

QUT Digital Repository:
<http://eprints.qut.edu.au/>



Davis, Julie M. and Gibson, Megan L. (2006) Embracing complexity: Creating cultural change through education for sustainability. *International Journal of Knowledge, Culture and Change Management* 6(2):pp. 93-102.

© Copyright 2006 Julie M. Davis and Megan L. Gibson

Introduction

Campus Kindergarten is a long daycare centre that caters for children aged two and a half years to around six years, situated on the St Lucia campus of the University of Queensland in Brisbane, Australia. Each day around sixty-three children, from a wide range of language and cultural backgrounds and with many attending part time, are catered for. Overall, seventy-nine children across three age groups attend weekly. There are nineteen staff members of whom six are full time. The centre has an educational philosophy that is child-centred, holistic and futures-oriented, where rights, respect and trust permeate the culture and curriculum . In a practical sense, this means that the teachers seek to interweave into everyday practices, their care and concern for children along with concern and respect for the centre's natural and built environments. These qualities underpin all facets of Campus Kindergarten's organisation and culture, and are exemplified in its *Sustainable Planet Project*.

In 2004, an indepth qualitative study was undertaken at the centre building on an eight year informal research relationship between centre staff and two university-based researchers focussed on this project. The purpose of this study was to better understand the rationale and key processes underpinning the *Sustainable Planet Project* and to elucidate project achievements. This paper discusses what was found. Specifically, it does this by highlighting the significance of early childhood education for sustainability; by explaining the motivations – both local and global - that led to environmental sustainability becoming part of the centre's curriculum; by outlining how environmental issues/ topics are raised and acted upon by children, teachers and parents; and by theorising about how sustainability thinking and practices have become integrated into the cultural practices of the centre.

The importance and potential of early childhood education for sustainability

According to recent evidence from the field of neuroscience, early childhood is a pivitol growth period in an individual's life. Experiences during this phase significantly influence physical and neurological developments which drive

biological, psychological and social emotional responses throughout life . Neuroscientists have determined that there are critical periods in the growth and ‘wiring’ of the connections in the brain when the brain is learning faster than at any other times, the majority of these occurring prenatally and in the first six years of life (Mustard, 2000). The research has also confirmed that stimulating, positive, nurturing environments are important for healthy brain growth. Literally, brains change as a result of the experiences they live (Begley, 2002) and the influence of early environment on brain development is considered to be long-lasting (Joseph, 2002). While parents are the most critical ‘first teachers’ of young children, there are also powerful and lasting impacts attributed to experiences with caregivers and early educators. According to the Organisation for Economic Co-operation and Development (OECD) many children will spend at least two years in early education and care settings before beginning primary school (Organisation for Economic Co-operation and Development, 2001, p.13). In Australia, figures show that almost half of all children aged birth to six years access some form of childcare service with about thirty-seven percent of these attending long day care (Australian Institute of Health and Welfare, 2003). These services, therefore, in terms of the numbers of children using them and the length of time spent in them, are important influences shaping children’s lives.

Childcare centres, then, can be visualised as places where ‘children build their brains’ (Simmons and Sheehan, 1997, quoted in Stone (1998/1999, p.98) with play seeming to have a particular relationship with the “blooming of the synapses” as it is extensive activity that involves significant physical, social and mental effort (Meade, 2001, p. 22). Cognitive development is helped, then, by a curriculum which encourages young children to be active, to question and to construct their own understandings and meanings. This focuses attention on the importance of good quality early learning environments. As Rushton and Larkin (2001) explain, these should build trust, empower learners, support children as decision makers, and encourage them to explore their feelings and ideas in real life, meaningful contexts.

As the above discussion indicates, we now know so much more about how young children develop, and how best to maximise their potential and to expand their life choices. For many children, these choices seem endless with far more material possessions and personal opportunities, freedoms and rights, than at any time in the past. Yet, we also live in an era of increasing uncertainty, instability and rapid change where there is mounting concern about the consequences of lifestyles that focus on individualism, materialism and technologies while ignoring social cohesion and marginalising natural systems (Lowe, 1998). The seriousness of these challenges is reflected in a growing list of social and environmental problems affecting both rich and poor: global terrorism, global warming, diminishing fresh water supplies, accelerating rates of land degradation, threats to biodiversity, heavy reliance on non-renewable energy sources, ongoing use of toxic chemicals in the global food chain, rapid urbanisation, disease epidemics and pandemics, civil unrest, and changing human migratory patterns (Davis & Elliott, 2003).

If children are to grow up in a world that maximises their development opportunities and nurtures hope, peace, equity and sustainability, adults ought not continue to do 'business as usual' and simply pass these environmental problems on. Rather, world views that embrace 'Earth stewardship' and the needs of future, as well as present, generations should be developed. Such world views involve ecocentric - rather than anthropocentric - ways of thinking, acting and living and recognise that people are a part of natural systems rather than separate from them. Education, including early childhood education and care (ECEC), is fundamental to this process. In recent times, a new dimension has been added to ECEC. This is early childhood education for sustainability, an emerging national and international field, which recognises that early environmental learning is important for shaping environmental attitudes and actions in children as well as providing significant groundings for adult activism around environmental issues (Chawla, 1998; Wells & Lekies, 2006). There is an expanding group of early childhood centres and services that recognise the importance of education for sustainability. Consequently, they are changing aspects of their operations while a

smaller group are also reshaping the cultures of their organisations so that education for sustainability is built into the centre's daily 'lifeworld' (Sergiovanni, 2000).

The Earth, however, cannot wait for children to grow up before it benefits from their environmentalism. The UNICEF report, *State of the World's Children*, stresses that children need to be seen *and* heard in their communities around a wide range of social and environmental issues of concern to them, noting that responsible citizenship is not something that is suddenly given at eighteen years of age. Hart (1997) insists that even very young children have the capacity for active participation and the acquisition of the skills needed for political activism and that at an early age, they are capable of 'making a difference'. Burfoot (2003) comments, however, that "new and imaginative practices, initiatives and resources are needed to encourage young children's participation" (p. 44) because, left to its own devices, society will not naturally develop ways of achieving this.

These challenges underpin Campus Kindergarten's *Sustainable Planet Project*. The capacity for children's voices to inform change within this organisation has provided the framework for this project. Giving children a voice focuses on actively listening to children, an idea that, as Dahlberg and Moss (2005, p. 101) highlight "can make us both surprised and shocked as we find how rich and intelligent children's thoughts are". Listening to children's ideas, validating their thinking, and supporting their actions have been integral to the processes of evolutionary change that have shaped the *Sustainable Planet Project*.

Origins and First Steps of the *Sustainable Planet Project*

The *Sustainable Planet Project* commenced in 1997, the outcome of a team-building exercise where teachers were seeking a project to build team work and shared purpose, and that would also create greater complementarity between their personal and working lives. The significance of creating a co-owned vision is identified by Fullan (2003) who explores this notion in terms of building capacity and shared commitment. As a past staff member commented, "I felt that I wasn't putting enough of my own personality into the room. It was great to give toward

the children but there was none of me in there”. The team-building process revealed that ‘the environment’ was a common interest amongst the staff. Consequently, under the banner of the *Sustainable Planet Project*, individual staff members were able to ‘add value’ to their work as early childhood educators by including personal interests such as gardening, wildlife conservation and recycling into their day-to-day work at the centre. From the start, the project had an action-oriented focus, encapsulated in the sub-title of the project “Saving our planet: become a conscious part of the solution”.

Once the concept was formulated, the teachers then began working with the centre’s children and families on a number of small-scale, mini-projects allied with their own particular environmental interests. These included:

So what are we doing?



Figure 1: Initial Mini-projects in the *Sustainable Planet Project* (Campus Kindergarten teachers, 1997)

There was considerable success with the project in these early days, but there were also operational challenges. A significant barrier was the variable levels of knowledge, experience and commitment regarding environmental matters amongst the staff. This led to periods of great activity and times when interest and energy waned as other topics, issues and priorities took precedence. There were

also frustrations with the level of parental commitment to some initiatives, in particular, to the centre's 'litter-less' lunch' policy. This required parents to pack the children's daily lunches, brought from home, in ways that minimised food packaging. Some parents resisted the idea, claiming that changing one's lunch-making habits was an unreasonable demand applicable to others but not to themselves. These days, the teachers are prepared for such resistance and work more collaboratively with families rather than adopting a strict policy position.

Later Developments

As time has progressed and the project has evolved, all these mini-projects have become part of the everyday routines at the centre and new projects are continually added. In effect, the centre operates with an 'environmental ethic' that has become part of its culture. Two newer projects, 'Water Conservation' and the 'Shopping Trolley Project', exemplify how this has occurred.

The Water Conservation Project

Central to curriculum practices at Campus Kindergarten is the belief that children can be active, informed learners, capable of impacting positively on their local environment. A project about water conservation, for example, was sparked when concerns were expressed by both children and teachers about excess water use. At a time when drought was well advanced across Australia, it was noted that the "Kindy friends were pouring out more than they could drink and then tipping the rest into the garden" ("Water Conservation" Documentation, 2002). As a consequence of collaboration between children, parents and teachers, a 'whole centre' project about water conservation emerged, organised mainly by the preschoolers.

The teachers worked with the children to conduct research on where household/centre water comes from, revisited earlier classroom documentation on the topic, discussed the concept of drought, and explored photographs and newspaper articles featured in the local weekly community newspaper. As the children's knowledge about water issues grew, their inquiries turned to water

conservation actions, including creating signage that was located at all the water points around the centre. Examples included:

Mia: Please don't leave the tap running.

Layla: When you flush the toilet, press the small button.

Andrew: Turn the hose off when you are finished.



Figure 2: Greta's Sign for Saving Water.

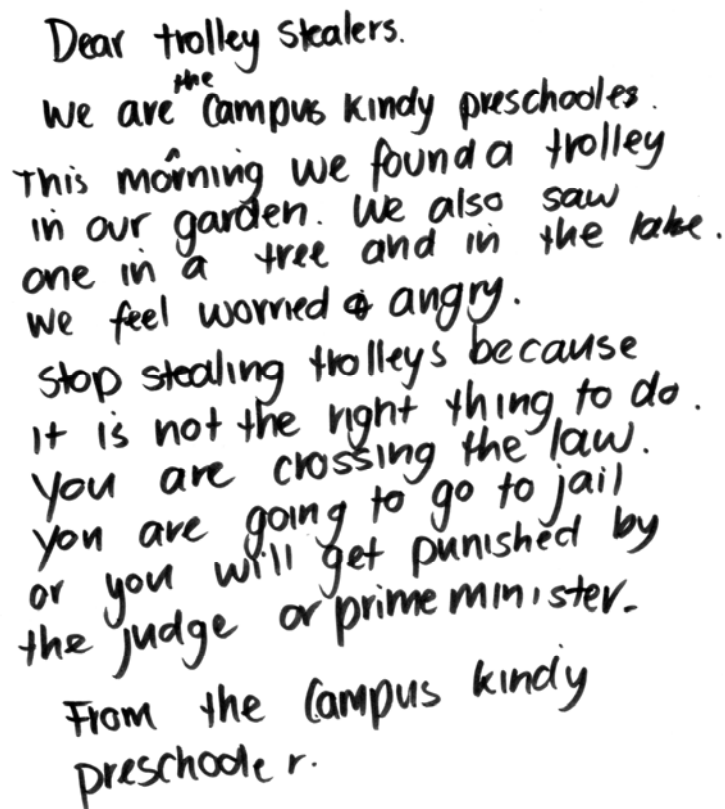
This project shows that even very young children are able to critically respond to environmental issues. With appropriate guidance from supportive staff, the children learned that water was precious, noticed they were using a lot of it, recognised community concern about water use, and did something about it. Furthermore, water conservation habits learned at the centre also transferred to home. As one parent commented during a focus group discussion:

The water issue... he's bringing it into bath time. We're only allowed to fill the bath to a certain level and we're not allowed to put the tap on again!
(Parent focus group, July 2004)

The Shopping Trolley Project

This project is another example of how sustainability principles and child empowerment pedagogies have developed at Campus Kindergarten. This project originated when the children arrived at the centre one morning to find a shopping trolley dumped in the playground, which raised many questions about why and how it happened to be there. The children were concerned about the visual impact and damage that dumped trolleys and other rubbish have on the local environment. It was decided to write a letter to the local supermarket informing the store manager that their shopping trolley had been found and that there were more 'stolen' trolleys in the area. The children also listed ideas for stopping such behaviour as well as offering to return the trolley to the store.

Ultimately, a decision was made to write to the local newspaper in the hope that, with its local community readership, the burglars would read of their concerns.



Dear trolley stealers.
We are ^{the} Campus kindy preschoolers.
This morning we found a trolley
in our garden. We also saw
one in a tree and in the lake.
We feel worried & angry.
Stop stealing trolleys because
it is not the right thing to do.
You are crossing the law.
You are going to go to jail
or you will get punished by
the judge or prime minister.
From the Campus kindy
preschooler.

Figure 3: Letter to the Supermarket (Campus Kindergarten Preschoolers).

Their story made front page news in the local newspaper, along with a photo story outlining the children's ethical and aesthetic concerns about stolen and dumped shopping trolleys. There was also editorial comment, '*Young teach us a worthwhile lesson*', where the children were praised by the editor for their social responsibility.

With local attention adding momentum to the children's interest in the issue, a supermarket visit was organised. While investigating the car parks, it was noticed that existing signage aimed at discouraging customers from taking shopping trolleys outside the shopping centre could be read only if customers actually utilised the car parks. However, the children had already identified that those who had 'borrowed' the trolleys were not car owners. Consequently, they suggested to the supermarket management that they (the children) make new signs which were then posted on the supermarket's main doors, targeting the 'shopping trolley thieves'.



Figure 4: Example of Children's Signage to the 'Trolley Thieves' (Alexander).

As Hart (1997) and Freeman, Henderson and Kettle (1999) cited in Burfoot (2003) propose, even very young children have the capacity for active

participation in decisions and actions about their education which helps build their political literacy. Using Hart's 'ladder of children's participation' as a measure, the children and teachers at this centre show that they are operating at the top rungs of the participation ladder, where the lowest rungs signify non-participation and manipulation and the top rung identifies the highest levels of political literacy and participation. At this top level, children are highly active politically, in terms of making decisions about their learning, as well as being effective social and environmental activists.

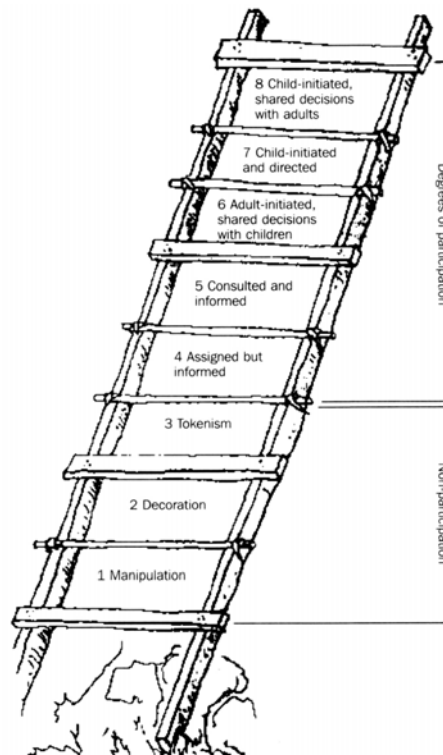


Figure 5: Ladder of Children's Participation (Hart, 1997)

Environmental Outcomes

Over the years, not only has the *Sustainable Planet Project* promoted active citizenship in these young learners, but it has also led to tangible environmental outcomes. These include: enhanced outdoor play and learning spaces that promote multiple opportunities for provoking curiosity and rich environmental learning; native plant regeneration in the grounds; removal of weeds and other

inappropriate plants within the grounds on the centre; and improved ‘eco-friendliness’ of the grounds for local native animal species.

In addition, the project has promoted improved resource use and waste management practices. These have included: bottle and cardboard recycling; significant reductions in photocopy paper use (from three reams/ month in 2003 to one ream/ month in 2004); bulk-ordering of products; the introduction of the ‘litter-less lunch’ policy; and the setting up of a composting system and worm farm. Consequently, the number of large waste bins requiring collection has been reduced from two bins/ day to half a bin/ day. Recent initiatives also include changing to less environmentally-harmful kitchen and cleaning products and the installation of a large water barrel (around 50 litres) into the sandpit. This is filled just once a day with the children learning to monitor their water use as they play. Although water consumption figures are not available, it is surmised that this strategy has dramatically cut water consumption at the centre. Collectively, these changes have contributed significantly to reducing the ‘environmental footprint’ of the centre.

Creating a Learning Culture for Change

The previous sections of this paper have shown what happens ‘on the ground’ at Campus kindergarten in its *Sustainable Planet Project*. This part of the paper explores the processes of change from a theoretical viewpoint influenced by chaos-complexity theory. As the study revealed, creating change at Campus Kindergarten has been an evolutionary rather than a revolutionary process, advancing incrementally, in small steps over almost a decade. Educational change theorists, influenced by chaos-complexity theory as it has been applied to social systems, explain this by recognising that an educational setting such as a school or childcare centre is a complex, adaptive system, rather than a stable, rigid organisation . Rather than change being quickly ushered out by radical reforms and replaced by new processes and structures, it emanates from the history of the organisation and the people interacting in it; a combination of tradition and

innovation underpinned by the quality of the people and relationships already in an organisation (Larson, 1999).

For these reasons, change is much more likely to be slow, small scale and imperfect, reflecting the complex, dynamic nature of the setting in which change is occurring. This signifies a process of slowly-emerging cultural change, rather than a revolution, with success vacillating between stability and disorder. Uncertainty is viewed as inevitable, and creativity, innovation and change are seen as normal rather than aberrant behaviours. Larson (1999) comments that innovation created by changing the *culture* of an organisation does not usually create momentous changes. Instead, they are ‘small wins’ which have the capacity to magnify into large-scale changes into the future.

The slow pace of change initiated through the *Sustainable Planet Project*, coupled with the shared sense of ownership, has provided a platform for change at the deepest level of the centre’s practices and philosophy. It is this deep change, identified by Sergiovanni (2000), that involves changes in fundamental relationships, in changing understandings of key areas of curriculum, pedagogy, how children learn, and in teachers’ skills and behaviours. Inherent in the changes brought about by the *Sustainable Planet Project* has been a strong grounding in, and emphasis of, the values of the culture, including a strong focus on rights and respect. These two key cultural values have not only informed the project but have also provided reciprocal inspiration for the broader ongoing evolution and change within the organisation.

According to Stacey (2000) and Wheatley (1992), leading organisational change theorists who work with chaos-complexity theory, organisational change that takes account of complexity emerges by spontaneous, or serendipitous, self-organising evolution, which requires interaction and learning in groups, rather than from systematic progress towards the predetermined goals or ‘visions’ of others. It is through such devolved, dynamic and inclusive processes that ‘professional learning communities’ are created and sustained. This is not a top-down change model, nor one designed to fit a number of settings. As Wheatley and Kellner-Rogers (1998) comment, no two change processes are the same

because the conditions that create the need for change are unique. They belong to the participants, and they are responsible both individually and collectively for what happens. The process is one of local capacity building for change and innovation.

Underpinning such ‘reculturing’ change processes is the leadership and management framework of the organisation. Learning organisations require patterns that develop self-organisation, ownership and self-directed professional development, rather than top-down hierarchal processes. As Hammonds (2002) citing Fullan (2001) remarks “effective leaders are energy creators, creating harmony, forging consensus, setting high standards, and developing a ‘try this’ future orientation” (p. 5). According to Fleener (2002) cited in Stacey (1992), problems are conceived as communicative obstacles or barriers to creativity, not issues to be overcome in order to re-establish stability and order.

Additionally, leadership developed within a learning approach views all members of staff as leaders, each with their own distinctive abilities to initiate and implement change. This collaborative emphasis has supported shared ownership and a sense of empowerment, where “organisational boundaries were dissolved and there was an emphasis on networking and collaboration with people outside the organisation” (Limerick, Cunnington, & Crowther, 2002, p.2). Such democratic, self-generating notions of leadership are built upon trusting and collaborative relationships between colleagues. At Campus Kindergarten, teamwork and mentoring are now just part of the centre’s normal social practices.

Leadership based on an understanding of complex systems also shapes approaches to staff development. Ehrich (1997) explores the role of professional development and writes “professional development beckons us to travel in directions untrodden and promises new realms of being and experiencing” (p. 276). At Campus Kindergarten, staff members have numerous opportunities to learn about and critically reflect upon their teaching and learning. This includes regular attendances at conferences and workshops, taking courses to upgrade qualifications, networking through professional associations, and actively seeking visitors/ collaborators who can share expert knowledge. The teachers also

commented that they learn a great deal from each other in lunch room conversations and through other informal exchanges. Thus both formal and informal approaches to professional development have helped to generate a ‘grass roots’ learning culture based on collaboration and relationships.

‘Small Wins’ and ‘Scaling Up’

As the *Sustainable Planet Project* illustrates, creating cultural change in a setting is, at best, a process that builds over years rather than weeks or months. Therefore, appreciating that change starts slowly and is likely to be of small scale is pivotal, lest frustration sets in. Ultimately, such change is the key to continuous organisational renewal (Larson, 1999) and is also a strategy that works now, when we cannot afford to wait for large-scale systemic changes that eventually fail to arrive. It is also a strategy that offers leverage beyond the immediate context as small-scale changes become the route to more substantial organisational improvements. Provided the changes go deep enough in terms of large numbers of people in an organisation making such changes, ‘small wins’ can be potent springboards for deeper and wider organisational change and renewal. Thus, chaos-complexity theory informs us that at some indefinable, critical point, small changes become magnified and cascade upwards through the system – the ‘butterfly effect’ often associated with chaos theory. Furthermore, these critical points are everywhere. As a result, small wins can set in motion further processes for continued small wins – a strategy that strengthens organisational capacity and the ability to solve larger-scale problems (Larson, 1999, p. xxiii). This is because there is a flow of *capabilities* that are transferred rather than products. This happens both within the setting, enhancing its capacity to tackle bigger, more complex issues, but also outside, where people who become inspired by changes in the original setting, start to create changes in new settings and situations. At Campus Kindergarten, an expanding range of environmental issues have been tackled as people within the organisation – including the children themselves – have grown in knowledge and the self-belief that they can ‘make a difference’.

However, scaling up needs to progress beyond the original setting if there is to be the magnification of capabilities required for large-scale changes into the future. To this end, staff at Campus Kindergarten actively participate in a broad range of outreach activities with their professional peers, aimed at encouraging others to reculture for sustainability. They regularly present at conferences, for example, give lectures and conduct workshops based on their philosophy and practices. They also provide opportunities for student teachers and others to visit the centre, to see for themselves what they do and how. While such activities increase the demands on staff who are already very busy, they also provide opportunities for new learning and new energy. Hence, they contribute to the processes of self-renewal.

Conclusion

In seeking to highlight how one early education centre has faced the challenges of sustainability this paper has explored a key project, the *Sustainable Planet Project*, through the lens of organisational culture and change. This paper has outlined an intensive study that aimed to peel away the layers of this project and in so doing highlight program changes and achievements. By exploring motivations that led to environmental sustainability becoming part of the centre's curriculum and discussing how environmental issues were raised and acted upon within the organisation, a picture of education for sustainability as a powerful vehicle for bringing about cultural change has been developed. Further, theorising about how sustainability thinking and practices have become integrated into the cultural practices of the centre has provided another layer of understanding, highlighting the complexity and deep nature of the changes.

Rather than ignore the critical issue of sustainability, the teachers at Campus Kindergarten have engaged the support of children, families and the broader community in making changes – 'small wins' - to many of their day-to-day educational and management practices. This has come about because complexity has been embraced as a vehicle for creativity, engagement, critique and change within the organisation. Now, a culture of sustainability permeates the centre

where young children are viewed as active participants in changing their world. Overall, a strong vision has been translated into small but realistic goals and achievements, and this early learning centre is playing a valuable role in creating a new generation of stewards of the Earth.

References

- Australian Institute of Health and Welfare. (2003). *Australia's Welfare 2003*. Canberra: Australian Institute of Health and Welfare.
- Begley, S. (2002). Wired for thought. In K. M. Paciorek & J. H. Munro (Eds.), *Annual Editions: Early Childhood Education* (Vol. 01/02, pp. 22-24). Guildford, CT.: McGraw-Hill/Dushkin.
- Burfoot, D. (2003). Children and young people's participation: Arguing for a better future. *Youth Studies Australia*, 22(3), 44-51.
- Campus Kindergarten. (2002). *Water Conservation Documentation*. Brisbane.
- Chawla, L. (1998). Significant life experiences revisited: a review of research on sources of environmental sensitivity. *Environmental Education Research*, 4(4), 369-383.
- Dahlberg, G., & Moss, P. (2005). *Ethics and Politics in Early childhood Education*. Oxfordshire: RoutledgeFalmer.
- Davis, J., & Elliott, S. (2003). *Early childhood environmental education: Making it mainstream*. Canberra: Early Childhood Australia.
- Ehrich, L. (1997). *Principals' Experience of Professional Development and thier Response to Teachers' Professional Development: a phenomonological study*. Unpublished doctoral thesis.
- Fleener, M. J. (2002). *Curriculum dynamics: Recreating Heart*. New York: Peter Lang.
- Fullan, M. (2003). *The Moral Imperative of School Leadership*. California: Ontario Principals' Council/Corwin Press.
- Hammonds, B. (2002). The latest ideas on school reform by Michael Fullan. *Leading and Learning for the 21st Century*, 1(3), 1-10.
- Hart, R. (1997). *Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. New York: UNICEF.
- Joseph, J. (2002). *Brainy Parents Brainy Kids*. Australia: Focus Education.
- Larson, R. L. (1999). *Changing Schools from the Inside Out* (2nd ed.). Lancaster, PA: Technomic Publishing.
- Limerick, D., Cunnington, B., & Crowther, F. (2002). *Managing the New Organisation: Collaboration and Sustainability in the Post-Corporate World* (2nd ed.). Sydney: allen and Unwin.
- Lowe, I. (1998). Environmental education: The key to a sustainable future. In N. Graves (Ed.), *Education and the Environment* (pp. 95-104). London: World Education Fellowship.
- Meade, A. (2001). One hundred billion neurones: how do they become organised? In *Promoting Evidence-based Practice in Early Childhood Education: Research and its Implications* (Vol. 1, pp. 3-26): Elsevier Science Ltd.
- Mustard, F. (2000). *Early childhood development: The base for a learning society*. Retrieved 23 August, 2004, from <http://www.oecd.org/dataoecd/31/18/31551283.pdf>

- Organisation for Economic Co-operation and Development. (2001). *Starting strong: Early Childhood Education and Care*. Retrieved 23 August 2005, from <http://www1.oecd.org/publications/e-book/9101011E.PDF>
- Rushton, S., & Larkin, E. (2001). Shaping the learning environment: Connecting developmentally appropriate practices to brain research. *Early Childhood Education Journal*, 29(1), 25-33.
- Senge, P. M. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organisation*. Sydney: Random House.
- Sergiovanni, T. J. (2000). *The Lifeworld of Leadership: creating culture, community, and personal meaning in our schools*. San Francisco: Jossey-Bass Publishers.
- Stacey, R. (2000). *Strategic Management and Organisational Dynamics: The Challenge of Complexity* (3rd ed.). Harlow, UK: Pearson Education.
- Stone, S. (1998/1999). Brain research and implications for early childhood education. *Childhood Education*, 75(2), 97-100.
- Wells, N., & Lekies, K. (2006). Nature and life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, 16(1), 1-25.
- Wheatley, M. J. (1992). *Leadership and the New Science*. San Francisco: Berrett-Koehler.
- Wheatley, M. J., & Kellner-Rogers, M. (1998). Bringing life to organizational change. *Journal of Strategic Performance Measurement*(April/May), 5-13.
- Yoshikawa, H. (1995). Long term effects of early childhood programs on social outcomes and delinquency. *The Future of Children*, 5(3), 6-11.