The relationship between the physical environment and learning: A blind spot in New Zealand early childhood education discourse?

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Abstract

Although the design, layout and space in ECE environments influences children's learning, New Zealand's minimum standards for physical space compare poorly with other OECD countries and there is a paucity of NZ research in this area. This paper argues that the relationship between physical environments and learning is a 'blind spot' in NZ ECE discourse.

In identifying why this blind spot may have occurred, aspects of the ECE sector's history are described. In particular it is argued that the sector's status as the 'cinderella' of the education system has led to political struggle for government recognition, improved qualifications, adult:child ratios, and funding, and that these issues have necessarily dominated ECE sector discourse. In addition it is argued that historical disparities within the sector have meant that concerns about physical space are not necessarily shared across the sector.

In describing why the relationship between physical environments and learning should be of growing concern, this paper argues that bulk funding and minimum standards for physical space, rather than pedagogy, appear to be influencing the design of ECE physical environments, particularly in corporate ECE which is the fastest growing part of the sector. The paper ends by challenging the government and the ECE sector to redress the lack of attention paid to the impact of the physical environment on children's learning.

T|e Whāriki[1] states that children learn through responsive and reciprocal relationships, not just with people, but with "places, and things" (Ministry of Education, 1996, p. 14). The physical environment has a significant impact on children's cognition, social learning, and behaviour (Maxwell, 1996; Moore, 1986, 1987; Olds, 2001) and Vea Vecchi[2], in highlighting the possibilities the physical environment affords children, warns that we must also be aware of the restrictions space can create and "that which it denies" (Ceppi & Zini, 1998, p. 135). Despite its importance, New Zealand's (NZ) minimum standards for space compare poorly with other Organisation for Economic Co-operation countries (OECD, 2011) and there is a paucity of NZ research in this area (Farquhar, 2003).

This paper argues that the relationship between physical environments and learning is a 'blind spot' in NZ early childhood education (ECE) discourse. It argues that this blind spot has partly occurred in response to the ECE sector's history as the 'cinderella' of the education system which has led to political struggle for government recognition, improved qualifications, adult:child ratios, and funding. These issues have been of shared concern to the sector and have necessarily dominated ECE sector discourse. Disparities within the ECE sector have meant that concerns about physical environments have not been shared by the sector as a whole, and as a result have not found their way into the discourse.

Other reasons for this blind spot may include research and practice trends which have responded to changing notions of quality. For example, teaching practice has moved from a developmental approach to a socio-cultural approach which places greater value on the relationships that take place between adults and children than on children's interactions with the environment. According to Dalli, White, Rockell, and Duhn (2011), "the factors that once occupied

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[1] Te Whāriki is NZ's ECE national curriculum statement.
[2] Vea Vecchi is a researcher from the influential Reggio Emilia ECE centres in Italy. Reggio Emilia is a provence in Italy where a group of community owned ECE centres have become influential around the world for their pedagogical approach.

researchers' attention therefore are now seen as subsidiary to this pedagogical and relational emphasis" (p. 25).

To support the argument that there is a blind spot in the discourse, part one of this paper briefly summarises (i) research trends in ECE since the early 1980s and how resulting reports on ECE quality view physical environments; (ii) how NZ's minimum standards for physical space compare with other OECD countries; and (iii) literature from architecture, environmental and social psychology which highlights the importance of the physical environment in relation to cognition, social learning and behaviour.

In asking why this blind spot has occurred in NZ's ECE discourse, part two discusses the ECE sector's diversity, history and politics. It illustrates how, in contrast to childcare, kindergartens' early history of government support and planning resulted in generally well-designed, purpose built physical environments and argues that this has contributed to a blind spot in the discourse. Issues of shared concern to the sector, such as qualifications and pay parity, have necessarily dominated the sector's political struggles and it is argued that this has also contributed to the development of a blind spot. In addition, part two of this paper discusses how pedagogical shifts in teaching practice may have reduced the sector's focus on the role of the physical environment.

Part three argues that this blind spot is a growing concern by describing how bulk funding and minimum standards for physical space, rather than pedagogy, appear to be influencing the design of ECE physical environments, particularly in corporate ECE which is the fastest growing part of the sector. It also discusses the link between group size and physical space, and questions the recent ECE Taskforce's recommendation to reduce group size without consideration of this link (Ministry of Education, 2011). The paper concludes by challenging the government and the ECE sector to redress the lack of attention paid to the role of the physical environment in children's learning, and in particular challenges the government to take the lead to ensure that regulations are of high quality and evidence based.

Part one: evidence of a 'blind spot'

Research trends and resulting reports on ECE quality

> Children learn through responsive and reciprocal relationships with people, places, and things. (Ministry of Education, 1996, p. 14)

ECE research has mainly focused its lens on people rather than places and things (Farquhar, 2003). NZ research in the 1980s and 1990s tended to look at people through a structural lens: the ratio of adults to children, the adults' qualifications, and the number of children in a group. These three features have been referred to as the 'iron triangle' underpinning quality processes (Smith, Grima, Gaffney, & Powell, 2000, p. 56) because, rather than being indicators of quality by themselves, they create the conditions for quality practice (Goelman et al., 2006, cited in Carroll-Lind & Angus, 2011).

Since the 1990s research has increasingly focused on process characteristics of quality such as the quality of interactions and how these impact on children's learning (Dalli et al., 2011). There has also been a greater emphasis on cultural contexts resulting in questions about who defines quality. Most recently, interest is growing in translational research whereby insights from varied disciplines, such as neuroscience and education, are drawn together.

Reflecting these research trends, significant reviews on the quality of ECE either do not not address the role of the physical environment (for example, ERO, 2009), or have tended to address physical environments from a health and safety rather than a wider curriculum perspective (for example, Carroll-Lind & Angus, 2011; Dalli et al., 2011; Meade, 1988; Smith et al., 2000). Government strategies developed in response to such reports also reflect this blind spot in the discourse, for example, *Before Five* (Lange, 1988), *Pathways to the Future: Nga Huarahi Arataki* (Ministry of Education, 2002), and *An Agenda for Amazing Children* (Ministry of Education, 2011).

Farquhar's (2003) Best Evidence Synthesis does focus on the physical environment's wider role, describing the physical setting as one of seven characteristics of quality teaching (Farquhar, 2003). Research on the relationship between the physical environment and

children's learning is included, although Farquhar acknowledges that the evidential base "is thin because most of the research focuses on describing children's experiences and learning outcomes" (p. 39).

A recent report by the Office of the Children's Commissioner into non-parental education and care of infants and toddlers (Angus & Caroll-Lind, 2011) also includes some discussion on the relationship between physical environments and children's learning (Canadian Council on Learning, 2006; Jalongo et al., 2004; NACCRRA, 2008; Penn, 2009; Te One, 2008, all cited in Angus & Caroll-Lind, 2011). However, most emphasis is placed on health outcomes, with the inclusion of research that raises serious concerns about the relationship between small physical environments, poor health, the spread of infectious diseases, and hearing problems (Bedford, 1999, 2008; Bedford & Sutherland, 2008, McLaren, 2007, 2008, cited in Angus & Caroll-Lind, 2011). The commission has responded to this health research by recommending that indoor minimum activity space increase from 2.5m^2 to 3m^2 for under two-year-olds (Angus & Caroll-Lind, 2011, p. 195) although this figure is not research based and the report acknowledges that 3m^2 is "behind our Australian counterparts" (Angus & Caroll-Lind, p. 179).

NZ's minimum standards: comparison with other OECD countries

New Zealand ECE regulated minimum space is 2.5m^2 indoor and 5m^2 outdoor per child (NZ Government, 2008). International research suggests that between 3.25 and 5m^2 indoor space is needed to support acceptable outcomes for children (Moore, Lane, Hill, Cohen, & McGinty, 1994; Olds, 2001). Fewer studies have assessed outdoor space, but Australian recommendations range from 7 to 25m^2 per child (Walsh 1994a, 1994b, cited in Early Childhood Australia, 2004; Olds, 2001).

Most OECD countries recognise that younger children need relatively more space. The OECD average requirement for indoor space is 3.6m^2 for zero to three-year-olds, and 2.9m^2 for over three-year-olds. The average outdoor requirement is 8.9m^2 for younger children, and 7m^2 for older children. NZ's minimum standard is 31st out of 36 countries measured (OECD, 2011).

Bedford and Sutherland (2008) note that New South Wales and Victoria's minimum space requirements are "30% greater inside and 40% greater outside" than NZ and that the NZ minimum standard "roughly equates to 30 children and 3-7 adults in a three-bedroom house" (p. 41). They argue that "whether you call the building a house or an Early Childhood Education Service, overcrowding is likely to have the same consequences for health" (p. 41).

In addition to regulated minimum space, NZ ECE licensing criteria require centres to "include quiet spaces, areas for physically active play, and space for a range of individual and group learning experiences appropriate to the number, ages, and abilities of children attending" (Ministry of Education, 2009, criterion 1). If under two-year-olds are present, centres must "ensure there are safe and comfortable spaces for infants, toddlers, or children not walking to lie, roll, creep, crawl, pull themselves up, learn to walk, and to be protected from more mobile children" (criterion 14). NZ's ECE curriculum statement Te Whāriki also states that the physical environment should be "predictable and calm" for infants (Ministry of Education, 1996, p. 22), provide "opportunities for independent exploration and movement" for toddlers (p. 24), and provide "challenging opportunities which keep pace with [older children's] physical development" (p. 26).

Both the licensing criteria and Te Whāriki are difficult to define from a regulatory perspective. However, Te One (2008) and the Children's Commission (Angus & Caroll-Lind, 2011) found environments that were clearly inconsistent with licensing criteria. The Children's Commission investigated the care and education of under two-year-olds and found that some ECE centres had few quiet areas, poor access to equipment due to the flow of the building and, in some cases, toddlers were regularly disrupted because their room acted as a thoroughfare for others (Angus & Caroll-Lind, 2011, p. 158). Early childhood teachers expressed concerns to the Commission that in centres with small spaces "babies lacked the spacial freedom to move and toddlers were sometimes jostled and unable to experience enriched learning" (Angus & Caroll-Lind, 2011, p. 157).

Te One (2008) found that poor design and limited space in ECE centres could compromise children's rights. When comparing a sessional kindergarten and an all-day mixed-age ECE centre, she noted that the purpose-built kindergarten's physical environment "was designed to encourage interactions and engagement [and] facilitated children's participation as active agents of their own experiences" (Te One, 2008, p. 209). In contrast, she found that aspects of the creche environment were inadequate and opportunities for infants to physically explore were compromised by its small size.

Research from architecture, environmental and social psychology

Literature from architecture, environmental and social psychology indicates that the physical environment has a significant impact on children's cognition, social learning, and behaviour (Burgess & Fordyce, 1989; Moore, 1986, 2002, both cited in Farquhar, 2003; Kantrowitz & Evans, 2004; Legendre, 1995; Maxwell, 1996).

Professor Gary Moore from the Faculty of Architecture, University of Sydney, found that the most intensive level of engagement and the highest level of exploratory behaviour and social interaction among young children takes place in well-defined ECE activity areas (Moore, 1986). Others have found that if settings are resource rich, children engage in activities more independently and there are significantly more positive social interactions such as cooperation and affection (reviewed in Prescott & David, 1976, cited in Moore, 1986).

Rohe and Patterson (cited in Moore, 2002) found that density (the number of children in a space) affects social behaviour, with higher density leading to more aggression and destructive behaviour. Kantrowitz and Evans (2004) found that the fewer children there were per activity in ECE activity areas, the more time the children spent in constructive play.

Children may adapt to density, and their need for privacy, through withdrawal, decreased intimacy (Hutt & Vaizey, 1966, cited in Maxwell, 1996), aggressive behaviour, more time in solitary play (Loo, 1978, cited in Maxwell, 1996) and avoidance of others (Burgess & Fordyce, 1989, cited in Maxwell, 1996). Withdrawal behaviour may result from over-stimulation (Evans & Lepore, 1993) and the

availability of a room or a space to which a child can escape from too intense stimulation. Wachs (1976, cited in Moore et al., 1996) describes this type of space as a "stimulus shelter" and its availability is a strong predictor of later cognitive development. This link to cognitive development appears consistent with research from neuroscience which indicates that repeated exposure to highly stressful environments has a negative impact on brain functioning and overall development (Dalli et al., 2011).

There may also be a cultural dimension to density. Kritchevsky and Prescott (1969) found that children of certain ethnic groups function well in what to most middle class Americans is relatively crowded and congested space. Kritchevsky and Prescott suspected the settings they observed resembled those that the children had experienced at home as affectionate, warm, and comfortable. In contrast, Maxwell (1996) found that children in both high-density homes and high-density early childhood centres were more susceptible to behavioural problems.

While this paper is largely interested in issues surrounding the amount and configuration of space, research also indicates that elements such as acoustics, lighting, surface texture, and colour impact on learning and behaviour (reviewed in Prescott & David, 1976, cited in Moore, 1986).

In terms of the initial design of ECE centres, Gary Moore argues that "the amount and organisation of both indoor and outdoor areas [are] among the most critical design considerations" (AECA, 1996, p.1, cited in Moore, 2002) and Anita Olds, American author of 'Child Care Design Guide' emphasises that "facility design needs to be right up there – along with subsidies [funding], staff salaries, staff/child ratios, and group sizes – as one of the key issues related to quality" (2001, p. 63). As discussed, NZ reports on quality and government strategies pay little attention to the design of ECE centres, or to the role of the physical environment on children's learning.

Part two: why a blind spot may have occurred

To explore why this blind spot may have occurred in NZ's ECE discourse, the following section describes aspects of the ECE sector's history and politics with a focus on centre-based teacher-led[3] services. In particular, it describes the impact of the separate development of kindergarten and childcare[4] and explains how these histories came to influence ECE's dominant discourses and political agendas. It is argued that the dominance of key discourses may have obscured other important issues, such as the impact of physical environments on children's learning. Changing notions of how children learn, and how these notions may have impacted on perceptions about the physical environment are also discussed.

ECE sector history

While the ECE sector as a whole has been referred to as the 'cinderella' of the the NZ education system (May, 2001), there is also a history of disparity within the sector. Kindergarten[5] has been seen as the sector's 'flagship' (Wylie, 1992) and childcare centres as 'the true cinderella' (May, 2001). The roots of this disparity are historical and reflect social attitudes about the role of children, their families, and in particular the role of women (May, 2001).

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[3] Centre based teacher-led ECE services include education and care centres and kindergartens. Playcentre is 'parent-led' because parents usually provide the ECE. Nga Kohanga Reo's history is whānau-led because whānau provide the language and care on a day-today basis.

[4] The description and naming of services within the ECE sector is complex. The term 'childcare centre' is historical and reflects the common social belief that dominated until the 1980s that such centres provided care, not education. In this section on the history of ECE, discussion of events prior to the 1988 reforms refer to ECE centres as 'childcare centres' or 'kindergartens' reflecting the terminology of the time.

[5] Free Kindergartens began in 1889, established under the New Zealand Free Kindergarten Union (later changed to an Association). Membership was open to all free kindergarten associations who were in receipt of government grants. Kindergartens have never been state owned, despite kindergarten teachers' inclusion in the State Sector Act. (NZ Kindergartens Inc, 2009).

Kindergarten

The Free Kindergarten movement in New Zealand had its beginnings in Dunedin in 1889. Learmonth Dalrymple was interested in the education of young children and had published a pamphlet in 1879 suggesting that from three years of age children should be taught in schools based on the ideas of German educationalist Friedrich Froebel who advocated 'play-based' education within a prepared environment.[6] Although kindergartens started in old halls that were hard to heat and had no outside areas, the government provided inspections and funding from as early as 1909. The first purpose built kindergarten opened in 1914 (Hughes, 1989, p. 11).

By 1943 funding had more than doubled and by 1958 there was significant state involvement with the Department of Education requiring kindergartens to be "established only in specially designed permanent buildings" (Hughes, 1989, p. 15). Guidelines required a quarter acre site with "sufficient proportion of flat or nearly flat land ... with maximum sun and shelter from wind. Part of the area was to be paved, the rest laid out in a garden with a place for digging" (Hughes, 1989, p. 15). Eventually, sites were set aside for kindergartens when primary schools were built, and expansion was planned and controlled to ensure there were enough teachers available to staff kindergartens as they opened (May, 2001).

Since the late 1940s, kindergarten was recognised as 'acceptable preschool education' and through the 1950s to the 1970s children who did not attend became viewed firstly as 'unfortunate' and in later years as 'at risk' or disadvantaged (May, 2001). In 1947 the government's Bailey Report had suggested that the state take ownership of kindergartens and continue to run them as a sessional provision (Department of Education, 1947, cited in May, 2001). Support for sessional provision was likely to be influenced by attachment theorist John Bowlby's views that children's separation from their mothers

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[6] Friedirch Foebel developed the first "Kindergarten' in Germany which was based on the belief that children can reach their potential in a carefully prepared environment with support from parents and teachers. Froebel argued that brain development is most pronounced between birth and age 3 and supported play-based education within a prepared environment.

was harmful. Bowlby compared the full-time employment of mothers as being on a par with "the death of a parent, imprisonment of a parent, war, or famine" [as] "reasons for family failure" (Bowlby, 1952, cited in May, 2001, p. 47). The Bailey report also recognised that 'all-day school' would be costly due to the equipment needed for meals, and extra staffing (May, 2001).

Although state ownership of kindergartens did not eventuate, the government accepted responsibility for kindergarten teachers' salaries and provided funding for training, buildings and operations (May & Mitchell, 2009). Training had become an important issue for government since the late 1940s, when Moira Gallagher, the first Supervisor of Preschool Services in the Department of Education, raised concerns that programmes involved excessive teacher direction (May, 2001). However, although kindergartens were fully staffed with trained teachers by 1965, and by 1972 teachers trained in colleges alongside their primary and secondary counterparts (Hughes, 1989), kindergarten training was shorter, and teachers' qualification levels lower than primary teachers.

By the 1980s, kindergartens were well designed and purpose built for children from three-years-old to school age who attended on a sessional basis. Their space, design and equipment were informed by educational theorists who supported 'learning through play' within carefully prepared environments. Kindergartens were not designed for mixed-age groupings or long day attendance. Kindergartens enjoyed strong links to government and teachers were paid directly by the government under the State Sector Act. The kindergarten movement's dominant discourses did not include concerns about physical environments because they were of good quality. Discourse focused on adult:child ratios, group size, funding, and particularly teacher qualifications. Helen May (2005) describes kindergarten teachers as being on a quest for pay parity with primary school teachers since 1973 when the Kindergarten Teachers' Association president Wendy Lee called for a "career structure which will attract people on the same basis as other branches of the teaching profession" (Lee, 1973, cited in May, 2005, p. 8).

Kindergartens' ownership model, which consisted of regional associations under a national body, provided a strong voice ensuring kindergarten issues were articulated in a coherent way. This collective ownership model provided a base for effective union organisation, and the Kindergarten Teachers' Association (the union) played an important advocacy role. Kindergartens' status as the 'flagship' of the ECE sector, its links to government, and its ability to organise, ensured that kindergarten discourse set the agenda for the ECE sector.

Childcare

In contrast, childcare centres in the 1940s were unregulated, often 'backyard' arrangements largely hidden from view and operating without government support or recognition. Some were run by volunteers or charities and many were small scale private operations run from homes and catering to working (often single) mothers (May, 2001).

From the 1940s to the 1970s childcare was generally viewed as harmful to children (May, 2001). It remained unfunded and unregulated until 1960 when, in response to scandals[7], regulations were introduced. In 1963, Sonja Davies organised the inaugural meeting of the New Zealand Association of Child Care Centres, later to become Te Tari Puna Ora o Aotearoa/NZ Childcare Association. Davies was dismayed by the poor quality of centres describing children as "listless or lacklustre [and] the people running them obviously [having] no idea of children's needs" (Davies, cited in May, 2001, p. 56).

Training became a key issue, along with funding and improved regulation. Centres did not receive government funding for operations until 1983 with the introduction of trained staff grants (May, 2001, p. 169)[8] and they remained outside the education sector, under the Department of Social Welfare, until 1986. It wasn't until 2005 that

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[7] Police removed 29 children from an Auckland home in 1958. Mabel Howard described the situation as 'too shocking to give full details'. Children had skin diseases and other illnesses, and one had a fractured leg (May, 2001, p. 53).

[8] Trained staff grants were an incentive scheme to encourage the employment of trained teachers. The grant could apply a maximum of two teachers per centre. At this time there was still no regulation requiring centres to employ trained teachers.

childcare centres were required to employ one teacher with the benchmark DipTch. This was the qualification requirement for all kindergarten teachers at the time.

In the early 1980s, a State Services Commission report (1980) had found that all ECE services (including kindergarten and childcare) should be seen as education and receive equitable funding for 50% of their costs. This report was shelved by the government because the cost of meeting education rather than 'care' standards was considered too high (NZ Herald, 1982, cited in May, 2001), but it did indicate the beginnings of some political traction by the childcare movement.

While many childcare centres were community owned, some private 'for profit' chains developed in the early 1980s. The Early Childhood Workers Union formed in 1982 and workers became increasingly politicised. When centres received trained staff grants in 1983, childcare workers were not covered by industrial agreements and this brought accountability for government funding into focus.

Throughout the 1980s community-owned childcare centres were established by parent groups, and organisations such as the Public Service Association on a not-for-profit basis. City Councils leased premises to some community groups for low rental, and a few community-owned centres were funded through mortgages.[9] A small number received government funding through Capital Works Grants which, while introduced in 1973, were very small and not widely available (May & Mitchell, 2009).

A necessarily 'make do' approach underpinned the choice of building and the design of renovations. When asked why a two storied house with a lot of small rooms was chosen to establish the PSA

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[9] In Wellington City Playspace, Adelaide, Te Kainganui, City Kids, Aubert, and PSA ECE centres are some of the community owned centres established during the 1980s. Of these, Adelaide and Te Kainganui operated from a Council owned building with low rental (later gifted), Aubert and Playspace rented premises from churches (in 2012 both were given notice of their leases ending; Aubert closed in November 2012). City Kids purchased their properties by raising mortgages, while the PSA childcare centre ownership has transferred to a not-for-profit parent group.

childcare centre in Wellington, one parent said "we thought it would be homelike."[10] Community groups were independent of each other and if resources on centre design had been available, it is unlikely that they would have greatly impacted because, unlike kindergartens, childcare centres developed without government funding or centralised planning.

By the 1980s the childcare sector's key discourses were government recognition of its role as education rather than 'care only' provision, funding, qualifications, industrial protection, and adult: child ratios, particularly for under two-year-olds. While kindergarten teachers were on a quest for pay parity with primary school teachers, childcare workers embarked on a quest for parity with kindergarten. Childcare issues fitted within the dominant discourses already established by the kindergarten movement.

Within this context physical environments were not a priority for the childcare movement who had 'bigger fish to fry', and they were not a sector-wide concern because, as already discussed, kindergartens enjoyed relative quality in this area. The ECE political climate was understandably dominated by issues that were (i) of sector-wide concern, (ii) supported by a solid research base, and (iii) considered integral to securing government support, particularly funding. As Ros Noonan, the General Secretary of the Kindergarten Teachers' Association at the time said, "we could better identify what action was necessary by focusing on one specific area rather than trying to change the entire system" (Noonan, cited in May, 2001, p. 167).

Beginnings of equity within the ECE sector

In 1988, plans for reform of the ECE sector began with the release of *Education to be More* (Meade, 1988)[11] and the resulting government statement of intent *Before Five* (Lange, 1988). Before Five sought to address inequities within the ECE sector,[12] increase participation,

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[10] Personal communication, circa 1984.

[11] Commonly known as the Meade Report.

[12] The ECE sector is sometimes known as the early childhood care and education (ECCE) sector, highlighting its focus on both 'care' and 'education'.

provide more parental choice, and lift quality overall. It signalled unprecedented funding increases at a time of reduced government spending in other areas (May, 2001).

Prior to these reforms, the Labour Government made two policy shifts that brought pieces of the sector closer together: (i) responsibility for childcare shifted from the Department of Social Welfare to Education, and (ii) training for kindergarten and 'childcare' teachers merged into a single qualification although childcare centres were still not required to employ qualified teachers.

Qualifications and pay parity: the dominant discourse for all

As part of the *Before Five* reforms, the Labour Government planned to lift qualification levels across the sector. However, Treasury expressed concern about the "increasing trend of professionalism ... which may have costs as well as benefits ..." (as cited in Wells, 1991, pp. 121-122), and both Treasury and the State Services Commission were acutely aware of the downstream pressures on wages and expectations of pay parity that would follow.

In 1991, the National Government halted Before Five's plan and introduced a lower level points system instead. In 1996, funding was increased to ECE centres employing one fully qualified teacher, providing an incentive but not a requirement, and by 1998 only 50% of EC centres had taken up this funding because the cost of meeting criteria was not considered financially viable (May, 2001).

1999 brought another change of government and a renewed focus on ECE. A ten-year strategic plan was developed (Ministry of Education, 2002). As part of its strategy to improve quality, the plan included a goal to introduce professional registration requirements for all teachers in teacher-led ECE services. The subsequent regulatory review set a series of targets to ensure that 100% of regulated staff would be registered teachers by 2012 (Ministry of Education, 2004a, p. 26), and in 2007 the 50% mark was reached as planned. However, progress halted with a change of government in 2008 and the 100% target for all ECE centres has not yet been reached.

Following campaigns such as 'A teacher is a teacher is a teacher,'[13] kindergarten teachers achieved parity with primary teachers in 2002. Although by this time kindergarten, childcare, and primary unions had amalgamated into one union, the New Zealand Educational Institute's (NZEI) most qualified teachers who work in ECE centres that are not owned by kindergarten associations are yet to win parity. Fewer than 6% of ECE centres are covered by the collective employment agreement which offers similar salaries to kindergarten teachers.[14]

In 2011, the National Government replaced plans for ECE centres to be 100% staffed by qualified teachers with an 80% target. Funding was lowered accordingly. This ensured qualifications remained a dominant discourse and cause for political action. The sector's efforts to reach 100% qualified are underpinned by a desire to improve quality and a recognition that 100% qualified can act as a lever for pay parity and associated funding. The current dominance of this discourse may continue to obscure other important issues, such as the impact of physical environments on children's learning.

A socio-cultural approach to pedagogy: changing perceptions about the role of physical environments

Changing notions of how children learn may have also contributed to the lack of discourse about physical environments. Trends in teacher practice since the early 1990s have placed increasing value on the role of the teacher. This has occurred as notions of how children learn move from a developmental approach to a socio-cultural approach that places greater value on the relationships that take place between adults and children (Dalli et al., 2011; Hill, 2009). Some literature argues that, in relation to under two-year-olds, the teacher as an attachment figure "is the curriculum" (Dalli et al., 2011, p. 65). Pedagogy in

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[13] NZEI campaign launched in 1998 in support of pay parity with primary teachers (May, 2005).

[14] 160 centres were covered by the *Early Childhood Education Collective Agreement* (ECECA) in 2011. In 2012, this represents 6.2% of all EC centres in 2011(www.educationcounts.govt.nz/statistics). The ECECA was first negotiated by the Early Childhood Workers Union in 1985 (and was known as the 'Consenting Parties Award') and is currently negotiated by NZEI.

relation to older children has also been influenced by the Reggio Emilia approach which emphasises the importance of teachers' dialogue with children and building curriculum in response to their theories and ideas (e.g., Edwards, Gandini, Foreman, & Reggio Children, 2011). Within the New Zealand context, the Māori concept of 'ako' also places the teacher and learner in a reciprocal learning relationship (Tamati, 2005, cited in Dalli et al., 2011).

As described at the start of this paper, Dalli et al. point out that "the factors that once occupied researchers' attention ... are now seen as subsidiary to this pedagogical and relational emphasis" (2011, p. 25). These authors argue that one of the factors that has become 'subsidiary' is the ECE physical environment because the emphasis on relationships has moved attention from the environment at a time when, as discussed in part three of this paper, lack of physical space is an area of growing concern.

Part three: the physical environment as a growing concern

The impact of bulk funding and the rise of corporates on space

The quality of physical environments in NZ ECE centres should be viewed with growing concern. This is because bulk funding, rather than pedagogy, appear to be influencing centre design, particularly in corporate ECE which is the fastest growing part of the sector. Prior to the introduction of bulk funding, childcare centres were funded through trained staff grants. These were capped at two grants per centre, providing no incentive for centres to enrol high numbers of children. As a result, centres enrolled numbers appropriate for the space and many continue to operate well above minimum standards as a result.[15] Kindergarten salaries were directly funded, again a model that did not incentivise services to increase numbers.

Bulk funding rates are based on an hourly, per child formula. Increases in the first year of the 1998 funding reforms represented a

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[15] For example, Aubert Childcare Centre in Wellington has more than twice the activity space than is required by regulation. Measured by Pairman, August, 2012.

50% increase for ECE centres, and up to a 100% increase for those with children under the age of two (May, 2001). Charters were introduced partly as an accountability mechanism. However, despite *Education to be More* (Meade, 1988) recommending that charters only be negotiated with Boards of Trustees, they were also signed with individual private owners. This decision allowed 'for-profit' centres access to bulk funding alongside not-for-profit centres[16] and has dramatically reshaped the ECE sector in the decades since. Later funding increases, including a 20-hours-free policy implemented in 2007, have led to further expansion of corporate ECE centres. According to May and Mitchell (2009), multi-national companies such as Macquarie Bank were able to move in and out of the market, rapidly buying and then selling centres for a large profit (p. 9).

Bedford and Sutherland's experiences[17] working with groups establishing new EC services indicate that bulk funding, rather than pedagogy, often informs centre design, particularly in the corporate ECE sector. They state:

> One of the most distressing features ... is the attitude of developers to occupancy and profit. We have discussed plans with one Centre developer who was quite prepared to sacrifice the usefulness of spaces in order to achieve a strict 2:1 outside to inside space ratio. This ratio gives maximum occupancy, as no space is 'wasted' say, by having a 46-child minimum space inside and a 52-child minimum space outside (you would only be licensed for 46). Why not take some outside space and have 50 children? Design for children's developmental needs was not part of the discussion. (p. 41)

Interestingly, although kindergartens showed signs of increasing rolls in response to bulk funding in the 1990s (Davison, 1997, p. 15), many kindergartens have since reduced numbers. The reversal of this

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[16] Non-profit was defined in *Before Five* (Lange, 1988). It required services to have clauses within documentation of incorporation which prohibited the distribution of income to members or trustees (over and above salaries/ wages/fees) and, on dissolution, to prevent the distribution of assets to markets.

[17] Bedford and Sutherland were the 'Early Childhood Centre Team' at Wellington Regional Public Health. In this role they have visited hundreds of ECE centres, and provided advice and support to new centres from the greater Wellington region, prior to their licensing.

trend appears to be in response to the introduction of the 2008 funding system. This system is based on 'cost drivers' and has a higher funding rate for full-day services to reflect the higher cost of full-day provision.[18] Many kindergartens moved to full-day provision in response (NZ Kindergarten Inc, 2009) and were then required to have better adult:child ratios[19] than sessional services. Most full-day kindergartens have improved their ratios by reducing their overall numbers, and this has led to more physical space per child.[20]

The impact of group size on space

In addition to bulk-funding, recent calls for reductions in group size (e.g., Carroll-Lind & Angus, 2011; Dalli et al., 2011) may negatively impact on the quality of physical environments if the relationship between group size and physical space is not considered as part of any regulatory change to group size.

There is clear evidence that small group sizes lead to better outcomes (Angus & Caroll-Lind, 2011; Dalli et. al., 2011; Farquhar, 2003; Ministry of Education, 2002, 2004a; Smith et. al., 2000); however, international research also identifies an interdependence between group size and space. Smaller groups, such as the group size of eight recently recommended for under two-year-olds by the Children's Commissioner (Angus & Caroll-Lind, 2011) need relatively more space per child than larger groups (Early Childhood Australia, 2004; Moore et al., 1994; Walsh, 1998).

This supports Bedford and Sutherland's (2008) observation that "while in some buildings smaller group size may result in more space per child, current development trends suggest that for many centres, especially new ones, the result will probably be smaller rooms" (p. 41).

The Ministry of Education's (2004a) regulatory review consultation document included options for regulating group size. However, the sector was unable to agree on how to manage this very

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[18] The Education (Early Childhood Services) Regulations 2008. Full-day provision is more than 4 hours per day.

[19] The Education (Early Childhood Services) Regulations 2008.

[20] NZKI personal communication, October 2012

complex issue (Ministry of Education, 2004b) and a 'reflective question' asked as part of the consultation: how should a group be defined? remains unanswered. How a group should be defined is particularly unclear in mixed-age settings where, for example, a group size of 8 would provide very few peers for a four-year-old who may be part of that group. Unintended consequences could result if reductions in group size are not considered in conjunction with minimum requirements for physical space, and within a clear definition of what constitutes 'a group' in different ECE settings.

The structural elements of ECE services (which are often regulated) are not necessarily indicators of quality by themselves, but they set up the conditions for quality practice (Goelman et al., 2006, cited in Children Commission). The OECD argues that the "regulatory instrument is among the most important tools of government in OECD countries and that consequently high-quality regulation is crucial for government effectiveness" (OECD, 1995, p. 1). In order to achieve high-quality regulations they must be research-based. Quality regulation is particularly important in ECE in which there may be "no relationship between parent satisfaction and research-based measures of quality" (Barraclough & Smith, 1996). This paper challenges the government and the ECE sector to redress the lack of attention paid to the role of the physical environment in children's learning and in particular, challenges the government to take the lead in ensuring that regulation is of high quality and evidence based.

Conclusion

The design, layout and space in ECE environments influences children's learning, yet NZ minimum standards for space compare poorly with other OECD countries and there is little NZ research in this area. Several decades of discourse have been dominated by issues of funding, pay parity, and to a lesser degree, adult:child ratios and group size. The dominance of these discourses, and the relative 'silence' on physical environments results in part from the ECE sector's history as the 'cinderella' of the education system and efforts to catch-up with other parts of the education sector. In addition, concerns about this issue are not shared by the whole sector because

kindergartens have enjoyed high quality physical environments, and because trends in teacher practice place increasing value on relationships between adults and children rather than physical environments or equipment.

The relationship between physical environments and learning is a growing concern because bulk funding acts as an incentive to build according to minimum standards rather than design for living and learning. While not all planners take this minimalist approach, it appears that many corporate developments do, and corporate ECE is the fastest growing part of the sector. Plans to reduce group size also raise concern because unintended consequences may result if regulatory change occurs without consideration of the relationship between group size and the physical environment. This paper challenges the government and the ECE sector to redress the lack of attention paid to the role of the physical environment in children's learning and in particular, challenges the government to take the lead in ensuring that regulation is of high quality and evidence based.

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