that ensure the continuity of environmental learning experiences in all aspects of school life.[29]

Encourage free-choice learning

'Free-choice learning' refers to learning that typically takes place outside of formal education (for example through camping and walking in national parks, and visiting museums, zoos and gardens). Through these experiences 'the learner exercises a large degree of choice and control over the what, when and why of learning'.[30] A number of authors have stressed the importance of focusing on these experiences as a path to encouraging lifelong learning and developing environmental understanding and responsible action.[26,30,31]

> Free-choice informal sectors can provide settings in which children as learners may enjoy the thrill of discovery along with the down-to-earth fun of learning.[15]

Rather than focusing on how children should experience and value nature[26] or whether children get the message, the focus is on the multiple ways in which they 'make sense of the information they encounter'[29]; this type of learning is described as open-ended, option, inquiry based, self-paced and voluntary[30].

> Free-choice learning represents a bottom up, individual-driven way to think about learning rather than a top-down, institution-driven view. Free-choice learning draws attention to the importance of focusing on each individual's unique, lifelong journey and the role of the individual and his/her social context in determining the direction of that journey.[30]

Tiri School Trip.
Photo: Mitsuro Aoyagi.

Foster the role of 'active stakeholder'

There is a lot of research on the importance of children and young people being encouraged to become active stakeholders in the environment and decision making, particularly from the middle childhood years (6–12 years old).[32] Researchers have referred to the need for children to have 'belief in their capacity', be optimistic about the future, and confident that they can make a difference.[13]

There is much critique of approaches that simply seek to inform children and young people about environmental issues in the hope that this will lead to responsible action.[18,33] Many researchers instead advocate for an approach that focuses on empowering young people through developing knowledge and understanding for decision making; planning and taking action; participation; emotional response; and critical thinking and reflection[34] and develops a sense of personal and civic responsibility[17].

The purpose of this approach is for students to learn how to be active participants in society.[35] Connecting young people to the environment in this way is described as developing young people's 'action competence'.[36,37]

In order to be active participants, researchers have emphasised the importance of fostering children and young people's 'locus of control':

> Variables most closely correlated with environmentally responsible actions are perceived skill in using action strategies, level of environmental sensitivity, perceived knowledge of action strategies, and locus of control.[17,38]

The 'locus of control' refers to the 'sense that they have the ability to influence the outcome of a situation' and can help children and young people develop a sense of empowerment and personal responsibility.[17] Research has found that 'internal locus of control' is the core variable for improving the intention to act for responsible environmental behaviour.[39] Therefore, it is important to stimulate the internal locus of control by:

> ...encouraging people to make their own decisions about problems and critically evaluate the opinions of others and by providing opportunities for people to apply action skills successfully.[17]

'The best results will be obtained when teachers are able to integrate learning in the natural environment...'

Target real local issues

> Skill building and application must be couched within the context of solving real problems—problems that directly affect learners either at home, at school or in their community.[17]

Building on from the role of children and young people as active citizens, many authors advocate the importance of children and young people having authentic experiences, getting involved in real life issues in the local context, exploring problems and taking action.[16,21] Engaging with real environmental issues at the local level helps young people to practise active citizenship and also see the effects of their contributions.[18]

The focus is on democratic environment education, rather than trying to influence individual behaviours. This approach involves:

> A balanced presentation of differing viewpoints and theories and openness to inquiry; encourage students to explore different perspectives and form their own opinion.[17]

Students are taken seriously and encouraged to question issues, form viewpoints and identify appropriate action. The focus is on the learner developing 'the ability to assess critically a situation and act based upon his or her assessment, interests, and values'.[40]

Promote collective action

> People are more likely to get engaged politically if they have a personal sense of competence and a belief in their collective competence (their ability to achieve goals working together with a group).[18]

The theme of fostering the active citizen also involves promoting a collective public approach rather than a private and individual environmentalism. An example of this is Education for Sustainability, a holistic learning process that aims to encourage new understandings and behaviours in order move towards a sustainable future. It challenges education to:

> ...move away from single actions, such as tree planting and recycling paper towards a focus on student participation in decision making—allowing learners to think or reflect for themselves.[41]

A number of authors argue that the most effective actions are collective, where people work together for the common good[18,42]:

> Left to themselves, young people can easily feel disempowered by the scale of environmental problems. They need opportunities to work for social and environmental change with others in order to acquire a collective sense of competence, or the belief held by members of a group that they can coordinate their actions effectively and accomplish shared goals through unified efforts. [18,43]

The concept of the 'classroom whānau' has been used to describe a process by which teachers and students work together as a group, with the focus on the group completing the task together, rather than 'the individual completing the task in isolation'. This focus on the 'social nature of learning' also gives students the opportunity to learn from each other.[19]

Caption. Photo: Waimahaka School.

2. Effective approaches for different ages

The best approach for connecting children and young people to nature and the environment can change over time, and needs to match children's ability to understand and explore their world[44]. While the first focus is on play in their immediate natural environment, this can then extend into active participation in managing their school, and then collective initiatives in the community:

Rather than introducing children younger than 12 years old to complex environmental issues, abstract concepts, and the need for new behaviours … the environmental curriculum should be matched to children's ability to understand and explore their world … if empowerment is the goal, nature-based play and other activities that foster a love for the earth should be the precursor.[44]

Young children (up to 6 years old)

> It is about immersing themselves in their environment, exploring and relating to their surroundings on an emotional, intuitive level.[13]

For pre-school and young school children, there is a strong emphasis in the literature on active hands-on exploration in the local environment, using all their senses to experience and appreciate the natural environment.[16] The focus is on learning and finding meaning in the environment through informal, spontaneous and unrestricted play and socialisation.[13,26,32,45]

> Learning during early childhood development is characterised by an emphasis on the child's innate drive to explore and discover … it is in this stage of early childhood that children cultivate their sense of affection toward the natural world and their perceptions of the needs of other creatures.[15]

The focus of environmental education at this stage is to encourage children to explore and experience their local environment, to develop a sense of wonder and sense of their place.[17]

> While adults conceive of nature as a physical presence (e.g. a green, bushes and landscaping) children experience nature as a potentiality.[26,45]

It is not appropriate to discuss abstract issues and distant environmental problems with these young children and the focus should instead be on their immediate environment (multi-sensory play, physical movement, touching things) and small-scale actions in the local environment. [15,18,44]

> Creative, spontaneous and unregulated play in neighbourhood places and traditional play environments such as streets, wild places and gardens, enables children to discover, explore and develop a personal understanding of the environment around them.[15]

At this early stage it is also important to involve family, as children are more likely to want to participate if their parents are also active and interested in nature, and parents can play a key role in nurturing their interest in the environment.[13,18]

Middle years of childhood (6–12 years old)

A number of authors talk about the importance of the middle years of childhood (6–12 years old) for the development of the child's relationship with the natural world.[2,46] At this stage, learning can shift from beyond the immediate home or school environment as children become appreciative of other nearby settings.[44,46] Children are able to assimilate knowledge, understand ideas and question actions.[15,17] Research recommends a strong focus on student-directed, experiential and action-based learning in natural environments for late primary-aged children. [16,48]

Research has found that participation with nature before age 11 is particularly potent in shaping both environmental attitudes and behaviours in adulthood.[49] This is a time when the sense of wonder of early childhood is transformed to a sense of exploration.

> [There is] a growing recognition that this period [early adolescence] is a pivotal one for children's envirPonmental involvement … children have a quest for understanding but also a capacity to focus.[13]

A number of authors stress the importance, at this age, of starting to promote children's participation as environmental stakeholders.[32] Research has shown the importance of nurturing a sense of competence, or sense of self-efficacy, and taking children's participation seriously.[13,18] Research with 6–11 year olds, for example, found that the children had a desire to play a role at the neighbourhood level and yet seemed to be ignored by adult decision makers.[32]

Young people (13 years and older)

In the secondary school years, the literature advocates an increased focus on active citizenship and programmes that are participatory and action orientated. In this age of 'daring exploration'[15], the focus moves beyond the immediate neighbourhood to include larger landscapes and ecosystems.

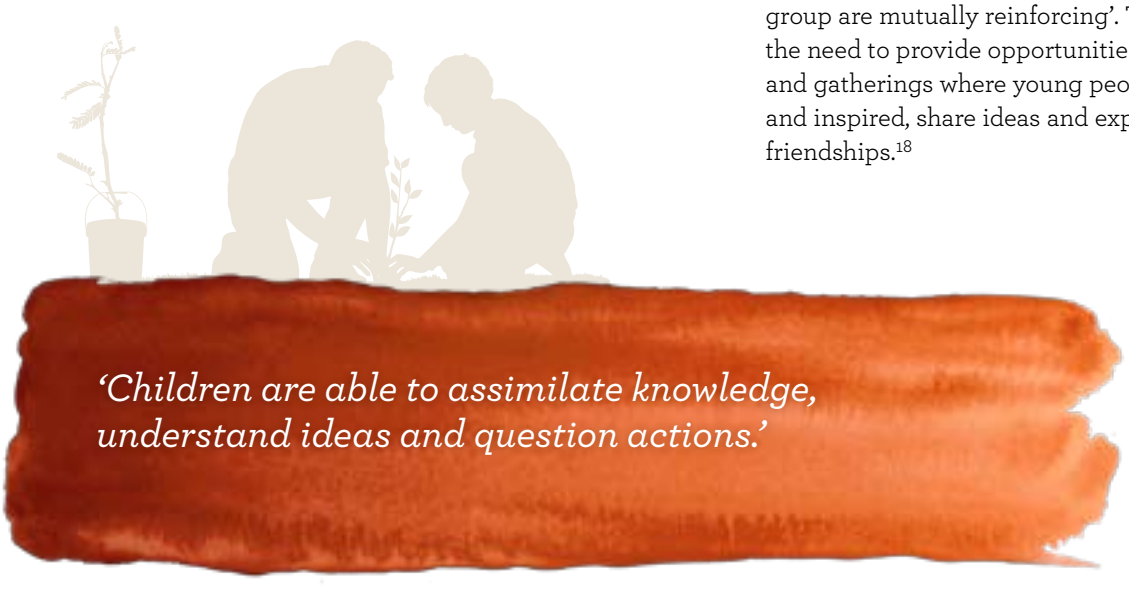
The focus is on collective approaches and critical thinking, with the role of environmental education being not to convince students about a particular view, but to develop 'learners' capabilities to participate as citizens in democratic society'.[40] The role of educators is to provide opportunities to 'define an issue, determine if action is warranted, identify others involved in the issues, select appropriate action strategies'[17]. Educators can also help to 'build skills in oral and written communication, conflict resolution, and leadership'.[17]

A key emphasis is on young people's genuine participation in shared decision making with adults:

> Through genuine participation, youth take part in making meaning of a particular environmental problem by defining it, analysing its root causes, and envisioning and enacting possible solutions.[40]

The priority is not only on environmental issues, but 'integrates concerns for social, political and economic development, and addresses education for long-term ecological and social sustainability'.[35] Students are prepared for public action, not simply 'private sphere environmentalism'.[18]

The literature also highlights the importance of developing both an individual and collective sense of competence, as 'confidence that one can achieve goals oneself and confidence in achieving goals as a group are mutually reinforcing'. This also reinforces the need to provide opportunities for social exchanges and gatherings where young people can be motivated and inspired, share ideas and experiences, and build friendships.[18]



'Children are able to assimilate knowledge, understand ideas and question actions.'

3. Effective approaches to connecting children to nature through arts education

> A human society makes (or discovers) meaning through its arts.[51]

Researchers have increasingly highlighted the need to encourage children to first develop an emotional connection with nature as a precursor to environmental awareness and responsibility.[13,26] They have argued that 'developing a relationship with nature involves not only reason but also feelings'.[13] The traditional linear relationship between knowledge and behaviour change has therefore been extensively critiqued[33,53] with suggestions that:

> A knowledge-based approach may not necessarily affect deeper held values of the kind that might drive an individual to alter their behaviour.[26]

An approach that focuses on children's attitudes, feelings and emotions is termed 'affective education'[26]:

> Underlying [affective education] is a belief that our emotional responses and values guide our actions and opinions on environmental matters in a way that a potentially more detached, scientific knowledge may not be capable of achieving.[26]

Artistic and creative approaches (e.g. drama, storytelling, music, dance, photography, poetry, creative writing, visual arts, film[54,55,56,57]) have been shown to be an important way to facilitate and foster affective knowledge[26] and 'deepen the emotional connections between people and places'[52,58]:

> The arts can address the emotional and imaginative connections missing in much environmental education.[59,60]

Another author stated:

> Environmental education has largely ignored some time-honoured methods of creating powerful connections between knowledge and emotional conviction. The most central of those methods is the bond formed in the process of self expression we call making art.[61]

Collaborative, participative approaches to arts education often embody the best practice principles discussed earlier by encouraging critical thinking and reflection, a focus on the local environment and social change, and promoting community involvement and social connections.

Creative approaches are described as a key way of encouraging children to develop a 'sense of place'[62] and to explore and reflect on their own values and their relationship to the environment[26,62,63]. This approach focuses on engaging the senses and identifying creative and innovative ways to deal with real issues.

Research suggests that environmentally responsible adults tend to 'recall aspects of their childhood experiences of natural environments that reflect affective, emotional responses far more than the acquisition of a scientific understanding of the environment from school lessons'.[26,64,65,66]

A key emphasis of arts education focused on the environment is to provide place-based interactive experiences, and to adopt creative and active processes in order to connect children and young people to nature:

> Art education has proven to be fertile soil in which to grow creative approaches to problem-solving, critical thinking skills, and self-reflexive learning, all necessary for making our communities healthier and happier places.[67]

The following sections provide detailed information on how three approaches (drama, visual arts and story-telling) can facilitate and foster affective knowledge[26] and 'deepen the emotional connections between people and places'[52,58]. The relevant literature focuses on these three areas. These approaches also align strongly to the best practice principles discussed earlier by focusing on active processes of engagement, direct experiences and 'play', collective interaction, engaging all senses, and encouraging reflection and critical thinking.

Drama

> Drama is an artistic means of telling stories, exploring meanings and creating understandings. [52,68]

Authors have provided many examples to show how people learn through drama, and how drama is used to pass on knowledge and stories in communities.[60,69] More specifically, drama has been identified as a key learning tool to create affective experiences in relation to the environment.[52,60] While research on the effectiveness of drama in environmental education is limited[52], many authors claim that drama is a valuable tool for environmental education and can 'evoke a powerful sense of connection, shed new light on issues and develop clarity or understanding about a bigger picture'[52]. Learning in drama can be made through the areas of 'experiential learning' and 'imagination in learning'.[70]

The key features of drama as an environmental learning tool have been described as:

> Its ability to grab and maintain attention and facilitate the emotional and imaginative engagement of audiences or participants; it provides a multi-sensory experience that reinforces the interpretive messages (brings stories to life in appealing, engaging and memorable ways); it is a natural and human communication medium (story is intrinsic to all human cultures); it has broad appeal (can capture the attention of the masses); it is an holistic tool useful for addressing serious issues in an engaging, non-confrontational and inspiring manner that gets people thinking—role modelling rather than preaching, costume, puppetry and mask are all valuable distancing effectives audiences find less confronting; and drama experience can have a profound long-term impact—engages the whole person—mind, emotions, imagination and senses—memorable interpretive experience.[52]

Drama in education can be used to describe a range of initiatives from watching a theatre performance, to participating in non-performance-based improvised work (focused on ideas, feelings and perspectives) with no external audience for the work.[70]

Researchers focused on participatory drama have concluded that the active, participatory approach is particularly useful for allowing children to develop skills in communication, collaboration and expressing ideas and opinions.[52,70,71] As drama has natural processes very similar to playing, it provides an opportunity for children to 'learn through play':[60]

> Drama allows children to rehearse and develop the skills they will need for active citizenship in a safe and non-threatening situation. They participate in fictional contexts, but they use real knowledge and real skills.[70]

Participatory drama and role playing has also been described as useful for encouraging active citizenship as, through an imagined context and narrative, children are able to put themselves in other shoes, offer different perspectives, explore values, feel sympathy and empathy, and plan solutions and identify alternatives[52,60,70,72,73,74]:

> In drama, the children are not passive recipients of the story but are, instead, active participants in the vents, tensions, problems and solutions.[70]

Drama allows for exploration in thinking of ways to solve problems. Due to the complexity of environmental problems faced, drama can help those involved to think about how different stakeholders may think about the same issue.[60]

In terms of theatre performance, a number of authors suggest that theatre can provide a powerful experience that can connect emotionally, inspire, engage and leave lasting impressions.[52] However, researchers also suggest it can be difficult to assess whether further understanding of environmental issues has been gained, and whether this has the potential to foster pro-environmental behaviour.[60] One researcher concludes:

> If a memorable experience in which the learners had direct involvement in manipulating the drama were to occur, then it is likely that effects would involve deeper understanding of environmental issues and an appreciation of the natural world which has the potential to foster pro-environmental behaviour.[60]

'Drama allows for exploration in thinking of ways to solve problems.'

Checking bales to see if artificial whitebait spawning sites are sucessful.
Photo: DOC.

Visual arts

A number of authors have written about the key role of visual arts in raising awareness about environmental issues and developing emotional connections to nature.[67,76] Visual arts can include everything from young children making artworks out of leaves and branches, to photographic images of places, to large collective community artworks that encourage debate and dialogue[76]

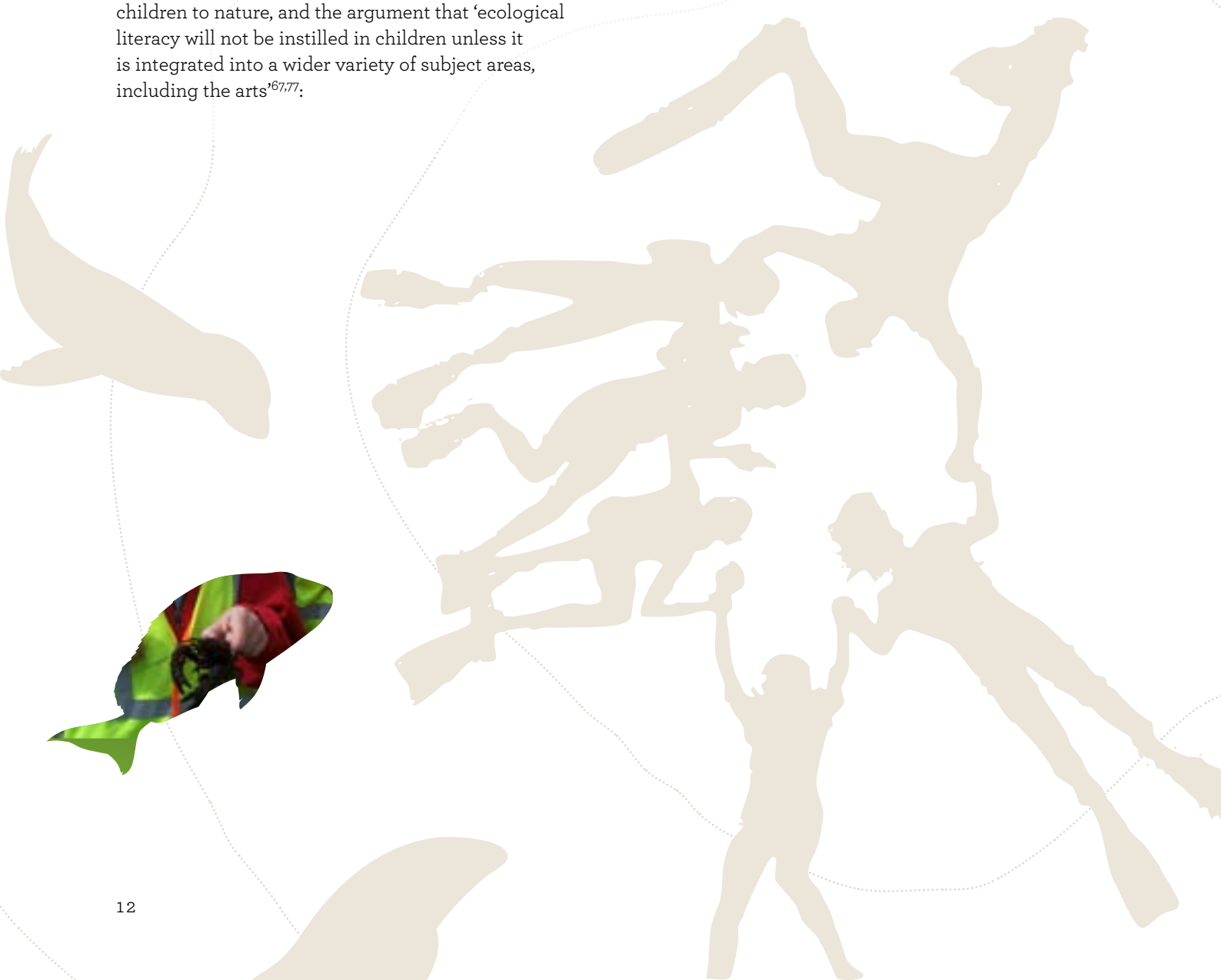
The phrase 'eco-art education'[67] has been used to describe the integration of art education with environmental education, particularly through schools:

> Eco-art education promises an innovative approach to environmental education, one that balances the traditional roots of this discipline, found in the cognitive, positivist approaches to science education, with the more creative, affective and sensory approaches of art education[67]

The concept of eco-art education reflects a common emphasis in the literature on the need for interdisciplinary approaches in order to connect children to nature, and the argument that 'ecological literacy will not be instilled in children unless it is integrated into a wider variety of subject areas, including the arts'[67,77]:

> Art-based study offers a way of knowing distinct from other disciplines. It not only emphasises the importance of sensory experience but is one of the few subjects in the school curriculum where an affective, subjective approach to study is valued and the relations of the world of the self with the world of objects is continually explored.[26,62]

The focus in this type of approach is on 'an open-ended journey of exploration, expression and experience'[76] rather than a particular output. A study of photography students each working on their own environmental issue, for example, found that 'the creative process allowed [the participants] to take ownership of issue, and led to a clarification of the participant's own position and feeling towards that issue'[76,78] Other studies have found that, through art education, 'the creative and the critical are brought together in a way that both empowers the learner and challenges the wider system'.[76]



Story-telling

> Stories…join together the pieces of our experiences and the experiences of others in a way that gives order, significance and meaning to the chaos around us.[79]

Story-telling is a traditional approach to sharing information amongst populations. Many cultures, for example, have narrative traditions that teach people ethical and proper relationships between people and the environment, and also encourage empathy and responsibility for nature.[80] Traditional oral story-telling is often identified as an approach that can inspire the imagination, and connect, and move people, emotionally.[27,80] A wide number of education researchers support the notion that story-telling can enhance the connection that children have to the environment.[27,79,80,81,82]

> Oral narratives have the power to establish enduring bonds between individuals and features of the natural landscape.[27,83]

Within the broad framework of story-telling, a number of authors advocate that environmental education emphasises the 'situated narrative'.[27,80,84] Situated narratives relate to the local environment and stories about particular local places.[27,80] Stories of local places are used as a teaching tool to inform and inspire, and to elicit an emotional response to the local environment.[80,84]

Telling local, situated stories can help children to develop a 'sense of place'. Sense of place describes 'a combination of an individual's place meanings and place attachments'. Stories about the natural and social history of a place can affect 'how the children engaged with the setting and invested in its meaning'.[27] New meanings can be attributed to local areas and help to form bonds and shape relationships with these unique places:[27,79]

> We need to discover and tell stories that embody our participation in our unique place—our home within the environment. We do not live in a generalised, theoretical environment. We live in this place, this home… [we must] find and profess the unique story of the unique place in the world that we wish our students to call home.[79]

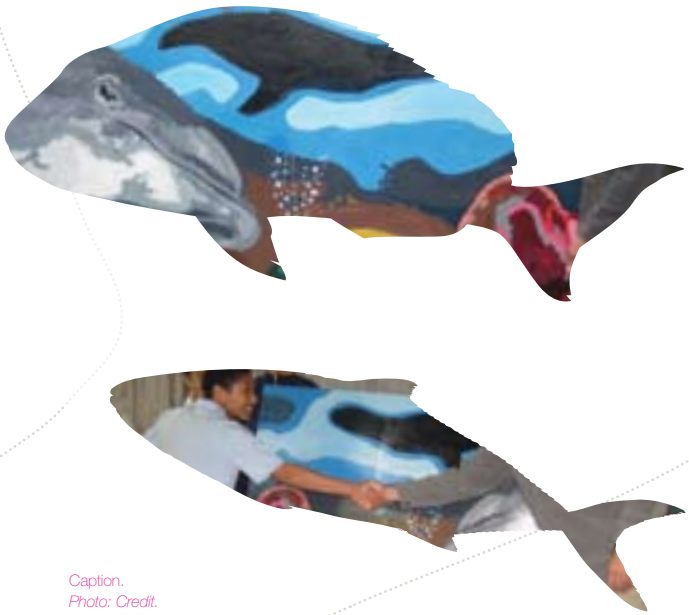
Authors have also advocated the power of oral narratives (compared with stories in books) for connecting children to nature[27]. Oral stories can involve the listeners and reach them emotionally more than written stories as they can be 'participatory, situational, communal, intersubjective and physical'.[27,81,82]

Oral stories require active participation from the listener and speak to their imagination[27,85]:

> Not only do listeners use their ears to hear, but also their eyes to see storytellers' facial expression and props being used. Students use their minds to build up their own pictures and to make sense of what they are hearing. Storytelling allows students the space to imagine themselves as a part of the action and to build connections to their own experiences, connections that are an essential part of long-term memory.[80]

Oral story-telling can therefore be an effective tool to capture children's imagination and actively involve them in developing their connections to nature and their own 'sense of place':

> Stories join together the pieces of our experiences and the experiences of others in a way that gives order, significance and meaning to the chaos around us. What home is without its stories? Without stories, can there be a home?… Stories can be powerful things. They give shape to our reality.[79]



Caption.
Photo: Credit.
Opposite: Boy with crayfish.
Photo: Credit.

4. Conclusion

The Department of Conservation's National Education Strategy[7] emphasises the importance of connecting children and young people to nature; equipping them with a breadth and depth of understanding, and a solid basis of attitude and value from which they can make wise decisions and choices about conservation and natural resource use. This paper has outlined effective ways to encourage children and young people to connect to the natural world, developing their love for nature and a foundation for the development of responsible environmental behaviour.

There is general awareness and understanding that children need to have frequent, informal contact with the natural world in order to develop emotional connections to places. In conservation education programmes there are a number of key principles that can enhance and promote the effectiveness of this contact between children and nature. For example: focusing on the local environment; involving families, friends and communities; providing opportunities to socialise and have fun; encouraging child-initiated, open-ended, inquiry-based learning; and being age appropriate (matching children's ability to understand and explore the world).

Creative arts education (e.g. drama, visual arts, story-telling) is also a key tool that can be used as part of conservation education to deepen the emotional and imaginative connections between children and nature. Creative approaches focus on active processes of engagement; direct experiences and 'play'; collective interaction; engaging all senses; and encouraging reflection and critical thinking.

It is therefore important that any education programme to help young people participate in their world as critical, informed and responsible citizens, incorporates best practice principles. It is also vital that these programmes have at their centre a sense of exploration, discovery and fun.

'There is general awareness and understanding that children need to have frequent, informal contact with the natural world in order to develop emotional connections to places.'

References

1. Kriesberg, D. 1999: *A sense of place*. Teacher Ideas Press, Englewood CO.

2. White, R; Stoecklin, V.L. 2008: Nurturing children's biophilia: developing appropriate environmental education for young children. White Hutchinson Leisure & Learning Group. www.live-learn.org/resources/teachers/A_Sense_of_Place_Conference/Biophilia.pdf. (Viewed 5 January 2011.)

3. Cimino, A. 2005: The gap between environmental values and conservation behaviours. www.leapfrogco.com. writingsamps/gap.doc. (Viewed 4 May 2011.)

4. White, R. 2004: Young children's relationship with nature: Its importance to children's development and the earth's future. White Hutchinson Leisure & Learning Group.

5. Arnold, H.E.; Cohen, F.G.; Warner, A. 2009: Youth and environmental action: perspectives of young environmental leaders on their formative influences. *The Journal of Environmental Education,* 40(3): 27–36.

6. Chawla, L. 2006: Learning to love the natural world enough to protect it. Barn, 2: 57–78.

7. Department of Conservation, 2011: *Investing in Conservation Education for a Sustainable and Prosperous Future. Tai Ao—Tai Awatea National Education Strategy 2010–2030.*

8. Carson, R. 1998: The sense of wonder. Harper Collins, New York.

9. Sobel, D. 2008: Childhood and nature. Stenhouse Publishers, Maine.

10. White Hutchinson Leisure & Learning Group. Children's Learning Environment eNewsletter, Vol IX, No. t2, Summer 2010. www.whitehutchinson.com/news/learnenews/2010_summer. (Viewed 4 May 2011.)

11. Chawla,L. 1999: Life paths into effective environmental action. *The Journal of Environmental Education, 31*(1): 15–26.

12. Chawla, L. 2001: Putting young ideas into action. The relevance of growing up in cities to Local Agenda 21. *Local Environment 6:* 13–25.

13. Blanchet-Cohen, N. 2008: Taking a stance: child agency across the dimensions of early adolescents' environmental involvement. *Environmental Education Research, 14(3)*: 257–272.

14. Payne, P. 1999. The significance of experience in SLE research. *Environmental Education Research, 5:* 365–381.

15. Kola-Olusanya, A. 2005: Free-choice environmental education: understanding where children learn outside of school. *Environmental Education Research, 11(3):* 297–307.

16. Ballantyne, R.; Packer, J. 2009: Introducing a fifth pedagogy: experience-based strategies for facilitating learning in natural environments. *Environmental Education Research, 15(2):* 243–262.

17. Athman, J.; Monroe, M.C. 2001: Elements of Effective Environmental Education Programs. In A. Fedler (Ed.). *Defining Best Practices in Boating, Fishing, and Stewardship Education.* Washington DC: Recreational Boating and Fishing Foundation, pp. 37–48.

18. Chawla, L.; Cushing, D.F. 2007: Education for strategic environmental behaviour. *Environmental Education Research, 13(4):* 437–452.

19. Anderson, D. 2009: *Harakeke: Enhancing Maori student engagement and achievement in a mainstream primary school.* Master of Education thesis, University of Waikato, Hamilton.

20. Gorinski, R. And C. Fraser, 2006: *Literature review on the effective engagement of Pasifika parents and communities in education.* Ministry of Education, Wellington, p. 1.

21. Monroe, M.C. 2003: Two avenues for encouraging conservation behaviours. *Human Ecology Review, 10(2):* 113–125.

22. Children and Nature Network, undated: *Nature Clubs for Families Toolkit.* www.childrenandnature.org. (Viewed 4 May 2011.)

23. Bishop, R. And T. Glynn, 1999: *Culture counts: Changing power relations in education.* Dunmore Press, Palmerston North.

24. Ballantyne, R.; Connell, S.; Fien, J. 2006: Student as catalysts of environmental change: a framework for researching intergenerational influence through environmental education. *Environmental Education Research, 12(3–4):* 413–427.

25. Pancer, S.M.; Pratt, M.W. 1999: Social and family determinants of community service involvement in Canadian youth. In M. Yates and J. Youniss (Eds.). *Community service and civic engagement in youth: international perspectives.* Cambridge University Press, Cambridge.

26. Gurevitz, R. 2000. Affective approaches to environmental education: going beyond the imagined worlds of childhood? *Ethics, Place and Environment 3(3):* 253–268.

27. Blizard, C.R.; Schuster, R.M. 2007: Fostering children's connections to natural places through cultural and natural history storytelling. *Children, Youth and Environments, 17(4):* 171–206.

28. Children and Nature Network, 2010: *Natural Leaders Network Tool Kit.* www.naturalleaders.org. (Viewed 4 May 2011.)

29. Ballantyne, R; Packer, J. 2006: Promoting learning for sustainability: principals' perceptions of the role of outdoor and environmental education centres. *Australian Journal of Environmental education, 21:* 89–100.

30. Falk, J.H. 2005: Free-choice environmental learning: framing the discussion. *Environmental Education Research, 11(3):* 265–280.

31. Palmberg, I.E.; Kuru, J. 2002: Outdoor activities as a basis for environmental responsibility. *Journal of Environmental Education, 31(4):* 32–36.

32. Barrat Hacking, E.; Barratt, R.; Scott, W. 2007: Engaging children: research issues around participation and environmental learning. *Environmental Education Research, 13(4):* 529–544.

33. Hungerford, H.R.; Volk, T. 1990: Changing learner behaviour through environmental education. *Journal of Environmental Education, 21(3):* 8–21.

34. Eames, C.; Law, B.; Barker, M.; Illes, H.; McKenzie, J.; Williams, P.; Wilson-Hill, F.; Patterson, R.; Rolleston, N.; Carroll, C.; Chaytor, M.; Mills, T.; Wright, A. (undated): *Teaching for action in the environment: some research outcomes.*

35. Bolstad, R. 2003: Environmental education: roots in the past, visions in the future, opportunities in the present. *Research information for teachers. New Zealand Council for Educational Research, 3:* 10–14.

36. Breiting, S.; Morgensen, F. 1999: Action competence and environmental education. *Cambridge Journal of Education, 29(3):* 349–353.

37. Jensen, B.B.; Schnack, K. 1997: The action competence approach in environmental education. *Environmental education Research, 3(2):* 163–179.

38. Sivek, D.; Hungerford, H. 1990: Predictors of responsible environmental behaviour in members of three Wisconsin conservation organisations. The *Journal of Environmental Education, 21(2):* 35–40.

39. Hwang; Kim, Y.S.; Jeng, J. 2000: Examining the casual relationships among selected antecedents of responsible environmental behaviour. *Journal of Environmental Education, 31(4):* 19–25.

40. Schusler, T.M.; Krasny, M.E.; Peters, S.J.; Decker, D.J. 2009: Developing citizens and communities through youth environmental action. *Environmental Education Research.*

41. Tilbury, D.; Coleman, V.; Garlick, D. 2005: *A national review of environmental education and its contribution to sustainability in Australia: school education.* Australian Research Institute in Education for Sustainability, Department of the Environment, Water, Heritage and the Arts, Australia.

42. Gardner, G.T.; Stern, P.C. 2002: *Environmental problems and human behaviour.* Pearson Custom Publishing, Boston.

43. Bandura, A. 1997: *Self-efficacy: the exercise of control.* W.H. Freeman, New York.

44. Sobel, D. 1996: *Beyond Ecophobia: Reclaiming the Heart in Nature Education.* The Orion Society and the Myrin Institute, Great Barrington, MA.

45. Olwig, K.R. 1989: The childhood deconstruction of nature. *Children's Environments Quarterly, 6(1):* 19–25.

46. Kellert, S.R. 2005: *Building for life.* Island Press, Washington.

47. Kellert, S.R. 1996: *The value of life: biological diversity and human society.* Island Press, Washington DC.

48. Knapp, D.; Benton, G.M. 2006: Episodic and semantic memories of a residential environmental education programme. *Environmental Education Research, 12(2):* 165–177.

49. Wells, N.M.; Lekies, K.S. 2006: Nature and the life course: pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environment, 16(1):* 1–24.

50. Bolstad, R. 2005: Environmental education: a place in the curriculum? *New Zealand Annual Review of Education, 14:* 215–235

51. Hawkes, J. 2001: *The fourth pillar of sustainability: Culture's essential role in public planning.* Common Ground and the Cultural Development Network, Melbourne.

52. Adcock, L.; Ballantyne, R. 2007: Drama as a tool in interpretation: practitioner perceptions of its strengths and limitations. *Australian Journal of Environmental Education, 23:* 31–44.

53. Kollmus, A; Agyeman, J. 2002: Mind the gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research, 8:* 239–260.

54. Snow, J. 1991: A circle in the trees: Using art as a way to connect to nature. *Children's Environments Quarterly, 8(2):* 38–41.

55. Ramsey, D. 2002: The role of music in environmental education: lessons from the cod fishery crisis and the dust bowl days. *Canadian Journal of Environmental Education, 7(1):* 183–198.

56. Mo Bahk, C. 2011: Environmental education through narrative films: impact of Medicine Man on attitudes toward forest preservation. *The Journal of Environmental Education, 42(1):* 1–13.

57. McArdle, K. 2009: Applying the arts to MPA planning and management: four examples. MPA News, September–October 2009, 3–5.

58. Dungey, J, 1989: Where arts, imagination and environment meet. In D. Uzzell (Ed.). *Heritage interpretation Vol 1. The natural and built environment.* Belhaven Press, London, 229–231.

59. Hoogland, C. 2003: The land inside coyote: reconceptualising human relationships to place through drama. In K. Gallagher and D. Booth (Eds.). *How theatre educates. Convergences and counterpoints.* University of Toronto Press, Toronto.

60. Gale, H. 2008: How does drama work in environmental education? *Earth & Environment 3:* 159–178.

61. Caddy in Campbell, J. 2011: *Eco art education notes draft.* Carbonpartnership, Tasman.

62. Adams, E. 1991: Back to basics: aesthetic experience. *Children's Environments Quarterly, 8(2):* 19–29.

63. Soetaert, R.; Top, L.; Eeckhout, B. 1996: Art and literature in environmental education: two research projects. *Environmental Education Research, 2(1):* 63–70.

64. Palmer, J.A. 1993: Development of concern for the environment and formative experiences of educators. *Journal of Environmental Education, 24(3):* 26–30.

65. Palmer, J.A.; Corcoran, P.B.; Suggate, J. 1996: Formative experiences of environmental educators: overview and comparison of empirical research in two nations. *Environmental Education, 52(3):* 5–8.

66. Chawla, L. 1998: Significant life experiences revisited: A review of research on sources of environmental sensitivity. *The Journal of Environmental Education 29(3):* 11–21.

67. Inwood, H.J. 2008: At the crossroads: situating place-based art education. *Canadian Journal of Environmental Education, 13(1):* 86–97.

68. Pascoe, R. 1998: The language of drama: Making and communicating meaning. In More than words can say: *A view of literacy through the arts* (pp. 43–45). Australian Centre for Arts Education, Canberra.

69. Epskamp, K. 1992: *Learning by performing arts: From indigenous to endogenous cultural development.* Centre for the Study of Education in Developing Countries, The Hague.

70. McNaughton, M.J. 2004. Educational drama in the teaching of education for sustainability. *Environmental Education Research 10(2):* 139–155.

71. Appleby, E. 2005: Mrs Blue Gum, some puppets and a remnant forest: Towards sustainability education through drama pedagogy. *Australian Journal of Environmental Education,* 21: 1–10.

72. Bicknell, S. 1994: Enlightening or embarrassing? Drama in the Science Museum, London UK. *Visitor Studies: Theory, Research and Practice 1993.* Conference proceedings, Centre for Social Design, Jacksonville.

73. O'Neill, C. 1995: Foreword. In D. Heathcote and G. Bolton (Eds.). *Drama for learning: Dorothy Heathcote's Mantle of the Expert Approach to Education.* Heinemann, Portsmouth.

74. Watkins, B. 1983: Drama as game. C. Day and J. Norman (Eds.). *Issues in Educational Drama.* Falmer Press, London, 35–47.

75. Inwood, H. 2010: Shades of green: Growing environmentalism through art education. *Art Education, Nov 2010,* 33–38.

76. Campbell, J. 2011: *Eco art education notes draft.* Carbon Partnership, Tasman.

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

78. Bergman, I. 1999/2000: How to grasp environmental complexities? *Photographic narratives and environmental concept formation. Australian Journal of Environmental Education, 15/16.*

79. Lutts, R.H. 1985: Place, home and story in environmental education. *The Journal of Environmental Education, 17(1):* 37–41.

80. Wirth, D.M.; Gamon, J.A. 1999: The art of situated narrative: a tool to teach environmental ethics. *Journal of Vocational Education Research, 24(1):* 45–60.

81. Sandlos, J. 1998: The stories curriculum: oral narrative, ethics and environmental education. *The Journal of Environmental Education, 30(1):* 5–9.

82. Sanger, M. 1997: Sense of place and education. The Journal of Environmental Education, 29(1): 4–8.

83. Basso, K. 1996: Wisdom Sits in Places: *Landscape and language among the Western Apache.* University of New Mexico press, Albuquerque.

84. Sheridan, J. 1995: The authenticity of story. *He Trumpeter: Journal of Ecosophy, 12:* 160–163.

85. Strauss, S. 1996: *The Passionate Fact: Storytelling in Natural History and Cultural Interpretation.* Fulcrum, Golden CO.

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