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Davis, Julie M. (2009) *Revealing the research 'hole' of early childhood education for sustainability : a preliminary survey of the literature*. Environmental Education Research, 15(2). pp. 227-241.

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## Revealing the research ‘hole’ of early childhood education for sustainability: A preliminary survey of the literature

### ***Abstract:***

In 2007, *EER* dedicated a special issue to Childhood and Environmental Education. This paper, however, makes a case for **early childhood** to also be in the discussions. Here, I am referring to early childhood as the before-school years, focusing on educational settings such as childcare centres and kindergartens. This sector is one of the research ‘holes’ that Reid & Scott (2006b) provoke the environmental education community to have the ‘courage to discuss’ (p. 244).

This paper draws on a survey of Australian and international research journals in environmental education and early childhood education seeking studies at their intersection. Few were found. Some studies explored young children’s relationships with nature (education *in*). A smaller number discussed young children’s understandings of environmental topics (education *about*). Hardly any centred on young children as agents of change (education *for*). At a time when there is a growing literature showing that early investments in human capital offer substantial returns to individuals and communities and have a long reach into the future - and when early childhood educators are beginning to engage with sustainability - it is vital that our field responds. This paper calls for urgent action – especially for research - to address the gap.

## **Revealing the research ‘hole’ of early childhood education for sustainability: A preliminary survey of the literature**

### ***Introduction***

The early childhood years are the period of the greatest and most significant developments in a person’s life and are generally regarded as the foundation upon which the rest of their life is constructed (Mustard, 2000; Rutter, 2002). Furthermore, an expanding body of research literature from fields as diverse as neuroscience, health and economics indicates that early investments in human capital offer significant returns both to individuals and to the wider community. Yet the early years are those that traditionally have received the least attention from the education world (Organisation for Economic Co-operation and Development (OECD), 2006). This pattern of neglect extends to the field of environmental education/ education for sustainability<sup>1</sup>.

Indeed, there is more than enough research to show the value of quality early childhood education and care (ECEC) to the development of healthy, competent children (Espinoza, 2002; Friendly & Browne, 2002; Shonkoff & Phillips, 2000). It is also recognized that ECEC delivers positive benefits to societies beyond immediate, personal interests when investments are recognised as public rather than private ones (Cleveland and Krashinsky, 2003 cited in OECD, 2006, p. 36, 249-258). Using cost-benefit economic analyses, these authors found that ECEC contributes, for example, to the general health of the nation’s children, to future educational achievement, to labour market volume and flexibility, and to social cohesion. Studies also indicate that there is substantial defrayment of later intervention and prevention costs in broad areas including juvenile crime prevention, school drop-out rates, and reductions in health-risk behaviors as a result of investments in ECEC.

Andersonn’s pioneering study in Sweden in 1992, for example, showed that the earlier a child entered high quality early childhood education and care, the stronger the positive effect on academic achievement at 13years of age. Andersonn concluded that “early entry into day care tends to predict a creative, socially confident, popular, open and independent adolescent” (OECD, 2006, p. 253).

Central to quality in ECEC is recognition that early experiences be stimulating and involve positive interactions with adults in appropriate learning environments. The “Starting Strong 2” report (OECD, 2006) identifies this latter element, in particular, as a developing focus for further research. Drawing

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<sup>1</sup> From this point on ‘education for sustainability’ will be used to reflect recent developments in the field, except where ‘environmental education’ has been used by an author, refers to a specific title, and/or refers to an earlier representation of education for sustainability.

on the work of Malaguzzi – pioneer of the Reggio Emilia approach to early education - this OECD report states that early childhood learning *environments* often fail to fulfill the role of the ‘third teacher’, identified as outdoor, experiential play and learning in nature (the other two teachers are the human ‘teaching pair’ characteristic of Reggio Emilia classrooms). Of course, there are exceptions. The ‘forest school’ movement, originally developed in Scandinavia for young children, made its presence in the United Kingdom in the 1990s. A 2006 Scottish Forest School evaluation found, for example, “demonstrable, multiple impacts of this outdoor experience” across broad learning areas including social, educational, health and environmental learning (Borradaile, 2006). The importance of quality outdoor environmental experiences and learning for children is also drawn out by Barratt Hacking, Barratt, & Scott (2007) in their review article in the *Environmental Education Research* special edition where they cite their own and others’ studies (see Chawla, 1998; Louv, 2005; Thomas & Thompson, 2004) on this issue. A consequence of diminishing opportunities for environmental learning is what Louv (2005) describes as ‘nature deficit disorder’ with further consequences for the development of children and young people as ‘environmental stakeholders’ (p.532). Contributing to disengagement from natural environments, Malone (2007) emphasises the worrying trend of children being cocooned or ‘bubble-wrapped’ away from outdoor environmental experiences and spaces, as ‘protectionist paradigms’ (p. 525) assert a negative impact on children’s lives. The implications from both sets of research for the field of education for sustainability – one that expounds the virtue of young children having quality learning experiences and interactions in rich environments in which nature has a central place; the other that shows how children are becoming more alienated from their environments - are obvious. Yet, teaching and learning (and research) for the very youngest of children that seeks to address increasing alienation from nature and that builds their capabilities as active, engaged young citizens has, until recently, been ‘missing in action’ despite the social, health, economic and educational benefits. The *value* of starting early with education for sustainability is becoming much clearer, even if the practice and research is yet to fully emerge.

In order to emphasis the literature gap in early childhood education for sustainability, this author undertook a preliminary survey (1996-2007) of a number of Australian and international research journals in environmental education and early childhood education, searching for studies at their intersection. Very few were found - fewer than five percent of published articles over a twelve year period. In general, early childhood education researchers have not engaged with environmental/ sustainability issues and environmental education researchers have not focused their attention on

very young children and their educational settings. Of those studies that were identified, most explored young children's relationships with nature (education *in* the environment), a smaller number discussed young children's understandings of environmental topics and issues (education *about* the environment), while there was an almost total absence of studies that examined young children's learning and capabilities in responding to sustainability issues such as water or energy conservation (education *for* the environment). As early childhood practitioners begin to finally engage, it is imperative that their efforts are underpinned and informed by research. This paper explores some of the reasons why research in early childhood education for sustainability (ECEfS) is lacking and proposes some ways to fill this identified research gap.

### ***Early childhood education for sustainability: Identifying the research gap***

ECEfS - a synthesis of early childhood education and education for sustainability - is finally beginning to emerge as an active new field of interest. In Norway, for example, environmental education is 'written into' its national curriculum documents, starting in nursery school and continuing throughout schooling. Other Scandinavian countries are also recognised as lead nations with commitments to early childhood environmental education/ education for sustainability though the reach into the childcare sector in these places has not been studied. New Zealand has recently established an 'Enviro-kindy' movement (a subset of Enviro-schools) aimed at before-school settings. In Asia, there is the South Korean 'Eco-Early Childhood Education' movement (Lee, Jo, & Park, 2007) while Hong Kong has its 'Green Preschool Award' that, since 2006, has been part of Hong Kong's 'Green School Award' program.

Furthermore, new partnerships around ECEfS concepts are being established by the previously-mentioned 'forest schools' movement that is reaching across borders in the northern hemisphere - this takes an overt participatory and activist approach to nature experiences and environmental issues. In the southern hemisphere, a vibrant community of Australian and New Zealander early childhood educators with an interest in sustainability is also emerging, following the hosting of the inaugural trans-Tasman conference on early childhood environmental education in New Zealand in December 2006, and reciprocated in Australia in 2007. In the international arena, the first international meeting dedicated to the role of early childhood education and sustainability was held in Sweden in May 2007, a UNESCO-supported event that brought together a small number of participants (around 30) from all continents of the globe. Papers developed by these participants have

been collated into the first international publication for ECEfS (UNESCO, 2008). Nevertheless, such developments indicate emerging uptake and interest in ECEfS, responses are still generally patchy and seldom embedded into comprehensive and coherent national or systems-level curriculum principles, policies or guidelines. Furthermore, a research-base to understand, build upon, and critique these developments is absent.

In Australia – and, I would speculate, at the broader international level – there are two key reasons that help explain why it has taken so long for the early childhood education field to develop traction around sustainability. These are: 1. the sector is not well understood. It provides mainly voluntary (though widely-used) educational services and loses out to the compulsory schooling sector for attention and a cut of the limited resources available for education for sustainability; and 2. there is great diversity and complexity of organisational types, structures, qualifications regimes, and governance arrangements in ECEC. In Australia, for example, this is illustrated by a wide variety of service types including long day care, kindergarten, family day care, play groups and preschool which may also be neighbour-based, work-based or school-based. There is also a mix of public, non-government, not-for-profit and private-for-profit organisations running these services, each mandating different qualification levels – ranging from university degrees to technical college and private provider qualifications (certificate to diploma). There are also significant numbers of untrained and volunteer staff working in the field. In terms of governance, most before-school settings and services are managed by government departments different from those for schools, and in Australia, also involves both state and federal departments. Such diversity and complexity creates difficulties for coherent attention to new curriculum and policy issues or emerging trends such as EfS (Tilbury, Coleman, & Garlick, 2005).

Despite these difficulties the early childhood education field in Australia and internationally, as outlined above, is beginning to develop enthusiasm for ECEfS – a contemporary conceptualization that builds on and distinguishes it from the traditional provision of nature education or outdoor play that has its roots in Froebel’s ‘kindergartens’ (children’s gardens) and what environmental educators might refer to as ‘early education *in the environment*’. **While playing and learning in nature remains highly valued, this newer conceptualization refers to a transformative early childhood education that values, encourages and supports children as problem-seekers, problem-solvers and action-takers around sustainability issues and topics related to their own lives. Issues might include, for example,**

water and energy conservation, or young children's active responses to vandalism or theft that impact in their locality. The case for a more politically-overt early childhood environmental education was made by this author a decade ago (see Davis, 1998), a position that some practitioners are now seeking to implement.

To illustrate in more detail this emerging energy for ECEfS, the peak, national professional association for early childhood educators in Australia, *Early Childhood Australia* (ECA), has designated global warming and its impacts on young children as an issue of significance for its membership, a position that builds on its earlier, though 'patchy' interest in environmental education. Reflecting this attention, in 2007, ECA focused an entire edition of its magazine, *Every Child*, on sustainability topics (February). It also established an e-group (April), charged with the preparation of information about sustainability, global warming and climate change with materials published nationally in print and electronically during the year. In September, it released a new booklet, *Greening services: Practical sustainability* (Kinsella, 2007), boosting its suite of ECEfS resources. Most importantly, the organisation updated and released (September) its *Code of Ethics*. This now includes the obligation for early childhood educators to "work with children to help them understand that they are global citizens with shared responsibilities to the environment and humanity" (Code 1.4).

Clearly the early childhood education field is beginning to recognise the relevance of sustainability to young children and to their early education. Nevertheless, while this growing interest is commended, **research** in early childhood education for sustainability is almost non-existent. Taking Australia once more as an example, first discussions about the lack of research - as an issue for the environmental education field to consider - were as recent as 1999 at a symposium entitled *Early Childhood Environmental Education: Mainstream not Marginal* (presented by Davis, Elliott and Kalucy), part of that year's Australian Association for Environmental Education Conference. At this event, the presenters addressed the difficulties faced by early childhood environmental educators in gaining visibility within both the environmental education movement and within early childhood education. They identified the virtually non-existent research base, the lack of researchers and the related problem of negligible research grant opportunities to support research, as significant delimiting issues.



The next step in the evolution of research debate/ discussion in this field in Australia was a national review of early childhood environmental education (ECEE), undertaken by Elliott in 2002 for the New South Wales Environmental Protection Agency. This led to the *Patches of Green* (2003) report which found that “the meager number of publications to support environmental education, together with the green patches of exemplary practice... and lack of consistent policy support suggest environmental education is still an emerging paradigm in the early childhood field” (p. 36). This report also emphasised that “research to inform and support practice is very limited” (p. 36) with “most research [focusing] on children’s knowledge about the environment or draws on autobiographical reflections” (p.36). More recently, in 2005, the Australian Research Institute for Education for Sustainability (ARIES) presented the first nationally-funded review of environmental education in Australia (Tilbury, Coleman, & Garlick, 2005). Encouragingly, this report gave consideration to the early childhood environmental education experience, even though the early childhood sector does not technically fall into the ‘school’ category, and, it is argued, continued use of the terms ‘school’ or ‘schooling’ as a catchall phrase simply serves to perpetuate the marginalisation of the early childhood sector.

The 2005 International Implementation Scheme for the United Nations Decade of Education for Sustainable Development (UNDESD) identifies research and innovation as one of seven interlinked strategies proposed for the decade (2005-2014). Specifically, the scheme calls for national task forces to “identify research issues in Education for Sustainable Development and plan cooperative research projects” (UNESCO, 2003, p.7). Working from these broad principles, the Australian Government Strategy for the UNDESD, *Caring for our Future* (2006) also identifies the importance of basing Australia’s approach to education for sustainability on sound research (Strategy 2). Broadly, this strategy calls for research priorities that include “identification of needs in different sectors, practical demonstrations or ‘how to’ studies, monitoring and evaluation guidelines and performance indicators to measure progress, and... comparative studies between countries” (p. 5). This author suggests that research in early childhood education for sustainability should be identified as a significant international and national research need and, therefore, a gap to be addressed. As noted, while there is growing activity and interest amongst educators in early childhood education for sustainability, attention by researchers has been minimal. What is reported is generally by anecdotal account in forums where interest is more on the story of the practice or project rather than on systematic study and critique. As was stated in the NSW EPA (2003) *Patches of Green* report

“There were many more publications advising practitioners about environmental education practice than about research or theory in this area” (p. 4). As little as eight years ago, no Australian doctoral studies and only three Masters research projects were identified (reported in Davis & Elliott, 2003). Thus, as indicators of research activity, this author considers the absence of such studies to underpin the research base for ECEfS as contributing to a hole that the environmental education community should have the ‘courage to discuss’ (Reid & Scott, 2006a, p.244). This ‘hole’, it is asserted, contributes to the slow and patchy uptake of early childhood education for sustainability which, if not addressed, will impact negatively on the future evolution of the field. It is also asserted that a cohesive vision for sustainability education, more broadly, will not be achieved while there is this dearth of early childhood education for sustainability research.

### *A preliminary survey of the literature*

To support the claim that there is a paucity of research in ECEfS, especially in the before-school education sector, the author undertook a preliminary survey of the state of public knowledge in the field. Specifically, the aim was to identify research about environmental education/ education for sustainability programs and issues that explicitly had young children and their education as active participants as the focus. This survey was undertaken in the hope of provoking other researchers and/or agencies with greater capacity and funding than was available to this researcher to respond to the gap and to undertake more a detailed literature review - and new research – to support the growth of this emerging field.

To start the search, several electronic news groups were accessed. These identified a limited number of web-based resources, but did not turn up those that clearly met the criteria of being about early childhood environmental or sustainability education programs. A few resources in languages other than English were suggested. While an attempt was made to translate some works from German, it was not possible to satisfactorily identify appropriate studies. Consequently, this line of investigation was abandoned. Another search strategy used personal contact – via email and face to face communication - with key informants in the field. However, this line of enquiry failed to reveal studies with which the researcher was not already familiar.

Consequently, the focus was sharpened into a survey of peer-reviewed journals in the fields of early childhood education and environmental education, undertaken for practical reasons – the survey was

unfunded, hence time and resources were factors – and because there was a belief that this strategy would yield at least some suitable research reports. This survey was further narrowed to the identification of a set of well-known English-speaking refereed journals for the decade 1996-2005, updated in 2006 and again in 2007 to account for recent additions, making for a survey over 12 years. Included in the set are two relevant, but newer, journals that were not in publication in 1996. Initially, the journals included in the set were those considered by the author as the most likely to publish papers by researchers with an interest in early childhood and environmental/sustainability education, that is major national and/or international journals (refer Table 1). **Later, some additional journals were added on the advice of reviewers. It was never the intention to undertake an exhaustive literature search; rather this was a scan to show the early childhood research ‘hole’ relative to other education sectors.** Similar to Lubienski & Bowen (2000) and Fox & Diezmann (2007) in their reviews of mathematical education, only peer-reviewed journals were included because they reflect the interests and values of mainstream research communities and because they have a degree of control and credibility through their processes of peer review. From this journal set, a data set of relevant articles was selected, achieved by manually scanning titles (as indicative of content) and abstracts. A more detailed reading of the paper was made where necessary to clarify inclusion into the data set. Descriptors that guided this final process were combinations of key words such as: early childhood, young children, environment, sustainability, environmental education, children’s participation, environmental learning, knowledge, understandings, nature education, outdoor education, childcare, daycare, preschool, kindergarten, as well as terms associated with environmental topics such as recycling and water conservation, that one might expect to be addressed in early childhood sustainability programs.

**To reiterate, the claim is not made that this is an exhaustive survey of the research literature in early childhood environmental education/ education for sustainability.** As noted, for example, the survey is limited to English-speaking journals. However, English is recognised as the primary language for communication in the research community. Nor does the survey include studies that appear in books, reports, theses, conference papers, policy documents, guidelines or curriculum materials – an assortment often not available electronically or only through university library print collections. Furthermore, it is acknowledged that there are limitations in simply counting the number of articles relating to the chosen themes; the quality of the study is not addressed for example, though the peer-

reviewed process addresses this issue somewhat. Notwithstanding these limitations, I contend that the results of this survey are indicative of the state of research in ECEfS.

Table 1 shows the actual number of refereed articles, from Australian and international journals that were identified through the process explained above. As the table reveals, only 39 refereed articles in 14 journal titles were found that give consideration to young children's environmental/sustainability education. To exemplify this lack, the *Australian Journal of Environmental Education* has published just five articles between 1996 and 2007. At approximately 10 research reports per issue, this amounts to fewer than 5% of articles published over the 12 year period under review. What is gratifying, though, is that there has been at least one paper per year in each of the last four years that touch on themes that can be described as 'action-oriented' environmental/sustainability education, reflecting a small but growing pool of researchers with an interest in young children. If one examines *Environmental Education Research*, arguably the most prestigious international journal for environmental education researchers, one might have expected larger numbers than those found in a journal with a predominantly Australian author base. With typically 6-8 papers published per issue, in approximately 50 issues, only two research papers were found, which represents less than 1% of all articles published over this 12 year period – both these fall into the category of education *about* the environment. While the volume of *Environmental Education Research* published in late 2007 is most welcome with its focus on 'childhood and environment', this author argues that this volume, for the most part, also mainly overlooks the needs and interests of very young children, those Birth to six years, and especially children in the educational and care settings that are not schools. Of the other 'environmental education' journals that were surveyed, the majority of articles also fell into the category of education *in* the natural environment (often about gardening projects) or about children's and teachers' environmental knowledge.

Table 1 goes here

Of the major refereed early childhood journals examined, it is significant that the *Australian Journal of Early Childhood*, (the peer-reviewed research journal of Early Childhood Australia, Australia's largest professional association for early childhood educators), to date has not published any research papers with a focus on environmental/ sustainability education. Of the international journals in early

childhood education that were scrutinised, the stand-out journal is *Early Childhood Education Journal*. Throughout the 1990s this journal had a champion in Ruth Wilson who, as one of the editors of the journal, developed a dedicated environmental education ‘strand’ that published papers about young children and learning in nature and the outdoors. However, especially through her editorials, she also discussed environmental and sustainability issues and their impacts of young children. Sadl, upon her retirement in the early 2000s, this focus appears to have been lost.

*The European Early Childhood Education Research Journal* has also published a small number of articles that have investigated environmental topics. These fall into the category of education *about* the environment as they examine young children’s understandings of environmental issues such as waste management (Palmer, Grodzinzinska-Jurczak & Suggate, 2003) and deforestation and global warming (Palmer, Bajd, Duraki, Razpet, Suggate, Tsaliki, Paraskevopoulos & Skribe, 1999).

Another journal in which a number of somewhat relevant articles were identified (particularly in relation to the numbers found in other journals) is *Young Children*, the journal of the National Association for the Education of Young Children, the largest professional association for early childhood educators in the United States. However, while peer-reviewed, this bi-monthly journal is largely practitioner-based with preference for short, practical articles, around three to five pages in length. As stated in their submission guidelines ‘a successful article devotes about one-third of the text to practical strategies for implementing recommendations’ (National Association for the Education of Young Children, 2007). Furthermore, the articles in *Young Children* also focus largely on ‘hands-on’, outdoor, gardening and nature education for young children. Again, these papers exemplify a narrower conceptualization of environmental education/ education for sustainability than this author uses, which is one that views young children as capable of being active participants and agents of change, involved in problem-solving and action-taking for sustainability.

### ***What the survey tells us***

This sweep through the environmental education/education for sustainability research literature and early childhood education research literature has revealed what those of us working at their intersection know anecdotally. There is very little research in ECEfS specifically in relation to children in early learning settings such as childcare centres, kindergartens and preschools that focuses on the theoretical, pedagogical, or broader educational issues that have been the substance of

studies in, for example, primary and secondary schooling related to environmental education/education for sustainability. As noted, the majority of studies can be categorised as falling within the domain of education *in* the environment, with a smaller number focused on education *about* the environment. While studies in these areas are important for this emerging field, they also show up the very tiny number of studies that recognise young children as agents of change around sustainability, what can be called education *for* the environment. There is evidence, nevertheless, of an increase in research articles overall – albeit from a very low base - since the beginning of the decade, so some comfort can be taken in this growing trend. Hopefully, this paper will spark further interest or at least some discussion about this situation.

One reason why research into current practices and approaches to ECEfS in the before-school sector is so limited is the extent to which those who are engaged with ECEfS in these settings have actually published about their experiences. While there is evidence of an overall expansion of early childhood environmental/sustainability programs recently, documentation of, and investigation into, these is not occurring. Rather, the work remains as part of the day to day operations of individual centres and their staff. This has three important effects. First, it means that others are denied the benefits of learning from exemplars of practice, slowing down the process of turning the ‘patches of green’ into a ‘patchwork quilt’ (Elliott, 2006, p. 1). Second, it means that there is little review of programs and practices. Common implementation mistakes, for example, are likely to be replicated, thus limiting the evolution of the field. Third, without a rich and growing source of studies, it is unlikely that there will be the discussion and critique around the wide range of topics and issues that are indicative, as Reid and Scott (2006b) note, of a “healthy field of inquiry, brimming with ideas and perspectives on its past, present and future” (p.1).

Another reason proposed why ECEfS research in non-school settings may be limited relates to concerns about the practical and ethical issues of conducting research with/on/about very young children. Even experienced researchers may feel daunted at undertaking studies in settings in which they are unfamiliar – schools, after all, are reasonably well-known to most of us. Young children are vulnerable. There are reasonably strong protection strategies in place in many jurisdictions, for example police checks may be required and there is need for parental and centre permissions (though these also apply to researchers wishing to work with school-aged children). Additionally, young children may have (apparent) limited verbal and writing skills which may make data collection more

difficult and more costly. Nevertheless, there is a growing body of research that focuses on young children as research participants. Early childhood researchers are developing rigorous, innovative strategies that engaged young children in research (sensitive ways of conducting child conversations and gaining children's consent through the use of non-text icons (Danby & Farrell, 2005), and use of photographs and drawings as data and/or stimuli for data-gathering, for example). The sub-field of research ethics with young children is expanding (see Abbott & Langston, 2005; Liamputtong, 2005). It problematises and helps researchers understand and manage research issues when working with young children. Today, there are national (eg Australia's National Health and Medical Research Council's (2007) *National Statement on Ethical Conduct in Human Research* and Canada's (1998, updated 2005) *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* to assist researchers to design appropriate studies involving young children and to help them avoid practices that are ineffective, coercive or manipulative. Additionally, there are sector statements (e.g. for Psychological or Sociological Associations) that offer guidelines or statements for the ethical conduct of research with children, all well codes prepared Commissions for Children and Young People, or their equivalent. In effect, the mystery of conducting researching involving very young children is diminishing as the body of research grows.

### ***Responding to this research 'hole'***

As a response to the challenges about early childhood education for sustainability research, this author suggests remedies: These are:

1. the initiation of research projects targeted specifically at the early childhood sector;
2. the provision of dedicated funding for early childhood education for sustainability research; and
3. research capacity-building for both new and experienced researchers into the field.

Each of these suggestions is now examined in detail.

#### **1. Initiation of ECEfS research projects**

It is recommended that research projects specifically targeted at the early childhood sector be initiated, whether by individuals, research centres, research funding bodies, professional associations or other groups with an interest in young children. Because the field is so under-researched, it is wide open for researchers to engage in the kinds of studies that have been foundational in other sectors of the education for sustainability field. This is hardly a radical suggestion; it is simply stating a need

for 'action' to fill the gaping hole that exists for early childhood education for sustainability. Some possible research areas – by no means definitive – are suggested.

*a. Research into young children's knowledge and capabilities:* This includes studies that identify what young children know, can understand, and can do about environmental/sustainability issues. For example, Palmer and Suggate (2004) have reported on children's ideas (ages 4-10) about distant places and environmental issues with the 4-year olds showing emerging understandings about deforestation and global warming. Hicks & Holden (2007, p. 503-504) in discussing the work of Page (2000) and Elm (2006) also note that that very young children (4-6 years) have an emerging awareness of the negative effects of issues such as deforestation, global warming and pollution. Further studies – in non-school early education settings and in a wider range of countries and continents - would help practitioners work more effectively with very young children, and would advance the practice of young children being listened to and empowered by their education (David, 2007). There is also a need for research that explores young children as change agents for sustainability. This researcher's own collaborative study of the Sustainable Planet Project at Campus Kindergarten (Davis, Rowntree, Gibson, Pratt, & Eglington, 2005), for example, involved 4 year olds initiating investigations and actions in their daycare centre and local community around water and waste issues. This suggestion accords with the proposal put forward by Barratt Hacking, Barratt, & Scott (2007) who also argue for participatory research with children as researchers and 'environmental stakeholders' capable of influencing environmental outcomes.

*b. Research into practitioner, program and centre practices, including potential for community education:* Because the field of early childhood education for sustainability is so new, and so far behind, opportunities exist to replicate the kinds of studies already evident in other parts of the education for sustainability field. These should include, as top priority, case studies of practice and evaluation studies of programs in non-school ECEfS (see, for example, Davis, Miller, Boyd & Gibson, 2008) to find out what works, why and how, and what are the barriers and opportunities for implementing education for sustainability in early childhood.. More studies are needed that focus on the role of the 'third teacher' (early childhood educational environments,) particularly in relation to children's experiences in or with nature and the outdoors, as identified by the OECD's Starting Strong 2 report (2006, p. 196), and the role of carers and teachers in, for example, daycare centres in making the most of children's environmental learning. Identifying links between such experiences



and the development of dispositions towards sustainable practices is worthy of investigation, perhaps drawing on studies of ‘significant life experiences’ (Chawla, 1998; Chawla & Cushing, 2007). Undertaking such studies specifically in relation to those who work in non-school early education settings may also reveal special areas for professional development given that many childcare workers, themselves, may not have had rich environmental learning experiences. Another area for attention is the study of leadership frameworks and practices that foster change in early childhood settings via ‘whole centre’ approaches, akin to ‘whole school’ sustainability approaches. Also, there is a need for area for investigations into the strategies that build partnerships and networks with families and communities – including across socially and culturally-diverse communities - to broaden ECEfS program reach.

*c. Research into professional learning in ECEfS:* This category of potential research could include the collection and analysis of baseline data into the current status of education for sustainability in pre-service early childhood teacher education courses and Technical and Further Education programs – across institutions, systems, regions or whole countries - with the aim of identifying opportunities for, and strengthening and mobilising education for sustainability across the early childhood sector. International comparative data would be particularly useful to highlight shortcomings and to gain leverage for new programs and initiatives. Studies that investigate the best ways to implement professional learning for staff already working in early childhood services are also required. This is especially so because, as emphasised earlier, there are a wide range of parameters – qualifications, type of service, who runs it, whether it is for-profit or not - that impact on the curriculum work of early childhood staff.

*d. Exploratory research/ new research partnerships:* There needs to be action research and other participatory studies to change teachers’/carers’ practices; studies that build active participation in young learners; explorations of whole-of-centre ‘sustainable kindergartens’ or ‘eco-centres’; intergenerational studies (such as Ballantyne, Connell & Fein, 1998) to reveal what can pass ‘upwards’ from very young children to their parents in relation to sustainability knowledge and actions, in order to rapidly build the research base. There are also opportunities to make the most of innovative and contemporary research methodologies, mixed method approaches and cross-disciplinary research partnerships especially as such approaches are being advocated for within the broader research community. For example, ECEfS has the potential to capitalise on new synergies

created by intersections with health and health promotion, sociology, psychology, urban planning, architecture, social marketing, organisational change and economics. Alignment with researchers from fields such as the Sociology of Childhood and with movements such as Child Friendly Cities offer the potential to create new knowledge, new processes and new partnerships not only for early childhood but for the whole of the education for sustainability sector. Partnerships with researchers engaged with early childhood versions of Health Promoting Schools – in Australia referred to as the Health Promoting Early Childhood Settings (HPECS) approach – offer opportunities to create early learning services that are both ‘green’ and ‘healthy’.

## 2. Dedicated funding for ECEfS research

The second suggestion for filling the research hole that is ECEfS, concerns the pivotal issue of research funding. It is obvious that dedicated funding needs to be made available to support researchers in early childhood education for sustainability. This could be a new scheme or a sub-set of other schemes already in operation. Ideally, this should be an international initiative so that the effect is of widening and deepening the range of research outputs to help inform a rapidly engaging international field. One simple way that funding agencies can include the early childhood sector is to broaden their terminology so that it is inclusive – rather than exclusive - of the early childhood care and education sector. To be blunt, use of terms such as ‘school’ or ‘schooling’ in defining research grant parameters actively excludes the early childhood sector, even if this is not the intention. This author suggests alternative wording – such as *early childhood education services* or *early childhood care and education (ECEC) services* - be ‘written into’ granting schemes to complement ‘school-based’ research opportunities.

## 3. Research capacity building

Third, strategies to boost research capacity in this area are essential. Ways need to be found to bring early childhood education for sustainability researchers together, to be mentored by more experienced researchers, to build capacity and to create teams that might then be able to apply for funds from major research organisations, such as the Australian Research Council or the United Kingdom’s Research Council. The funding of Masters and doctoral scholarships specifically for early childhood education for sustainability research would also be constructive. Additionally, experienced education for sustainability researchers should consider partnering with early childhood researchers to bring them and their perspectives into teams and projects.

## ***Conclusion***

This paper makes the case for early childhood education for sustainability to be given status as a legitimate new field of research endeavour. From small beginnings, there is now rapidly expanding interest amongst practitioners in early childhood education for ECEfS. Capitalising on this interest must not happen in a vacuum. This paper has identified that there is a paucity of research in the field of ECEfS which needs to be addressed. Opportunities will be lost, resources will be wasted, effort and enthusiasm will be diminished if an effective research base is not established to guide and nurture this fledgling field. To this end, I propose that research and researchers need to be supported both conceptually and practically. Conceptually, this means full recognition that the early childhood education sector has something to contribute, both to the development of human capacities that underpin learning for sustainability, and also to education for sustainability more broadly.

Practically, this means that funding and support for research needs to be explicitly directed into the field and towards the development of research capacity. With such moral and practical support, everyone will benefit – not just young children and early childhood educators. The education for sustainability field will learn much from research that gives consideration of the capabilities of young children, their teachers and carers and the learning environments in which they operate. As recent studies in fields as diverse such as brain science, economics and health promotion show, early childhood is a high leverage area with investments in young children having the potential to reap big rewards into the future. Research in early childhood education for sustainability will add to these investments. This is a field whose time has come.

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Table 1: Journal titles and the number of articles with an ECEfS focus

Environmental Education Journal	Years	No. of articles	Total
<i>Australian Journal of Environmental Education</i>	1996-2006	5	
<i>Applied Environmental Education and Communication</i>	2002-2007 Started 2002	3	
<i>International Research in Geographical and Environmental Education</i>	1998 - 2007	3	
<i>Journal of Environmental Education</i>	1996-2007	3	
<i>Environmental Education Research</i>	1996-2007	2	
<i>Canadian Journal of Environmental Education</i>	1996-2006	1	
<i>Children's Geographies</i>	2003-2007	nil	<b>17</b>
Early Childhood Education Journals	Years	No. of articles	
<i>Young Children</i>	1996-2007	9	
<i>Early Childhood Education Journal</i>	1996-2007	6	
<i>Contemporary Issues in Early Childhood</i>	2000-2007 Started 2000	3	
<i>International Journal of Early Years Education</i>	1996-2007	1	
<i>International Journal of Early Childhood</i>	1997-2007	1	
<i>European Early Childhood Research Journal</i>	1996-2007	2	
<i>Australian Journal of Early Childhood</i>	1996-2006	nil	<b>22</b>