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Childrens' Conceptions of Nature

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A B S T R A C T

This paper describes a study of sixth grade children's conceptions of nature and the environment. In so doing, it asks that environmental educators pay more attention to children's preconceived notions of environment and nature. Should this occur the theory-practice gap in environmental education may be diminished. Learners' concepts of 'nature' and the 'environment' provide a needed perspective for the development of individually and contextually appropriate teaching and learning strategies in environmental education. Without knowledge of them it is not clear whose version of environment it is which the learner is being educated 'in', 'about', 'with' or 'for'.

When environmental educators talk about education 'in', 'about', 'with' or 'for' the environment they rarely state what they mean by the term 'environment'. All too often its meaning is taken for granted. In fact the term 'environment', and a 'nature' implied by it, has a wide variety of meanings, thus pointing to the more difficult question of what version of 'environment' or 'nature' learners are being educated in, about, with or for.

'Nature is often viewed as external'

Environmental educators would do well to consider learners' views about 'nature' and the 'environment'. While educators invariably have good intentions, sometimes their educational objectives are at odds with the socialized or cultural backgrounds of the children they teach. For example, a 'wilderness' camp may be of little 'environmental' importance, practical significance, intellectual interest and educational relevance to many inner city children who regularly drink 'smelly' water, eat 'fast' food or sleep in dank, musty bedrooms. All of *these* issues are 'natural' problems to those children. Without an adequate understanding of the ways in which learners experience their environments, develop understandings of nature, and feel about it and its 'values' teachers may find themselves promoting a view, or experience of nature that has a lot, little or nothing to do with children's daily living circumstances.

Furthermore, the political nature of environmental education identifies the risks teachers take in emphasizing a particular version of the environment or nature. For example, the preposition 'for' has created concern amongst some educational liberals about its potential to be socially coercive in relation to the subject of 'the environment' (Jickling & Spork 1998).

This paper reports a study of sixth grade childrens' conceptions of nature and has two aims. First, it describes children's conceptions of nature and the environment as they might be influenced by the social, historical and geographical 'contexts' of their lives. Second, and of specific relevance to teachers, it highlights how a 'philosophical' approach to teaching and learning can be used to gain insights into children's views about their environments and nature. Such teaching-as-research takes seriously the views of children as they are influenced by the contexts in which they live—a crucial need in environmental education research.

'Nature' and 'environment' are loaded terms. The variety of ways in which these terms are used highlights the dilemmas outlined above. Nature is often viewed as external, a material/physical environment that exists 'out there' to be studied scientifically, experienced practically or 'saved' morally, socially and politically. This external version of nature tends to emphasize 'natures' that hold to a presumption of 'natural' versus 'artificial'—such as a lake or wilderness versus a dam or polluted beach. Urban, domestic and self-environments are obscured; human 'nature' as yet another version of environment is discarded. Some, however, view nature as internal, that 'healthy individual' or human 'being' whose authentic existence is worth protecting. Others view nature as that spiritual quality of an 'ecological consciousness', a transcendental state deemed necessary to overcome the materially consumptive sources of the 'ecological crisis' In this 'new age' view of nature, a different way of 'knowing the environment' is needed to counter the despoliation of inner and outer natures, thus ushering in the paradigm shift for selves and communities required for an ecologically sustainable future.

More specifically, these commonly used metaphors of nature highlight why disagreements occur between environmental educators and between teachers, students and parents. Nature can be characterized in many ways such as a sanctuary, quarry, cathedral, gymnasium, laboratory, archive, woman, spaceship, escape, zoo, resource, lifeboat, 'other', sublime, wild, frontier, conquered, place, home, property. The conflicts potentially emerging from these different metaphorical understandings are well summarized in Holmes Rolston 111's (1985) typology of wildland values and taxonomy of human-meaning values.

'there are risks in imposing a view of nature,

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'there are risks in imposing a view of nature, consciously or unconsciously, on children'

The diversity of theoretical positions and values that teachers might hold about nature, wildlands and environments points to the problem of an environmental educator assuming too much or too little about learners' historically or culturally conditioned views of the environment. Similarly, there are risks in imposing a view of nature, consciously or unconsciously, on children. For the educational purposes of grappling with the possible uncertainties, confusions and contradictions of a simple idea like 'environment', this report only describes a small sample of children's conceptions of nature and the environment. The paper does not explain how children such as those in the study are socialized into, and socially construct, understandings of nature and of their environments. On these interrelated matters further research is required.

Assumptions, background and format

The study examined sixth grade childrens' conceptions of nature and their constructed meanings of the people-environment or culture-nature interfaces. These conceptions were revealed in a 'Philosophy for children' program devised and taught by the researcher in an urban primary school in a major regional centre. The study was mainly descriptive of childrens' conceptions, and emerged from assumptions including those briefly discussed below.

There is a lack of consideration in environmental education theory and research practices about the children who are the subjects of environmental education. There is a need for teachers and curriculum designers to pay much more attention to the routines, patterns and rhythms of children's daily lives—their individual and collective ontology requires explanation, or study of what it is for them 'to be in the world' Learners already have a rich working knowledge of the social and environmental circumstances and living patterns in which they find themselves, including concepts like 'nature' or 'the environment' which are so central to environmental education.

Children's 'human being and living' in environments are multiple, diverse and dispersed and less unifying. Children have had significant life experiences, embody family values, and act and interact according to certain habits, local customs and social expectations that reflect various cultural conventions, social arrangements and environmental conditions. Furthermore, children's immediate participation in local traditions of family life, places, schooling and culture is now being reshaped by broader globalizing trends and socio-economic issues of which the technological transformation of daily life is a central concern. That is, direct experiences of family, friends, colleagues and 'others', understandings and appreciations of local places, spaces and community, and understanding of immediate time is now being 'disembedded' by broader contemporary developments. In many cultures higher technologies like CD-ROMs and the Internet now mediate life in the home and at school. Other environments and natures cannot escape. Children now experience unknown people, virtual images or abstract events on the other side of the globe in cultural settings, socio-environmental conditions and time frameworks utterly different from their own.

'childrens' lives are hardly 'natural' any more'

With particular relevance to this study was the recognition, therefore, that childrens' lives are hardly 'natural' any more. Naturalness is increasingly reformed by the abstracted images and information they obtain second hand from afar. Many children 'know' more about the Suzuki or Bellamy version of the Antarctic wilderness than their own backyard! Natures, inner and outer, become problematic in their own right, reinforcing the need for educators and researchers to re-examine their assumptions about 'the' environment and where learners are 'coming from' in the present society.

If this view of contemporary living is correct, even young children should be viewed as uncertain, confused and contradictory carriers of various moral, social, political and ecological perceptions, views, beliefs, attitudes and values. In this paper children are presumed, as carriers of a range of complex, often competing beliefs, values and ontological dispositions, also to be active agents whose actions have known and unknown consequences for the environment.

Further, the paper presumes that children's self-understandings, identity formation and conceptions of environment/nature are caught somewhere in between these locally embedding and globally disembedding circumstances. Until environmental educators and researchers give clear expression to what is entailed in being a present-day learner in environmental education, there is a probability that the range of academic- and teacher-driven curriculum theories of environmental education will be relatively ineffective in terms of learner needs, interests and understandings.

Problem and method

One way to grapple with the challenges to the effectiveness and relevance of environmental education posed above is to describe and explain children's conceptions of nature. Educational 'interventions' might then be better planned.

'Philosophy for children' was conducted for half an hour on Friday afternoons over a five month period with nine girls and five boys in a grade six class of 28 students. Philosophy might appear to be an unusual research method for obtaining from children their views about nature and the environment. However, competent constructivist teachers frequently involve their students in 'philosophising'. In this research context, philosophy was an informal questioning

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process about practical interests and issues confronting children in their daily lives. Philosophy also involved a form of 'challenging', where children were asked to think about and explain ideas that, for this researcher-as-teacher, amount to the 'stuff' of person-environment or culture-nature relations. This challenging, reflective but unobtrusive method of philosophical inquiry asserted that there were no right or wrong contributions and solutions. Moreover, the experiences provided an 'objective' opportunity to pursue some individual and social wisdom through personal reflection, discussion with peers, and re-engagement with initial reflections.

The use of philosophy for collecting data presumed a basic inadequacy of formal research methods with children. It relied primarily on childrens' verbal statements, anecdotal comments, written responses and illustrations. The participant-researcher was 'teacher' and philosophical guide or provocateur. Data collected included: after class recording or paraphrasing of comments about a topic made during a session; student writing about newspaper cartoons selected to elicit individual conceptions and group constructions of 'nature' and 'nature-culture'; other written statements that responded to the researcher's requests for elaboration of an earlier written comment; and childrens' illustrations about scenes that mixed natural and human characteristics. One limitation, if it can be called that, of the research was the evident unfamiliarity of children with verbally, textually and artistically revealing their views about nature and their multiple sources of construction of these views—as seen in the unsophisticated way in which they did so.

This research is preliminary with findings presented here in a manner that, first, remains true to childrens' conceptions of nature as interpreted through the use of the multiple data collection methods outlined above and, second, is speculative in its limited theorizing about childrens' conceptions.

Conceptions of nature

Most children conceived nature as living and non-living things existing naturally in the external environment. One included humans in his concept of nature. Minimal human influence, interference or effect was identified as a primary characteristic of natural nature. Some provided ecological insights, acknowledging growth and change in nature but their emphasis on the naturalness of nature indicated a belief that external nature was a relatively static entity—temporally and spatially. Most students did not include a value orientation to their initial conception of nature. Some tended to be instrumental in a spiritual or ethereal manner; one felt nature was godly.

> *Nature is a place with clouds, trees, grass, shrubs and many other things which are very peaceful. Nature is quiet. (Bianca)*

> *Nature is something natural, like a plant, something that was probably made by God, something that is always there. Nature is always there or has grown there—like grass or a tree. Nature does change, an example is how trees get bigger or an animal gets older. (Shawn)*

> *Nature is something that has not been touched or harmed by humans. A simple thing such as a leaf or something as complicated as a flower could be nature. Nature has been created by itself, not a human or something cared for by humans. Nature doesn't always have to come from the bush or from forests. It could come from your own backyard, such as a weed. Humans don't encourage it or help it grow, instead they pull it out but before they do it would have been nature. Nature is something that has not been encouraged, touched or harmed by humans. (April)*

When April was asked if nature is also a koala in a zoo, or if it was natural for humans to pull weeds, she responded:

> *The koala has been harmed by humans, it's no longer natural. I don't know what you mean by pulling weeds out but leaves at the top of a tree have not been touched or harmed by anyone so the leaves are still nature.*

Adam's views were similar to April's but placed more stress on nature as dynamic or cyclical.

> *Nature is when trees form from the ground and chickens from the egg. Nature is when leaves fall to the ground and rot.*

Adam's nature did not include the rotting of a tree after it had been cut down by humans.

Renee's concept of nature included an ecological dimension.

> *Nature is plants and animals bonding together to become a beautiful substance.*

David's concept of nature was the only one that conceded an 'unnatural' component of nature.

> *I think that nature is the animals, trees, us and I also think that somethings that we made can go back and be a part of nature again. A good example is a pier. Piers have been made out of timber. When the supports are put in , things like shell fish grow on them and feed the fish. One bad example is the millions of dust mites that lived in our portable classroom last year.*

It was clear to David that humans were part of nature.

> *Animals and trees are nature. I think we are nature because we are meant to have evolved from apes.*

Amy did not conceptualise nature; rather she provided a strong normative assertion.

> *I think nature is something for us to look after. Nature is rare and special.*

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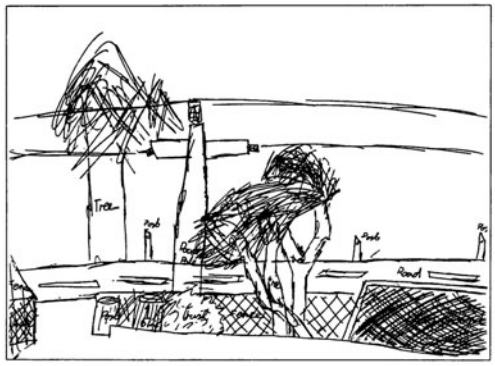
Conceptions of the local environment

Approaches

First, children illustrated a scene while sitting in different parts of the schoolyard selected by the researcher because its panoramic view included natural entities and human-made objects; see, for example, the illustrations in Figure 1. The purpose of this exercise was to consider any continuities or discontinuities with individual conceptions of 'nature' and 'environment'. Following the completion of the drawing children were asked to list any things they had deliberately left out of their drawing. Second, follow up homework included a short writing exercise to describe a 'good' and 'bad' environment in close proximity to their house. The intention of this latter exercise was to glean value orientations and judgements about various characteristics of a highly localized 'place'.

Illustrations

Figure 1. Children's illustrations





Only one of the class believed that the terms 'nature' and 'environment' had different meanings. Contrary to the naturalness of nature preferred in their prior conceptualization of nature, about half of the group now included human-made objects such as fences, basketball rings, sheds and power lines in their illustrations of the 'environment' Shawn, previously a strong advocate of nature as natural, did not exclude anything from his illustration, thus suggesting confusion or uncertainty about the characteristics of nature. The inclusion of constucted objects in the illustrations of 'environment' appear to be arbitrary. For example, although Bianca drew a house and basketball ring she deliberately excluded bicycles, bins, fences and gates. Amy included power lines and sheds but excluded bricks because 'Thomas was sitting on them'. Amy did not include Thomas in her illustration. Rebecca also excluded people from her illustration. Three respondents categorically stated that nothing was excluded from the environment. Of the other half of the group whose illustrations only included natural objects, all consciously excluded people and various facilities constructed for human use. Samples are shown in Figure 1 above.

'concepts of nature and environment were not fully developed'

Children's concepts of nature and environment showed some ambivalence. About half consistently viewed nature as natural with the majority excluding humans, their artifacts, and objects whose value resided in their use to humans. The other half initially viewed nature as natural, but later included various human-made objects in their conceptions of the environment which were claimed to be no different to nature. The most plausible explanation for this apparent contradiction is that the concepts of nature and environment were not fully developed despite cognitive leanings to, or constructed preferences for, the naturalness of nature. Further research into the changing nature of conceptions and constructions of nature and environment is required.

Writing exercise

When asked to write a story describing a 'good' environment at or near where children lived two 'places' were preferred and valued for their recreational opportunities. Most children agreed that One Tree Hill was good primarily because of the abundance of natural features like bush, trees, and animals and because it afforded recreation and solitude. A number of children believed the environment was good because they could go for walks with their pet. One Tree Hill is a regenerating area about 10–15 minutes walk from the school and most childrens' homes. In fact, the flora and fauna of the One Tree Hill Reserve is reputed to be under threat from the childrens' very own living circumstances—the encroachment of housing around the base of the Reserve with pets having a negative effect on the local fauna.

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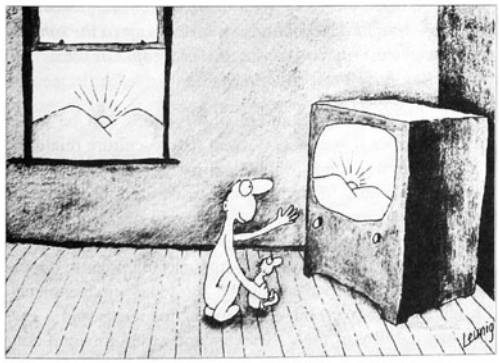
A smaller number of children agreed that a bike track running along a creek bed provided for recreation and relaxation because it was very close to school and had lots of trees and birds. Both groups valuings of 'good' was premised on the absence of litter, pollution and noise. Only one child identified a specific site as a good environment. She had a favourite tree that always smelt good or provided escape and relaxation from fights at home, even if it was very close to one of the area's busiest roads.

Ideas about 'bad' environments were brief and covered a wider spectrum of places and their characteristics. Some felt the bike track was bad primarily because there was evidence of litter, dumping of clothes and other unwanted household items and noise. One believed it was bad because he felt he was being observed constantly. Others disliked the roads because of pollution and noise. In individual cases there were negative evaluations of a local pony club, a messy neighbour's house and yard, and a drain that entered the creek next to the bike path. Bad odours, ugliness, lack of safety for children, and use by undesirable people provided for negative valuings of these specific places.

Conceptions and constructions of person-environment and culture-nature relations

Two cartoon illustrations were distributed on separate occasions to children. On both counts children responded to the question of what meaning did the illustration create in their minds or what personal message did they receive. No other prompts were offered. Children were directed not to discuss these personal messages—or 'meanings'—until after they had completed their writing. Personal meanings were then shared via class discussions, followed by an opportunity to add any new 'social' meanings to the personal responses.

Figure 2. Cartoon illustration A



'Sunrise on TV'

Micheal Leunig/*The Age*. Reproduced with permission.

April's response to Figure 2 indicated a preference for direct experience of natural nature.

> *People don't have to watch tv, they can look out of the window because its the same thing...people would rather use technology than something that is natural.*

To which she added after the class discussion:

> *Everything at one time has been natural, everything somehow has come from nature.*

Shawn remained preoccupied with the naturalness of nature, which now unknowingly included people. He explained and then added:

> *That's how people are naturally...people spend a lot of time watching tv when they could go and see it outside.*

In contrast, Bianca, the two Renees and Amy observed:

> *The background out the window is the same on tv. (Bianca)*

> *Live tv is so good.....and people bring up their own children to do the same thing because they spend a lot of their lives watching tv. (Renee)*

> *The kid is new born and the big thing is showing the little thing the sun rising on the stone age tv. (Renee L)*

> *People are brought up to be like their mums and dads. (Amy)*

To which they added respectively:

> *You can go out and live out life instead of watching tv and you just see the same thing. (Bianca)*

> *They can go outside and live their lives and see the same thing. (Renee)*

> *...modern times are different to older times. You don't need tv because it is virtually the same as what you see in everyday life. (Renee L)*

> *People spend all their time watching tv when the same thing happens outside. (Amy)*

Rebecca and Jaylene agreed 'they don't have to go outside'. David added:

> *Tv can do almost anything...but it's crazy to show your children images on tv when one day you can show them the real thing in nature.*

Daniel concluded:

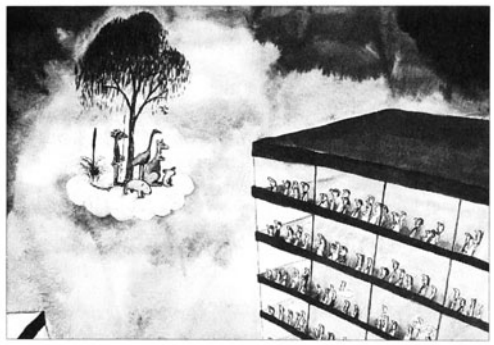
> *There's life in everything, in the tv, in the house and outside...some people are less fortunate than others so be grateful.*

For the most part children focussed on the non naturalness of technology and, to varying degrees, how it was a poor substitute for natural nature. Nevertheless, one tentative

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conclusion that can be suggested is that some children saw parents as reproducing the cultural role of technology that they somehow feel needs contesting. These tentative conclusions were endorsed by the responses to Figure 3 which more earnestly, but ambiguously, depicts the historical culture-nature question as Australians might understand it.

Figure 3. Cartoon illustration B



'Koorie spirituality/Western materialism

Micheal Leunig/*The Age*. Reproduced with permission.

Not surprisingly, the meanings derived from Figure 3 varied considerably amongst individuals. Bianca felt 'our' lifestyle was taking over. She added:

> *We are building so many buildings and one day all the animals are going to be dead and we are not going to notice.*

Shawn's preoccupation with the natural and unnatural exposed a strong value orientation.

> *Once people used to be like the man in the clouds with the animals. We were natural and didn't have anything wrong with us. But now we live in cities which aren't natural, with polluted air and rubbish lying on the streets.*

Less philosophical, but equally compelling was April's description.

> *In the past there was a beautiful forest full of animals, birds and native people in it until a few people came along and built a great city. All the people and animals were terrified with these changes and so they drifted off in a cloud to try and find somewhere else to live. All the people in the big building were staring and wondering why they were leaving.*

Equally potent, perhaps for its innocence, was Adam's response.

> *People on the cloud died and in the storm they came to live in the wrong place and the people are looking at them.*

The two Renees tended to see natural nature as a relic of the past.

> *The people in the apartment building are looking at some people in the clouds from the caveman days, thinking what on earth they are. (Renee T)*

> *Aboriginals...are a thing of the past because skyscrapers and factories have taken over...there is no room for the animals so they are on the cloud of the past too. (Renee L)*

Amy felt that all the animals, trees and people who once lived in the bush had become extinct. The only place they had to go was to the clouds. Daniel believed that buildings were a replacement for the things that used to be there while Thomas argued that the people in the office were looking up at what they had destroyed. Crystal focussed on the differences between Aborigines and "Aussies", in particular the clothes the "white" people were wearing, and the absence of weapons.

David's conclusion captured a sense of resignation to the inevitable.

> *It is about the people of the future looking at the past. Everything is industrialized and the cloud is the last natural thing left. The people are looking at the cloud as if to say 'such was life'.*

Again, Amy exhibited a strong value orientation and sense of urgency in writing:

> *If we don't save the trees and animals soon there won't be any. And in the long term we will be the ones that suffer.*

Jaylene somewhat romantically concentrated on the influence of technology and centrality of work.

> *The animals and the aborigines are happy just the way they are, they don't need any great technology and they don't have to work or breath in bad fumes. The people in the building are looking up to the others and most of them look sad. The people in the building have to work to live.*

In general, a few preliminary observations can be made about the preceding conceptions of nature-culture relations. First, children tended to associate indigenous people with nature or a natural lifestyle. Anglo-Australian lifestyle was associated negatively with nature because of the despoiling effect of the non-natural, built environment and technology, and positively with the recreational and therapeutic opportunities afforded instrumentally by local environments. Children's constructions of relationships suggested a certain inevitability of their lifestyles and environmental consequences. There was a sense of a romanticisation of the nature lived in naturally by indigenous peoples and a 'longing' for pure environments. A sense of resignation to the negative consequences of cultural determinism was discernible, but warrants further investigation.

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Findings, discussion and some further research questions about the 'nature' of environmental education

Despite the exploratory nature of this research a number of preliminary conclusions, implications for teaching and recommendations for further study can be drawn. These sixth grade children generally subscribed to a version of nature that was 'external' and 'natural' in a 'pure' and 'romantic/idealistic' sense. Childrens' apparent preference for an absolute 'essence' of nature intrigued this researcher in that it seems to contradict their own, direct experiences of a local environment as nature modified or transformed. Clearly, the natural local environment conceived of as 'natural' by children was a relative one; raw nature consistently experienced, preferred and valued would convey a misunderstanding of their predominant experiences of nature, despite their preference and positive valuings of a 'natural' nature. Teachers might explore with children, conceptually and experientially, the 'ideal' of the natural environment and how it is modified in practice by personal, social and cultural realities.

'childrens' experiences of nature.....were derived, ironically, from recreational and therapeutic involvements'

In this study, childrens' experiences of nature and valuings of it as natural were derived, ironically, from recreational and therapeutic involvements—both instrumental, or anthropocentric, reasons. Perhaps this failure to recognize instrumental reason in person-environment relations, even if relatively benign as for recreational purposes, while proclaiming nature as naturally intact is at the root of many of the predicaments teachers face. Despite their lived experiences of a modified but relatively natural nature, how and why young children might continue to conceive or perceive of nature as pure or natural in the face of their own use demands further inquiry. One possibility is the influential role of nature documentaries on television, where nature is typically 'imaged' by technologies as pristine, sublime and relatively untouched by human and cultural interventions.

Most children felt 'nature' and 'environment' were the same. Some important questions arise for the field of environmental education, particularly if this finding were replicated across a range of studies. Children participating in environmental education might expect a 'nature' education that stresses the naturalness of nature or environment. If so, the prioritisation and valorisation of a 'natural' and 'external' version of nature immediately reduces the range of 'environments' available for study 'in', 'about', 'with' or 'for'. This reduction of environments would be of concern to those environmental and social educators concerned about the person-environment, culture-nature relationships. Those relationships are brought into sharp focus by taking account of where inner urban children are coming from—those more immediate personal environments such as human 'nature' and 'being' that speak more emphatically to 'cleaning up your own backyard' or neighbourhood before attending to the more exotic and often seductive 'saving the wilderness'.

Some individual's conceptions of 'nature' and 'environment' did vary slightly with regard to the quality of naturalness.The reasoning behind this requires further research noting that any individual or cohort discrepancies indicate that conceptualisations of the terms are not totally settled in favour of the 'external' and 'raw' essence preferred and subsequently valued.

Children appeared also to relate environment to place, as an area known or experienced, primarily in a physical, spatial or geographical manner. 'Place' is an increasingly popular concept in environmental circles. If the term continues to be popularised, educators must ask whether or not it will become just another convenient label, amenable to as many different meanings as those I have ascribed, for example, to the term 'environment'.

Apart from a few children, much sense of the temporality or historical dynamic of environments was absent, suggesting that the children in this study conceptualised place as a static 'nature' and an unchanging environment. Given the 11–12 year age of these children this is not surprising, even if some did discern detrimental changes to their local environments/places in the more recent past. This perceived and preferred sense of stasis for 'natural' and 'external' natures, environments and places further illuminates for environmental education the need for children to be exposed to the changing nature of their local environments, particularly those environments that indicate the consequences of their own actions. If correct, these observations point again to the question of how children conceive of nature and environment as both the same, and as pure.

With respect to constructions of person-environment and culture-nature relations a number of inconsistent, if not contradictory, findings can be pointed out. One interpretation of children's collapsing of historically modified environments with 'naturalness' is that either inadvertently or in ignorance, children excluded humans from the conceptualisation of nature as pure. Most children had constructed a largely negative view of the relationship of culture to nature irrespective of their already instrumental use of local environments. These contradictions point to the need for further inquiry into how children conceptually separate off humans, culture and self from the essence of a natural nature privileged, but instrumentalised. A related question would ask how individuals reconcile this apparent contradiction. Notably, there were some indications of a sense of resignation to the cultural dilution of 'nature' as natural.

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Like humans, technologies were presented as non-natural. Despite the imaging of nature in Figure 2, when children were confronted with a choice most believed technology to be a poor substitute for direct experience of natural nature. Yet, as already suggested, television and other technologies may contribute significantly to childrens' perceived sense of, positive valuings and need for a raw essence of nature.

The exclusion of humans from nature may explain why there was little nostalgia for the indigenous lifestyle depicted in Figure 3, but a romancing of the nature in which indigenous Australians once lived.

Conclusions

Conclusions can only be limited and speculative because of the assumptions outlined earlier. Most strikingly for environmental education, the apparent search by children for a raw essence of nature can be interpreted in a variety of ways, some of which might be in contradiction depending upon the ideological orientation of the teacher, the researcher or the curriculum definitions/imperatives. For example, nature conceived of as natural provides a cognitive, scientific or aesthetic benchmark, or standard, for assessing change to environments. It is reassuring. At another level, despoiled nature experienced by children as relatively untouched or unmodified disguises the effects, historical and immediate, of people and culture. Environmental educators need to remain alert to the fallibility of cognitive, aesthetic and experiential conceptions of nature.

'the idea that there can be an inner nature seems lost to the stress on outer or external nature'

Irrespective of the two extremes just mentioned there is cause for concern about the strong alignment of the term 'nature' with the physical characteristic and elevated quality of externalised naturalness. People, as are urban environments, are all too often excluded from 'nature'. In particular, the idea that there can be an inner nature seems lost to the stress on outer or external nature. Such a separation of person and environment, culture and nature endorses the Cartesian distancing of I and world, or self and lifeworld. In this scenario, nature is conceived in a highly selective and reductive manner. Individual and social accountability and responsibility for the environment/nature is jeopardised. In the broader scheme of environmental education, this reduction and probable dilution of accountability and responsibility devalues a range of 'inner' and 'outer' environments. A preoccupation with non-human 'naturalness' of nature in education 'in, about, with or for the environment' can orchestrate elite and irrelevant/non-practical purposes of environmental education, thus delegitimising its scope and undermining its broader purposes. There is a need for further research into the nature conceptions of a wide range of populations (children, teenagers, adults, aged, multicultural, gender) and settings (city, rural, remote).

Ontologically based explanations of children's living circumstances are required, as are ontologically-focussed educational interventions. Needed, for example, are comparative studies of how children 'socially construct nature' from the ground up but over and through time, place and space, in addition to inquiries into the roles played by teachers and curricula. Further research into how conceptions of nature and the environment are socially constructed would describe the home context and availability and frequency of access to influential 'time and place' resources, including play sites and family involvement in gardening, animal care and excursions to National Parks and so on. The development of individual profiles, or 'life histories' including significant life experiences, would be an important contribution into the related research problem of how times and places influence conceptions and values of nature.

Finally, in a technologically-replete 'postmodernity' more attention must be devoted to how technologies influence the 'space' of our understandings of selves, others and the environment. In particular, technologies like television, CD-ROMs, the world-wide web and so on conduct invisible 'work' on their users, including the virtual 'space' many children now increasingly occupy alongside the real-life dimensions of time and place. The 'withdrawal', 'non-neutrality', 'intentionality' and 'ambivalence' of technologies provide exciting theoretical constructs that might inform how nature, is 'designed' and construed in ordinary living contexts—morally, socially, politically and ecologically (Payne 1995, 1996 & 1997).

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