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Sometimes I reflect on how vulnerable we are to changes in policies and changes in government. I remember the frenzy in the Australian early childhood community at the time of the latest federal election as we all tried to create space on the political agenda for young children and their families. I reflect on elections in the past and the cycles of policy changes I have experienced over my time in early childhood. I remember restructuring degree courses based on my expectations of outcomes from government policy changes. McLachlan summarises this for us in the New Zealand context and points out the shifts in early childhood policy arising from the new government, their stronger focus on targeted services rather than universal, and their withdrawal of funds from a number of early childhood initiatives that had garnered New Zealand a leading reputation in early childhood over past years. And in reading this article, I wonder what this might presage for the rest of us in Australasia. Will we see similar moves?

Part of the political arena is the space we create (or don’t create) for children to participate in the decisions that impact upon them. Theobald, Danby and Allwood review policy and research in Australia and identify a growing commitment for children’s participation coupled with an ongoing challenge to translate this into daily practice. Greenfield proposes one way this can be addressed in research, using a mosaic approach to facilitate children’s voice.

Irrespective of the political agenda, we want to focus on excellence in service delivery and the remainder of our articles in this issue do just that. A number of researchers report work they are doing in specific areas of the early childhood curriculum. Stagnitti, Kenna, Malakellis, Kershaw, Hoare and de Silva-Sanigorski discuss their intervention focusing on fundamental movement skills for children from disadvantaged backgrounds. Blaklock undertakes a comparison of the UK Early Years Foundation Stage and Te Whāriki in New Zealand, focusing particularly on how these documents promote early literacy, and the implications for this on local practice. McDonough and Sullivan address learning to measure length in the first three years at school, using data from the 70 schools in the Victorian Early Numeracy Research Project. Howitt, Lewis and Upson take us on a forensic science experience with young children, demonstrating young children’s competency in an area we often think as being associated with older children. They argue that such experiences not only impact on children’s science thinking but on imagination and oral language as well. Mills also makes the point that experiences have multiple outcomes. She addresses transmediation, the process of transferring information from one sign-system to another and argues that such experiences support generative thinking. Sajaniemi, Suohon and myself investigate some of the biological underpinnings impacting on children’s learning and propose a model linking children’s regulation of arousal, the synchronicity of the underpinning biology and children’s learning outcomes.

In following the curriculum focus, the next two articles address issues related to pre-service teacher education. Yim and Ebbeck discuss pre-service teachers and music education, comparing experiences and perceptions of music between students in South Australia and those in Hong Kong. Garvis focuses on arts education and demonstrate links between experiences on placement related to arts and students’ self-efficacy in arts education. Nolan and Sim focus on reflection, a key skill in improving practice and one used in many teacher education programs. They argue that reflection needs a structure or framework in order to be effective.

Many of the papers in this issue focus on young children in the context of early childhood programs—children in classes or groups. Millear looks at the transition of Korean children from the home environment into classes in junior primary and identifies the importance of language and relationships in facilitating successful transitions. Jackiewicz, Saggars and Frances discuss issues of access and barriers to participation for Indigenous children participating in early childhood programs. They identify four key issues: accessibility, affordability, acceptability and appropriateness.

Finally we offer two papers that address issues outside of the classroom; issues relating to young children and their families. Ford offers an evaluation of a program designed to support parents who experience difficulties related to their infants’ sleep. George, Vickers, Wilkes and Barton analyse the cost of caring for a child with chronic illness for parents who are working full time. These parents are often not eligible to receive additional supports because they are working, but are faced with the prospect of lower-paid jobs (in a trade-off for flexibility) and higher costs associated with their child’s needs.

As we progress through 2011 and the world changes around us, we also reflect on the changes in the early childhood landscape. Every day we learn more about quality early childhood service provision, and every day we strive to deliver the best we can to our children, their families and our students. Enjoy reading these articles and reflecting on what they mean for your practice.

Margaret Sims
University of New England
Introduction

Early childhood professionals in New Zealand are accustomed to hearing praise for *Te Whāriki*, the early childhood curriculum (Ministry of Education, 1996). Praise for the innovative approach of *Te Whāriki* has come from teachers and academics, nationally and internationally (for example, Alvestad & Duncan, 2006; Fleer, 2003; Smith, 2003; Tyler, 2002).

*Te Whāriki* contains many admirable statements about early childhood education. There are few who would disagree with the introductory statement in *Te Whāriki* that declares the curriculum was founded on the following aspirations for children: ‘to grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society’ (Ministry of Education, 1996, p. 9).

It appears, however, that the rhetoric that surrounds *Te Whāriki* may not match the reality. No research has been carried out to show whether the implementation of *Te Whāriki* has made a positive difference to the learning and wellbeing of children across a range of early childhood services. Furthermore, concern has been expressed that the lack of curriculum content in *Te Whāriki* (in areas such as language, literacy, music, mathematics, art and science) provides teachers with little guidance on how to provide children with a range of experiences in crucial areas of learning (see Hedges & Cullen, 2005).

In this article, I focus on one essential area of learning, namely early literacy. I analyse the information that *Te Whāriki* provides on this topic and compare it to the curriculum used in England, the Early Years Foundation Stage (EYFS). The curricula are compared in relation to (1) the description of literacy-related learning outcomes; (2) guidance for teachers on how to foster literacy learning; and (3) guidance on formative and summative assessment.

The EYFS contains more detailed information in each area of comparison. The article suggests that the lack of information on literacy in *Te Whāriki* may mean that children are provided with an inadequate range of literacy experiences in New Zealand early childhood centres.

Curriculum guidelines for early literacy:
A comparison of New Zealand and England

Ken Blaiklock
Unitec Institute of Technology

THE DEVELOPMENT OF EARLY literacy knowledge is generally seen as an important aspect of early childhood education. The way early literacy learning is promoted, however, varies greatly in different national curriculum frameworks. This article compares the approach taken in the New Zealand early childhood curriculum (*Te Whāriki*) with the approach outlined in the curriculum for young children in England (The Early Years Foundation Stage or EYFS). The curricula are compared in relation to (1) the description of literacy-related learning outcomes; (2) guidance for teachers on how to foster literacy learning; and (3) guidance on formative and summative assessment.

The EYFS contains more detailed information in each area of comparison. The article suggests that the lack of information on literacy in *Te Whāriki* may mean that children are provided with an inadequate range of literacy experiences in New Zealand early childhood centres.

Early literacy goals and learning outcomes

*Te Whāriki* is divided into five broad strands: Well-being, Belonging, Contribution, Communication, and Exploration. Each strand is subdivided into three or four goals and each goal includes a number of indicative
learning outcomes. Literacy outcomes are included within the third goal of the Communication strand, which states: ‘Children experience an environment where they experience the stories and symbols of their own and other cultures’ (Ministry of Education, 1996, p. 78).

Under this goal the following literacy learning outcomes (Ministry of Education, 1996, p. 78) are listed:

- An understanding that symbols can be ‘read’ by others and that thoughts, experiences, and ideas can be represented through words, pictures, print, numbers, sounds, shapes, models, and photographs.
- Familiarity with print and its uses by exploring and observing the use of print in activities that have meaning and purpose for children.
- Familiarity with an appropriate selection of the stories and literature valued by the cultures in their community.
- An expectation that words and books can amuse, delight, comfort, illuminate, inform, and excite.
- Experience with some of the technology and resources for mathematics, reading, and writing.
- Experience with creating stories and symbols.

The general nature of the above learning outcomes can be partly explained by recognising that the outcomes are designed to be applicable to all children throughout the birth–five years age range. Hence the outcomes do not convey an expectation that older children may be capable of more complex learning than younger children.

In contrast, the EYFS is more explicit about age-related developmental changes (see Practice guidance for the Early Years Foundation Stage, Department for Children, Schools and Families, 2008a). The framework of the EYFS divides learning and development into six areas:

- Personal, Social and Emotional Development
- Communication, Language and Literacy
- Problem Solving, Reasoning and Numeracy
- Knowledge and Understanding of the World
- Physical Development
- Creative Development.

Each of these areas is further divided into subsections. For example, Communication, Language, and Literacy is subdivided into the following: Language for Communication, Language for Thinking, Linking Sounds and Letters, Reading, Writing, and Handwriting.

Within each subsection, descriptive information is provided about what children may typically learn within the following overlapping age ranges: birth–11 months, 8–20 months, 16–26 months, 22–36 months, 30–50 months, and 40–60+ months.

Although information is provided about age-related changes, the EYFS guidelines recognise that there is considerable variation between children. Cautions are provided that the descriptions of learning should not be seen as age-related goals. It is also noted that ‘children will not necessarily progress sequentially through the stages’ and ‘some elements may appear to have been achieved very quickly, others will take much longer (Department for Children, Schools and Families, 2008a, p. 11).

Specific goals are stated for the time that children complete the Early Years Foundation Stage. These final goals (known as the ‘early learning goals’) are designed to be at a level that children can achieve ‘by the end of the year in which they turn five’. (Unlike New Zealand, where nearly all children start school on their fifth birthday, children in England start school in the term in which they turn five. Hence some children will begin primary school a few months before they turn five, whereas other children may be nearer five and a half years.)

The Early learning goals for literacy occur within five subsections of the Communication, Language, and Literacy division of the EYFS (Department for Children, Schools, and Families, 2008b, p. 13). (Additional goals that focus purely on listening and speaking are not included in the following list.)

1. Language for Communication
   - Enjoy listening to and using spoken and written language, and readily turn to it in their play and learning.
   - Listen with enjoyment, and respond to stories, songs and other music, rhymes and poems and make up their own stories, songs, rhymes and poems.

2. Linking Sounds and Letters
   - Hear and say sounds in words in the order in which they occur.
   - Link sounds to letters, naming and sounding the letters of the alphabet.
   - Use their phonic knowledge to write simple regular words and make phonetically plausible attempts at more complex words.

3. Reading
   - Explore and experiment with sounds, words, and texts.
   - Retell narratives in the correct sequence, drawing on language patterns of stories.
   - Read a range of familiar and common words and simple sentences independently.
   - Show an understanding of the elements of stories such as main character, sequence of events and openings, and how information can be found in non-fiction texts to answer questions about where, who and how.
4. Writing
- Attempt writing for different purposes, using features of different forms such as lists, stories, and instructions.
- Write their own names and other things such as labels and captions, and begin to form simple sentences, sometimes using punctuation.

5. Handwriting
- Use a pencil and hold it effectively to form recognisable letters, most of which are correctly formed.
- Attempt writing for different purposes, using features of different forms such as lists, stories, and instructions.
- Write their own names and other things such as labels and captions, and begin to form simple sentences, sometimes using punctuation.

Guidance for teachers on how to foster literacy learning

Te Whāriki provides little information about the provision of learning experiences related to the literacy outcomes that are mentioned in the document. Statements about learning that are included in Te Whāriki tend to be very general and reflect the sociocultural basis of the curriculum. For example, the introduction states:

"This curriculum emphasises the critical role of socially and culturally responsive relationships for children with people, places, and things. Children learn through collaboration with adults and peers, through guided participation and observation of others, as well as through individual exploration and reflection" (Ministry of Education, 1996, p. 9).

Only minimal guidance is provided on how teachers can foster learning in particular areas. Some examples of learning experiences are included for the goals in each strand but these do not necessarily link with specific outcomes and are phrased in broad terms. For example, suggested literacy experiences include the following: ‘Adults read books to infants’, ‘The toddler’s name is written on belongings’, and ‘Children experience a wide range of stories’ (Ministry of Education, 1996, p. 79).

Information on how to use Te Whāriki for program planning is also very general. Early childhood services are advised to ‘develop their own distinctive pattern for planning, assessment and evaluation’ (Ministry of Education, 1996, p. 28). There is no requirement to ensure that children are provided with experiences related to a core set of learning outcomes. Instead centres are advised to ‘offer sufficient learning experiences for the children to ensure that the curriculum goals are realised’ (Ministry of Education, 1996, p. 28). The breadth of the goals, however, means that it would be possible for a centre to consider that it was covering all the goals of Te Whāriki even if the program contained no reading or writing experiences.

The non-specific nature of the guidelines in Te Whāriki might not be such a concern if teachers were provided with supplementary resources on how to foster literacy learning.
literacy. Currently, however, the Ministry of Education provides early childhood teachers with little information about ways to provide a range of literacy experiences for young children.

A very different situation exists in England. The structure of the EYFS makes clear links between specific aspects of literacy learning and guidance for effective practice. As noted above, EYFS publications include descriptions of the literacy learning that typically occurs for particular age ranges (Department for Children, Schools and Families, 2008a). Teachers can use this information to assist their understanding of individual children. Ideas on specific practice are given for each of the age-related descriptions of literacy learning that occur within the relevant subsections of the Communication, Language and Literacy section of the EYFS (that is, Language for Communication, Linking Sounds and Letters, Reading, Writing, and Handwriting).

Extensive additional resources are available to assist EYFS teachers in the provision of appropriate literacy experiences for children. Video clips of teachers engaged in effective activities can be found on the CD-Rom that accompanies Practice guidance for the Early Years Foundation Stage. The Department for Children, Schools, and Families provides publications on emergent writing activities (Mark making matters, Department for Children, Schools and Families, 2008c) and introducing children to letter names and sounds (Letters and sounds: Principles and practice of high quality phonics. Department for Children, Schools and Families, 2008d). Online professional development courses on language and literacy are available to all EYFS teachers. In addition, commercial publishers have developed many resources that link with the EYFS guidelines. (A directory of these resources is located on the standards website of the Department for Children, Schools, and Families: www.standards.dcsf.gov.uk/phonicstrld/)

Both Te Whāriki and the EYFS emphasise the importance of play for all areas of learning. The EYFS is clearer, however, on the role of the teacher in guiding learning. Although Te Whāriki suggests that adults should support and extend children’s play and interests, little information is given on the provision of teacher-led activities. In contrast, the EYFS guidelines state: ‘All the areas must be delivered through planned, purposeful play, with a balance of adult-led and child-initiated activities’ (Department for Children, Schools and Families, 2009a, p. 10). Adult-led activities are defined as follows:

Adult-led activities are those which adults initiate. The activities are not play, and children are likely not to see them as play, but they should be playful—with activities presented to children which are as open-ended as possible, with elements of imagination and active exploration that will increase the interest and motivation for children. … Practitioners plan adult-led activities with awareness of the children in the setting and of their responsibility to support children’s progress in all areas of learning. They will build on what children know and can do, and often draw on interests and use materials or themes, observed in child initiated activities (Department for Children, Schools and Families, 2009a, p. 13).

The advice in the EYFS to provide a balance of adult- and child-led activities is supported by the findings of a recent European study of over 3000 children (aged from three years) in 141 early childhood settings (Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004). The study found that ‘in effective settings, the balance of who initiated the activities, staff or child, was about equal’ (p. vi). Furthermore, the study concluded that ‘children’s cognitive outcomes appear to be directly related to the quantity and quality of the teacher/adult-planned and -initiated focused group work’ (p. vi).

Encouraging practitioners to provide adult-led activities marks a distinct pedagogical difference between the EYFS and Te Whāriki. The provision of adult-led literacy-related activities, particularly for three- and four-year-olds, is likely to result in greater opportunities for literacy learning than is possible with the strategies outlined in Te Whāriki. Given that Te Whāriki is said to be a sociocultural document, it is somewhat ironic that the value of adult-led activities is not more clearly acknowledged. A sociocultural approach is not just about teachers and children interacting within social contexts. A sociocultural approach allows for teachers, as ‘more knowledgeable others’, to engage children in meaningful activities and to teach them specific skills in appropriate ways (Daniels, 2001). This could include the planning and implementation of teacher-led activities aimed at enhancing the early literacy skills of particular children.

Assessment

Te Whāriki includes some general statements about assessment (see Ministry of Education, 1996, p.30) but contains no requirement to assess any specific learning outcomes for children. Additional information on assessment is available in Kei Tua o te Pae: Assessment for learning: Early childhood exemplars (Ministry of Education, 2004; Ministry of Education, 2007; Ministry of Education, 2009). The Ministry of Education has devoted large amounts of funding towards developing and promoting Kei Tua o te Pae but the value of the resource is limited by its almost exclusive focus on one type of assessment, namely learning stories.

Learning stories are an innovative form of assessment developed by Margaret Carr (1998; 2001). The technique requires a teacher to first observe a child engaged in a particular experience. The teacher then
writes a narrative ‘story’ that documents the learning that is said to have occurred in the observed context. The focus of a learning story is meant to be on a child’s dispositions, rather than on knowledge and skills.

Despite their widespread use in New Zealand, there is little research evidence that learning stories are an effective way of assessing the complexities of children’s learning. A particular concern is that learning stories have not been shown to be suitable for showing changes in individual children’s learning over time. Learning stories tend to be situation-specific and are dependent on the subjective interpretation of a teacher (see Blaiklock, 2008; Blaiklock, 2010).

The literacy-related learning stories in Kei Tua o te Pae (see Book 17, Ministry of Education, 2009) provide some anecdotal descriptions of children listening to storybooks and being involved in early writing. However, no examples are provided to show how children’s literacy knowledge develops over time. Furthermore, Kei Tua o te Pae, and other published guidelines on learning stories (for example, Carr, 1998; Carr, 2001) contain no suggestions to ensure that literacy learning is assessed at any point before a child begins school. Hence it is quite possible for early childhood centres in New Zealand to avoid making any assessment of children’s early literacy skills.

The EYFS provides a much more systematic approach to assessment than is found in New Zealand. Assessment is both formative and summative. Formative assessment is ongoing and is based on observations of children in daily activities. Information from parents is also taken into account.

Guidelines on assessment are provided in the Practice guidance for the Early Years Foundation Stage (Department for Children, Schools and Families, 2008a). As discussed earlier, Practice guidance includes descriptions of specific areas of learning that may typically occur during particular age ranges. The descriptions of early literacy development can help teachers to be aware of what a child may be learning. Alongside the descriptions of learning are ‘look, listen and note’ pointers that provide additional information about what teachers can observe.

Teachers are informed that ‘these sections are not intended to be exhaustive—different children will do different things at different times—and they should not be used as checklists’ (p. 5). Additional information on how teachers can gather and use assessment information to support children’s learning is provided in the guidebook, Progress matters: Reviewing and enhancing young children’s development (Department for Children, Schools and Families, 2009b).

Summative assessment occurs when children are at the end of the EYFS. Teachers are required to complete the EYFS profile to provide a summary of observations and assessments of a child’s learning up to that point. Children’s progress is recorded on scales that are derived from the final early learning goals. The completed EYFS profile is made available to parents and to the teacher of the class when the child starts school.

In summary, it is apparent that the EYFS provides considerably more guidance on assessing early literacy than is available in Te Whāriki or Kei Tua o te Pae. The differences in assessment requirements may have implications for the provision of learning experiences. Knowing that literacy-related skills are to be assessed may help EYFS teachers to be aware of opportunities to enhance children’s literacy skills. In New Zealand, the opposite scenario may exist. The lack of guidance given to New Zealand teachers may signal to them that literacy is not an important learning area during the early childhood years.

Conclusion

Te Whāriki and the EYFS show very different approaches to early literacy. Te Whāriki has few outcomes related to literacy, whereas the EYFS has many. Te Whāriki provides little information on how to plan and implement literacy activities, whereas the EYFS and associated resources contain detailed guidance. Te Whāriki has no requirements to assess literacy learning, whereas the EYFS requires formative and summative assessments.

It could be argued that the guidance the EYFS provides on early literacy amounts to a prescriptive approach that allows teachers little freedom in designing their programs. The EYFS, however, also emphasises the importance of teachers responding to individual children’s needs and interests. Although there are many suggestions regarding what teachers can do, teacher ideas and initiatives are also seen as crucial.

It could also be argued that the emphasis the EYFS gives to academic outcomes is at the cost of attention to other areas of children’s wellbeing. Including a focus on content learning, however, does not need to take away from the importance of other aspects of children’s development. A focus on both academic and social skills has been found to be a feature of high-quality early education programs (American Educational Research Association, 2005; National Research Council, 2001).

One of the guiding principles of Te Whāriki is ‘empowerment’. This is further described as assisting ‘children and their families to develop independence and to access the resources necessary to enable them to direct their own lives’ (Ministry of Education, 1996, p. 40). Although early literacy skills receive little emphasis in Te Whāriki, becoming literate is a key way to empower children.
Tunmer and Prochnow (2009) suggest that:

...literacy should be conceptualised as a fundamental enabling skill, a tool by which readers can acquire the knowledge necessary for participating fully in the processes of society (social, cultural, and political) and for achieving their personal goals and developing their potential. ... The literate person can read to learn and write to influence (p. 182).

The literacy skills that children develop in the early childhood years are crucial for their later literacy success. A New Zealand longitudinal study by Tunmer, Chapman, and Prochnow (2006) found that measures of literacy-related skills at school entry (including phonological and grammatical awareness, letter knowledge, and vocabulary) accounted for nearly half of the variance in reading comprehension seven years later, even after controlling for socioeconomic status. Numerous international studies have also found that what children know about literacy-related areas before they start school has a significant impact on their progress in learning to read and write (see National Early Literacy Panel, 2008). Given this research evidence, and given the example of a greater emphasis on literacy in the EYFS, it is time for the New Zealand early childhood profession to reconsider whether Te Whāriki is really providing effective guidance about how to help children get off to a good start in reading and writing.

References


Korean children’s cultural adjustment during transition to the early years of school in Australia

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**This study investigated Korean** children’s cultural adjustment during transition to South Australian junior primary school settings. Using case-study methodology to provide a sociocultural perspective, data were collected during interviews with a sample of South Korean international students aged five to eight years, their mothers and teachers. All participants were asked to identify experiences that facilitated or impeded the children’s cultural adjustment to school life in Australia. The study found that language difficulties were a major concern for these children in adapting to an Australian education setting. Successful cultural adjustment was found to link to positive interpersonal relationships with peers and teachers and the ability to adapt to Australian classroom teaching methodology. The study identified cultural adjustment issues which may also be relevant to other students from a non-English-speaking background and for teachers of international students.

**Introduction**

In recent years globalisation has precipitated the growth of an international knowledge economy in which acquisition of the English language is considered to be a significant ‘marketable asset’ (Winkelmann & Winkelmann, 1998, cited in Butcher, 2004, p. 255), particularly in Asian countries. The governments of mainland China, Hong Kong, Japan, Malaysia, Taiwan, Vietnam and Korea have education policies which promote English language teaching and learning. Many Korean teachers, however, do not have the proficiency or confidence to teach in English (Nunan, 2003). Korean students travel to Australia to experience Western culture and consolidate existing English skills, or begin learning English, through immersion in an English-speaking culture (Kwon, 2000).

In Australia, the government has internationalised education to increase education market share and strengthen economic ties with neighbouring countries (Nelson, 2003). Particular emphasis has been placed on recruitment of students from the Asia-Pacific region, causing a corresponding increase in Asian international student enrolments (Nelson, 2003). In 2007–2008, international education was rated as Australia’s third-largest export industry ‘contributing $14.2 billion to the Australian economy’ (SA DECS, 2010). Currently, international students from Reception to Year 7 enrolled in the DECS Primary School Study Abroad Program pay up to $9160 for four terms tuition at South Australian government schools (SA DECS, 2010).

In this article the term ‘international students’ describes full-fee-paying foreign students on student visas studying in Australian schools. The students attend government schools in South Australia for a designated period, usually one year. After this time students return to their country of origin, although some families choose to convert their visas and apply for immigration status. While Korean students were the second-largest group of international students enrolled in South Australian public primary schools by mid-2009 (SA DECS, 2010) little is known about the social and academic needs of this culturally, and linguistically, unique student population. As the number of Korean students now attending South Australian junior primary schools is increasing an investigation of the needs and expectations of these children, and their families is warranted. The findings of such a study may provide helpful information for Korean families considering enrolling their children in Australian schools, and inform teachers about the needs of these students and their families.

The purpose of this study was to investigate factors affecting the cultural adjustment of young Korean students after their relocation from Korean to Australian
education settings. The term ‘cultural adjustment’ may be described as ‘cultural involvement and ethnic identity behaviour’ displayed through cultural practices such as social activities, customs, food (Sonderegger & Barrett, 2004, p. 352) and language (Renwick, 1997). Previous research has indicated that cultural adjustment is affected by self-esteem, anxiety, social support, self-description, ethnic identity, and acculturation (Sonderegger & Barrett, 2004).

Most Australians have little or no knowledge about Korean culture or lifestyle. Therefore, most Australian teachers may have difficulty addressing the needs of children from this ethnic group (Armitage, 1999). In order to specifically meet the needs of Korean students (Dooley, 2003), early childhood educators need to become aware of the factors affecting successful cultural transition into Australian education settings (Okagaki & Diamond, 2000) and to develop some understanding of the nature of education in contemporary Korean society.

In Korean society and education settings, relationships are vertically structured and patrilineal, reflecting Confucian values (Armitage, 1999). Korean parents have high expectations for their children’s academic achievements (Kwon, 2000). Korean children are taught to fulfill familial duties of obedience, attention and honour. In return, Korean mothers devote themselves to their children’s education and fathers provide social position, family leadership and decision making (Kim & Choi, 1994). The strength of adult–child relationships is also evident in the important bond between teacher and student. Like the child–parent connection, the rapport between student and teacher is founded on Confucian values (Kwon, 2000).

Koreans spend much money on their children’s education (Kim, 2004). Families often spend up to one-third of their household income on private tuition in art, music and English (Nunan, 2003). Outside regular school hours many children attend intensive classes, particularly in English, at private academies known as hagwon. In 2000, approximately 60 per cent of Korean students attended some form of hagwon (Kim, 2004). Anecdotal evidence suggests many Korean parents are dissatisfied with their country’s contemporary English language curriculum, which is based predominantly on reading and grammar, so some choose to have their children educated in Australia to acquire English oral language skills (Tran, 2006). Previous research about the transition of Korean students into Australian schools has mainly focused on the experiences of secondary and tertiary students (Armitage, 1999; Kwon, 2000). To date, research with younger Korean children has been limited to exploration of mother–child relationships in preschool settings (Rodd, 1996). Therefore, this study focuses on the cultural transition of young children in early childhood settings.

Children studying in a country other than their own encounter a variety of barriers they need to overcome to achieve social and academic success. Renwick (1997) suggests that poor English language proficiency is the issue which most crucially affects Korean students’ adjustment to Western education environments. Studies of tertiary Asian international students in Australia indicate that English language problems seriously affect students’ social competence and academic progress (Sawir, 2005; Wong, 2004). An inability to communicate confidently in English presents myriad difficulties for tertiary students. In the present study it was expected that similar problems may be encountered by younger students.

In Korea, early literacy education has traditionally used rote-learning (Lee, Park & Kim, 2000). Children’s education experiences are usually teacher-directed and highly competitive (Kwon, 2000). In Australia, early childhood education teachers incorporate social constructivist approaches which emphasise language-rich, activity-based, interactive learning. This pedagogical methodology is based on sociocultural theory which states that successful close interpersonal relationships are critical to effective cross-cultural learning (Lim & Renshaw, 2001). In many Australian early childhood classrooms social constructivist approaches are evident in the use of collaborative learning. In collaborative classrooms competition is not valued. Less importance is placed on individual goals and achievement (Hill, 1994). A growing body of evidence also indicates the importance of social interaction during play (Bodrova, Leong, Hensen & Henningher, 2000).

Australian settings often incorporate a play-centred curriculum which stimulates children’s cognitive and social development while they participate in social interaction during planned play experiences (Van Hoorn, Monighan Nourot, Scales & Rodriguez Alward, 2003). Okagaki and Diamond (2000) have suggested that the activities incorporated in play curricula, such as use of manipulatives, are beneficial for all children, particularly those learning English as a second language. The use of small groups for play and structured activities also allows children to observe and follow peers’ modelling (Okagaki & Diamond, 2000). In addition to teaching and learning principles, based on social interaction, the partnerships between teachers and parents of young children are crucial to the children’s social and academic success. Improved learning outcomes may be achieved when children see positive relationships between their parents and teachers (Billman, Geddes & Hedges, 2005). Australian junior primary school teachers often encourage parents and families to participate in the classroom by listening to children read in the morning or assisting with a range of class activities.
The Early Years Learning Framework for Australia advocates that teachers demonstrate ‘cultural competence’ which will enhance children’s self-esteem and capacity for lifelong learning (DEEWR, 2009). Teachers may augment cultural competence through engagement in culturally responsive teaching practices (Gay, 2002) and by increasing their knowledge about specific cultural groups (Kwon, Suh, Bang, Jung & Moon, 2010). Teacher understanding of the families’ cultural background, beliefs and circumstances is crucial for development of strong teacher–parent partnerships (Handscombe, 1994).

Peer relationships are also important to development. Children may have improved academic outcomes if they form sound relationships with their peers at school. However, previous research has indicated that students from a non-English-speaking background spend most time with their own cultural group (Kagan, 1986 cited in Coelho, 1994) and they receive few invitations to homes of families outside that group (Coelho, 1994).

Review of methodology literature

Case-study methodology allows in-depth investigation of individual children’s relationships and environment through comparison of life stories (MacNaughton, Rolfe & Siraj-Blatchford, 2001). Previous studies indicate the importance of including the perspectives of students, parents and teachers as stakeholders in school transitions (Dockett & Perry, 2005). It was decided early in the project to include interviews with children, parents and teachers to give depth to the findings. Based on sociocultural perspectives, this study explored how children’s development may be affected by relationships with others and cultural activities in society (Rogoff, 2003). Cultural activities could refer to ‘clothes, food, tools, holidays, rituals, crafts, artifacts [sic] and music’ (Garcia, 1990 cited in Ramsey, 2004).

The value of obtaining young children’s views in research has been established in previous studies, such as the Starting School Research Project (Dockett & Perry, 2005). In that project the role of children as ‘social and cultural actors’ was stipulated. Children’s perspectives were gathered during group discussions (Dockett & Perry, 2005), but this method of data collection was deemed unsuitable in the present study because the interpreter considered that individual interviews would be easier for translation purposes. Using an interpreter gave participants flexibility to express their thinking in either English or Korean, or both, and gave the interpreter time to gather more information during interviews. Triangulation was established using multiple data sources (Miles & Huberman, 1994), and reliability of data was validated by cross-referencing participant responses.

Park and Lahman (2003) suggest that researchers in the field of multicultural studies face dilemmas and perplexity, particularly related to language differences, and that potential bias should be acknowledged early in the project. The children and parents who participated in this study were all Korean speakers, with varying abilities when using English as a second language. As the researcher had little knowledge of the Korean language, she was assisted by an interpreter during six of the eight interviews with Korean participants. The interpreter and researcher discussed issues of bias before and during the interview process.

The following research questions were posed: What factors facilitate the cultural adjustment of young Korean children studying in South Australian junior primary schools? What factors impede their cultural adjustment? It was expected that the identified factors may include English language difficulties (Renwick, 1997), teaching methodologies and learning styles (Kwon, 2000; Lee et al., 2000), interpersonal relationships (Farver, Kim & Lee 1995; Lim & Renshaw, 2001) and differences in educational and cultural experiences in Korea and Australia (Kwon, 2000; Okagaki & Diamond, 2000).

Method

Design

This project used case-study methodology, with data comprising interviews with children, their parents and teachers (Stake, 1995).

Participants

Participants were four international students from Korea (three boys and one girl aged between five and eight years), currently attending one of two South Australian DECS junior primary schools, their mothers and teachers. In all cases the parent was the child’s mother since the father of each child remained in Korea, continuing his employment to support the family members living overseas.

All child participants had experience of education settings in Korea. Three had attended Korean kindergarten before arriving in Australia, and had older siblings who attended school. One child had attended the first year of school in Korea. All Korean participants had been in Australia between six and 18 months. The children’s ages are described from an Australian perspective calculating the number of years from the birth of each child. This differs from Korean age calculation which includes the period prior to birth.

Procedure

Initially, the researcher contacted the International Office of DECS to ascertain which schools had the
most Korean international students. Four schools were identified. Principals at the schools were contacted and potential participants identified at one school (purposive sampling). After initial interviews were concluded, a second site was included to increase the sample size. The principal at this school approved inclusion of a family suggested by the Korean interpreter.

Information letters about the project and consent forms were translated into Korean and copies made in both Korean and English. It is the researcher’s understanding that Koreans place great importance on formal processes, so the forms were sent home with the children in personally addressed envelopes. After a few days, the Bilingual School Support Officer (BSSO) asked older siblings of potential participants to remind their parents about returning the consent forms. The class teacher of each child was also provided with an information letter and consent form.

Participants were given opportunities to share their personal experiences and perceptions through semi-structured interviews. Interviews took place over a period of approximately six weeks. Individual interviews were conducted by the researcher with assistance from a Korean interpreter. The interpreter was born in Korea but had been living in Australia for 15 years. The child interviews were conducted in English, with minimal additional explanation provided in Korean. Parent interviews generally involved considerable verbal interpretation. Interviews took place either at the school or the home of the participant, depending on parental preference. There were many discussions between the researcher and interpreter, during and after each interview, regarding the content and intent of the Korean mothers’ statements. During each interview the researcher and interpreter regularly clarified the meaning of the vocabulary used.

To identify factors affecting Korean children’s cultural adjustment, data were obtained through posing issue-oriented, open-ended questions, recorded in the form of field notes. During preliminary discussion with the Korean BSSO and school principal it was decided to record interviews in note form to reduce potential participant discomfort.

To establish relationships with the children before beginning the interview process (Miles & Huberman, 1994) the researcher visited the children’s classrooms several times. The child interviews were conducted in the presence of either a member of the school staff or the child’s mother. Two child interviewees required some translation. Using the interview schedule, the researcher asked questions regarding language skills and experiences the child found positive or challenging at school in Australia. For example, ‘What has been easy for you at school in Australia?’ and ‘What are the differences you have noticed between living in Australia and living in Korea?’ These interviews lasted approximately 10 minutes. The children participated willingly.

The parent interviews focused on the same topics as the child interviews but required parents to comment on their observations of the child’s experiences. First a question was posed in English and then translated into Korean. The answer was translated back into English and notes taken. In some cases, the interpreter expanded questions to help the participant more fully understand what was being asked. The mothers appeared open and candid. Through smiles and nods they demonstrated enjoyment at having the opportunity to converse about their children in Korean. Each parent interview lasted for approximately 45 minutes.

Teacher interviews required the participant to comment on their observations of the child’s experiences. The teachers answered using their observations of the focus child in the classroom and playground. Teacher interviews focused on children’s attributes, such as speech and language, social skills and perceptual-cognitive understanding.

**Data analysis**

Data were ordered to make possible comparison between child, parent and teacher responses to questions. Sets of responses from each of the three groups were displayed in four tables. Data were then analysed by classifying common themes evident in each case and from the three data sources. Patterns and similarities among individual perceptions were identified (Miles & Huberman, 1994).

**Results**

The results are presented as individual cases so common responses connecting participant groups, relevant to the research questions, can be presented, compared and contrasted. For ease in reading, fictitious Korean names have been assigned to each child.

**Case 1**

Kyung Min was a seven-year-old Year Two girl. She had been in Australia for nine months and was living with her mother and two siblings. She had attended kindergarten and one year of school in Korea. Kyung Min spoke English confidently and said she had been able to ‘cope’ with English when she first arrived. She said she liked going to school and had found making friends easy; she had two special friends in her class, one Korean and one Australian.
Kyung Min said listening in class was sometimes difficult owing to the rapid speech of her classmates, but often friends took the time to talk slowly to her. She said she found spelling challenging but generally found school ‘easier’ than in Korea. Her mother said Kyung Min was more relaxed at school in Australia than in Korea; she enjoyed play-based activities in class and did not realise she was learning new things. Kyung Min’s mother also observed the pressure on Korean children to succeed in their examinations. She thought the different approach to learning in Australia was more successful for young children.

Kyung Min reported feeling sad and lonely in the first few months of her stay. She said she missed her wider family and old Korean school friends. She also found the single-storey housing unusual since she was used to living in a multi-storey apartment block and could visit friends whenever she wished. Kyung Min commented, ‘In Korea I could go see friends in my [apartment] building’.

Kyung Min’s mother said that in Korea even very young children walk the few blocks from their apartment building to school unaccompanied by an adult. She described how Australian parents with young children drive their children to school, enter the grounds and stay with them until class time. She reported that in Australia mothers arranged ‘play dates’ in advance and accompanied children to friends’ homes rather than the children going alone.

Case 2

Sung Kook was a five-year-old boy in Reception who had been in Australia for nine months. He was living with his mother and older brother. Sung Kook relied on an interpreter during the interview but said he understood what was happening in the English-speaking classroom. He said he had no friends when he first arrived but now he could do ‘drawing, writing and playing with friends’. There was one other Korean student in his class.

Sung Kook said he had three close male friends and they spent most break times playing soccer. He reported that he often had friends over to play at home. His mother said he had adapted easily to school in Australia because he was so young. She suggested he was learning social skills such as sharing through play and explicit teaching. She said, ‘I like talking to other mothers after school’ as other parents gave her positive feedback about Sung Kook’s achievements.

Sung Kook’s teacher said she thought positive relationships with other students had facilitated his adjustment. She said she provided a language-rich environment and used a lot of role-playing and facial gestures during his first days at school. She reflected that at first it was difficult to assess if he understood English, or whether he was shy, lacked confidence, or deliberately did not maintain eye contact. She suggested that, although he had received a few hours tuition in English as a Second Language (ESL), initially he would have benefited from an interpreter in class.

Case 3

Jae Hoon’s teacher said he displayed no English skills when he arrived nine months ago. She said he was placed in a Reception class with no other Korean students and no bilingual support. She remembered that in the early days, before his father returned to Korea, he would do simple interpreting for his son at the beginning of the day but Jae Hoon would be quite distressed when his father left. The teacher said she established a buddy system and used peer literacy tuition to support Jae Hoon. The other children in his class played alphabet games and did reading activities with him. She reported that he finally became more settled when a short-term stay group of Korean students visited the school. She recalled arranging for him to join in as many of the group activities as possible. After the study group returned to Korea he stopped displaying separation anxiety and no longer cried each morning.

The teacher said she told the class about the difficulties Jae Hoon was having and encouraged their support for him from the beginning of his stay. She observed that the rest of the class readily helped him and the group regularly ‘celebrated’ his learning achievements. She also introduced him to the Korean boy in the class next door. His mother said Jae Hoon had fitted into the school class very well because the teacher was constantly checking to see if he understood what was happening, and what he had to do next.

Jae Hoon reported that he is good at speaking and writing English although he also stated that sometimes, ‘it’s hard ’cause I don’t know much English’. He said he now had a group of male friends who all enjoyed playing Australian Rules football. The differences Jae Hoon noticed between Australia and Korea were not walking to school and needing to bring a packed lunch from home. He said food was served at school in Korea. Jae Hoon also observed the difference between single-storey housing in Australia and apartment buildings in Korea. He said he liked school in Australia because he had good friends.

Case 4

Dae Hyun attended a different South Australian school from the other participants. He had attended the school throughout Year One and was now in Year two. He said initially it was ‘hard talking in English, but now OK’. He said he had no friends at school when he first arrived but now ‘I play basketball, tennis, sand-pit with friends, and like to make things and do painting’.

Dae Hyun’s mother said he had some English when
he arrived, owing to private tuition and weekly English classes at kindergarten in Korea. She said the ‘free atmosphere’ in his Australian school helped her son learn, as classes were not as formal as they were in Korea. She added that the Australian students and teachers were open-minded to ESL students. In particular, she liked the way teachers paid attention to her son’s needs and she was grateful for the work of the BSSO.

Dae Hyun’s mother reported that the class group activities helped her son learn about cooperation and leadership. She also thought Australian students were more involved in their learning than were Korean students. She said Dae Hyun was still getting used to asking the teacher questions because that was not encouraged by Korean teachers. She also reported sometimes feeling powerless to help her son with learning at home because there were no textbooks provided for homework in Australia.

Dae Hyun’s teacher said he was a ‘very able student’ and one of a large cohort of Korean and Chinese students placed at the school. She said the ESL students were supportive of each other. She also recalled the school had programmed a large topic on Asian countries at the beginning of the year and she thought this helped the Asian students feel comfortable at the school.

In all four cases the children, mothers and teachers considered that the children’s cultural adjustment was impeded because of difficulties establishing peer relationships and achieving academic success due to limited English language skills. The mothers agreed Australian teaching approaches facilitated their children’s learning and consequently their cultural adjustment, and the teachers identified the strategies they employed. The mothers and children made comparisons between lifestyle and education experiences in Australia and Korea and identified specific differences which facilitated or impeded the children’s cultural adjustment.

**Discussion**

Education policy-makers encourage Korean children to study in Australia (SA DECS, 2010), so there must be adequate supports in place to effect cultural adjustment. This study identified a number of factors which facilitated or impeded the cultural adjustment of Korean children to South Australian junior primary schools.

**English language skills**

Consistent with previous research (Renwick, 1997; Sawir, 2005; Wong, 2004) all participants said they thought the Korean children’s cultural adjustment was largely affected by actual, and perceived, language limitations. The common concern for all Korean mothers participating in this study was English proficiency, both for their children and themselves. They were aware how isolated the children were when they first arrived in Australia. All mothers observed that these children did not rely on language to understand what was happening in class as much as their older siblings had. They said that hands-on, open-ended class activities allowed their children to follow what the other children were doing, and their English skills improved rapidly as a result.

**Teaching approaches**

The mothers all suggested that constructivist approaches, cooperative learning and play-centred experiences helped their children adapt easily to the new cultural environment (Farver et al., 1995; Hill, 1994; Okagaki & Diamond, 2000). The children were able to relinquish rote-learning and teacher dependence (Lee et al., 2000) and, once language barriers had decreased, to comfortably participate in open-ended, child-centred learning activities (Farver et al., 1995). The mothers and children generally spoke positively about the Australian system. Some said school was ‘easier’ in Australia, although they expressed concern about lack of homework.

**Interpersonal relationships**

Consistent with sociocultural learning theory, the results showed that accessibility to other Korean students at school facilitated cultural adjustment (Lim & Renshaw, 2001). Most Korean children and parents placed great emphasis on interpersonal relationships with other students and teachers. Development of a social support network was crucial to successful cultural adjustment (Lim & Renshaw, 2001; Sonderegger & Barrett, 2004). The mothers all said strong friendship groups were crucial to their children’s academic success.

Contrary to the findings of previous research (Coelho, 1994), this group of Korean children were invited to the homes of classmates and had friends visit their own homes. The children and mothers said they were included in invitations to other people’s homes and birthday parties. One mother said Australian children were ‘good at giving praise and compliments’ and were not as academically competitive as children in Korea (Kwon, 2000). Teachers and mothers agreed that peer tuition and the friendliness of other children in the class contributed to Korean children’s cultural adjustment.

The student–teacher relationship is significant in Korean society (Kwon, 2000). In this study, Korean mothers said their children were able to develop positive relationships with Australian teachers and that the teachers’ interest, care and nurturing helped with cross-cultural transition. Two mothers observed that the teachers gave their children extra attention and focused on their needs.
During their interviews all four teachers revealed gaps in their knowledge about the Korean children and their families’ circumstances. Three teachers were unaware that the children were living in Australia with only their mothers and siblings. There was also an apparent mismatch between teachers’ perceptions and mothers’ perceptions about the English language abilities of new Korean students. In all cases the teachers reported that the children came to Australia with ‘no English’, though two children had received intensive private English tuition for nearly six months before arrival. These findings indicated that some educators need to become better informed about the educational context of the international students in their classes (Gay, 2002; Kwon et al., 2010). Deeper understanding would also reinforce development of stronger teacher–parent relationships (DEEWR, 2009; Handscombe, 1994).

Educational and cultural experiences

Jae Hoon’s experience shows the importance of international students’ accessibility to other students from the same country. Only after the teacher introduced him to other Korean students did Jae Hoon begin to display signs of cultural adjustment. Consistent with Sonderegger & Barrett (2004), his anxiety decreased once he formed relationships with these students.

The two children who had received intensive English tuition in Korea were reported as showing signs of quicker cultural adjustment. However, that these were the two eldest children may be relevant. All four children’s self-description indicated that during the early weeks at school in Australia they had poor self-esteem regarding English language skills and experienced varying levels of anxiety. The mothers and teachers said the children’s process of acculturation was ameliorated by social support from peers and teachers (Sonderegger & Barrett, 2004).

Serendipitous findings involved the needs of the mothers. The families in this study had no contacts in Australia prior to arrival and needed to generate new social networks. Problems of social isolation were significant, particularly for one mother who arrived with no English skills.

Recommendations

In this study, three teachers expressed frustration at what they perceived to be limited language support for the Korean students in their classes. Since English language difficulties are a barrier to cultural adjustment, the children may benefit from an initial intensive language course similar to the New Arrivals programs. Korean students’ mothers may also benefit from access to language support.

Teachers voiced concern about lack of teacher professional development regarding international students. Professional development opportunities which will increase cultural competence by learning about Korean society, culture and the education system could benefit teachers. In order to develop strong partnerships with the families, early childhood educators of Korean students should familiarise themselves with the culture and circumstances of their students’ families. This could be achieved through welcome activities at the school, in addition to clear communication about the children’s education history at the time of enrolment. Australian teachers could initiate teacher–parent relationships by acknowledging the central role of rote-learning in Korean education and discussing with Korean families why textbooks and homework are not used with young Australian learners.

Lists of Korean churches, shops and social organisations in South Australia, translated into Korean, could also be made available through schools to promote cultural adjustment for the whole family through a network based on shared linguistic and cultural background. School principals may facilitate smoother transition by placing Korean children in classes with other Korean students. The experiences of Korean mothers accompanying young children on student visas may be an area for further investigation.

Given the increasing number of Korean students enrolling in DECS schools (SA DECS, 2010) a larger, qualitative study is required to increase Australian educators’ understanding about the cultural adjustment needs of these students. A large-scale study may also consider how the presence of Korean international students affects teaching approaches, learning experiences, and relationships between teachers and other students.

Limitations

The case-study approach used meant only the views of full-fee-paying, international students were included. It was only possible to obtain a maternal perspective because of geographic separation of parents. Language differences may have affected the findings as parent participants all used a combination of Korean and English and the researcher relied on an interpreter. The interpreter also acknowledged difficulty translating some words for which there is no equivalent meaning in Korean.

This research was undertaken to fulfil the requirements of the author’s Honours study and the sample size was limited owing to time restrictions. Care should be taken in generalising the findings because of the small number of participants and the limitations of purposive sampling.

Conclusion

This study indicates that a number of factors may facilitate, or impede, the cultural adjustment of Korean children transitioning into South Australian junior primary schools. English language difficulties
immediately impact on children’s capacity to communicate, causing complications for newly arrived students as they commence relationships with peers and teachers. Social interaction affects development of self-esteem and identity, therefore it is crucial to provide an environment in which Korean children will establish positive relationships as quickly as possible. Early childhood educators need to provide ample opportunities for English language learning, including significant levels of explicit instruction, rather than relying on immersion.

After a number of months attending school in South Australia the children in this study were found to have adapted reasonably well to Australian teaching approaches. However, to ensure successful and rapid cultural adjustment to Australian education settings for future students, educators should ensure they understand the kinds of experiences children have had prior to arrival in Australia. In conjunction with increased knowledge about Korean culture, teachers will be able to confidently offer sensitive support to Korean international students. The creation of this awareness and knowledge is not solely the responsibility of teachers but needs to be addressed by policy-makers through provision of professional development opportunities for staff working with Korean students, and increased funding for English language programs.

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References


This paper examines the major social policy movements and theoretical understandings that have driven an international agenda of child participation. Participation is a term used freely to signify many roles that children take on as they experience the varying contexts of their lives. The concept of participation is ‘multi-dimensional’ and can be interpreted in many ways (Kellett, 2009; Sinclair, 2004). Reviewing child participation agendas, one common understanding is that participation is a process, as children are involved in making decisions about matters that affect their lives, whether independently or as a group (Hill, Davis, Prout & Tisdall, 2004). Continuing this idea, Alderson (2008) suggests participation encompasses the activities of children ‘talking, thinking and deciding’ (p. 79) and adults responding to and incorporating the views of children.

While there is movement and a commitment to participatory ideals, change in key agendas and practices for early childhood education remains slow. First, this paper presents an overview of understands, definitions and scope of child participation within social policy and theory. With a focus on the Australian context, a review of the field of participation shows that, while participation has been somewhat effective in policy development in Australia, there is limited response in the field and practices of early childhood education. Next, the paper examines the impediments to child participation in early childhood education. Finally, we argue that child participation is an interactionally managed activity that relies upon specific child–adult practices. Further research into the daily experiences of young children may demonstrate what participation might look like when translated at a foundational level; in other words, how children’s everyday participation with each other, and with the teacher in the everyday activities of the classroom and playground, is enacted.

Children’s right to participation in matters that affect them is not a new idea. It has been two decades since the rights of children, including participation, were legally acknowledged and adopted by the United Nations Convention on the Rights of the Child (UNCRC) (United Nations, 1989). However, the concept of children’s participation rights still are often viewed as contentious and challenging (Alderson, 2008; Smith, 2007) because children are considered too young to form an opinion about decisions that affect them in their lives. As a field of inquiry, child participation remains contested and often disputed.
Understanding child participation

The view that children should have a say in matters that affect them is now an accepted position when considering research and policy in the early years. Increasingly evident is research involving children and youth (see Alderson, 2005; Balen et al., 2006; Christensen, 2004; Hill, 2006; Kellett, 2009), accompanied by recent understandings that ‘social life for children often appears differently from how it looks from an adult perspective’ (Prout, 2002, p. 68). For example, recent campaigners for children in research advocate that children should be more than participants; they should be positioned as co-researchers or leaders of research in their own lives (Kellett, 2010). A key feature of a participatory framework is that children are conceptualised as competent interactional beings, able to participate in decisions that affect them.

Whose perspective is heard and who gets to speak for whom (Christensen, 2004; Danby & Farrell, 2005) are significant issues when considering child participation agendas. For example, at a surface level child participation may be a consultative practice where children are given a means through which adults can obtain their views. If views are heard but no action is taken, then consultation is seen mostly as a stand-in for participation (Hill et al., 2004). In other words, child participation is limited when decisions are made without the direct involvement of children (Hill et al., 2004; Thomas, 2007).

Participatory initiatives that position children as exercising choice and having control over their decisions build democratic processes. Children become self-advocates in the fulfillment of their own initiatives (Lansdown, 2001). In this understanding, the practices of child participation enhance communication so that each participant, including children, becomes ‘a practitioner of choice’ (Dahlberg & Moss, 2005, p. 160).

The child rights movement, through recognising and promoting children’s capabilities and rights as active citizens, enables children’s active participation in social and political issues. Perhaps because of the UNCRC (United Nations, 1989) decision, child participation in the Australian context has been most evident in the areas of policy, including recently emerging policy frameworks for the early years. For example, the 2005 release of the United Nation’s General Comment No 7: Implementing child rights in early childhood (United Nations, 2005) raises awareness of the rights of young children in the early years (MacNaughton, Hughes & Smith, 2007b), calling for increased action in addressing such rights (United Nations, 2005).

Child participation in Australian policy

In Australia, increasing legislation for children’s views demonstrates the importance that government bodies are giving to young people’s participation in services and activities. This emphasis on children actively contributing is most recently recognised in the latest national strategy for the development of young children. The National Framework for Protecting Australia’s Children 2009–2020 and the Early Years Learning Framework (COAG, 2009a; 2009b) both position children as active decision makers. For the first time in a federal government policy document, young children are acknowledged to have the right to participate in decisions that affect them and also are to be seen as active users and employers of these rights as they influence their own lives (COAG, 2009a). These early childhood education reforms, however, remain concentrated in settings before formal school.

In addition to national policy agendas, a number of state-developed policy documents in Australia call for children’s opinions to be heard. The Commission for Children and Young People’s (NSW & Qld) report A Head Start for Australia: An Early Years Framework (2004, p. 57) suggests that ‘children have valuable knowledge to contribute to developing and evaluating the policies and services that affect them’. The report recommends child participation through policy action, awareness raising and advocacy. The follow-up document, What about the kids? (NSW & Qld Commissions for Children and Young People & NIFTeY Australia, 2006, p. 2) builds on ideas of recognising children as ‘people with entitlements’ and suggests policy development in two areas: early childhood education, and care and family. In addition, the NSW Commission for Children and Young People (2005) released a Taking participation seriously kit that promotes ways for individuals and groups to get children involved in matters to do with them. As part of the Taking participation seriously advisory kit, Count me in! (NSW Commission for Children and Young People, 2005) outlines participatory ways of conducting social research with children and young people.

With calls for children to be approached for their views and attention paid to the importance of young people’s contribution, we see a shift in Australian policy making. Some work within early childhood education policy is occurring where child participation is seen through consultation with young children. For example, MacNaughton, Hughes and Smith (2007a) report on two studies that used action-research within childcare settings involving children in policy formation. The first study, in 2003, asked children in child care to comment on factors that influence their wellbeing. The children identified services they understood as having an impact on their everyday lives, such as school and play, as well as broader factors to do with protection, community safety, community infrastructure and public space (MacNaughton et al., 2007a, p. 464). The second study, in 2004, focused on children’s views of gender. This study found the influence of gender relations affects how children rated justice and fairness issues during
their kindergarten day. A study by Thorpe et al. (2004), asking children to report on their daily experiences in a preparatory year, suggests that including such views in the research project helped adults understand what was important to children. These studies reinforce the growing message about children’s capabilities in expressing their views.

The Australian Capital Territory’s Children’s Plan (ACT Government, 2003), which outlines a multi-phased Children’s Strategy Consultation Process, is another example of child participation in policy formation. In the first phase, researchers worked with early childhood educators, nurses, social workers and carers from a range of early childhood services including playgroups, women’s refuge centres, family day care schemes, preschools and childcare centres. The aim was to build the practitioners’ skills in consulting with children. The second phase of the project used participant reflections on the first phase to design and implement a consultation project. The resulting document, Hearing young children’s voices (MacNaughton, Smith & Lawrence, 2003), notes that involvement in the project increased the practitioners’ focus and skills in consulting with, and listening to, children. These documents suggest that Australian government bodies are recognising the value of children’s contributions in the areas of policy and research. However, statements in documents such as these show potential for participation that may or may not come to fruition (Bae, 2009).

**The child competence paradigm: Advancing the child participation agenda**

Alongside the international child rights movement is the competence paradigm, framing participatory models in which children actively contribute as informers in research studies (Balen et al., 2006; Christensen, 2004; Christensen & James, 2000; Clark, 2005; Danby & Farrell, 2004, 2005; Grover, 2004; Hill, 2006; Holland & O’Neill, 2006; Mayall, 2000; Theobald, in press). Competence is defined as children actively engaging in everyday life events and interactions (Hutchby & Moran-Ellis, 1998; Speier, 1973). The interactional competence paradigm first emerged in the 1960s, investigating children as active participants in their own lives (Aries, 1967). Pioneering work by Speier (1973) and Mackay (1974; 1991) focused on how children accomplish interactional competence in everyday activities, including school settings. This work emphasises the importance of empirical studies of children’s lives to show how they organise and arrange their social relations. Speier (1973, p. 6) highlights the importance of social participants themselves and their ordinary experiences of ‘doing things together in a shared environment’. Further work in this field has been undertaken by Waksler (1991) and, more recently, Cromdal (2004); Björk-Willén and Cromdal’s (2009) study of the social interactions of children who are multilingual; Theobald’s (2009; in press) investigation of child participation in the playground; Butler’s (2008) study of children’s talk and interaction during school recess; Danby (2002; 2005), Danby and Baker’s (1998a; 1998b; 2001) studies of how children manage their social relationships in preschool; and Hutchby (2005) and Hutchby and Moran-Ellis’ (1998) review of the competence of young children. Waksler (1991) suggests that the lack of children’s explanations about their own lives is ‘rarely missed’, because the possibility of children having explanations is not acknowledged in the first place.

The interactional competence approach in research is echoed within the more recent sociology of childhood perspective (Cromdal, 2006). The Prout and James (1997) framework, referred to as the ‘new’ sociology of childhood, recognises childhood as a social construct where children are active members. Viewing children as Social agents challenges conventional ideas of children as passive subjects of social structures and processes (Corsaro, 2005; Mayall, 2002a; Prout & James, 1997). From this perspective, children do not simply mirror what they see from the adult world, but rather use their experiences to add to, and make sense of, their own lives (Corsaro, 2005). The standpoint of such studies is that ‘children are competent interpreters of their everyday worlds’ (Danby & Farrell, 2004, p. 35).

From a competence paradigm, children’s competence is understood as within children’s experiences in the here and now, rather than according to the stage of life trajectory (Wyness, 2000). Recognition is given to children’s contribution to society, and their influence in social worlds or peer cultures (Corsaro, 2005; Wyness, 2000). This recognition moves away from simply identifying particular aspects of childhood as childlike, or from a view that childhood means children speak or act in certain ways (Hutchby & Moran-Ellis, 1998).

**Participatory rights**

Early directions of participatory rights for children, which have been taken up within the sociology of childhood framework, complement those of the UNCRC (United Nations, 1989). The work of the UNCRC (United Nations, 1989) can be seen as an attempt to legalise children’s participation and influence. Acknowledging children’s right to influence and have a say in decisions about matters of concern to them within family or society gives them opportunities to practise the principles of democracy (Sheridan & Pramling Samuelsson, 2001).

Similarities have been drawn between the two perspectives of the children’s rights movement and the sociology of childhood approach. This ‘common ground’ lies in the positions both perspectives take in relation
to research and valuing children’s views (Freeman, 1998, p. 434). Both perspectives take the view that research should concentrate on the agency of children as constructors of their own social worlds; that children are persons and not property, subjects and not objects; and that they are participants in social processes rather than social problems themselves (Freeman, 1998).

The reports of the Organisation for Economic Cooperation and Development (OECD), *Starting strong* and *Starting strong II* (2001; 2006), both emphasise the significance of child participation for political agendas. *Starting strong* (2001) identifies three early education programs that promote themes of child participation: the curriculum and pedagogy of Reggio Emilia (Italy), Te Whāriki (Ministry of Education, 1996), and *Curriculum for pre-school Lpfö 98* (Swedish National Agency for Education, 1998). These case studies suggest that child participation and democratic principles are the basis of exemplary pedagogy and curricula in early childhood education (Bennett & Leonarduzz, 2004; Pramling, 2004; Rinaldi, 2006). *Starting strong II* (OECD, 2006) found further evidence that OECD countries with more successful education systems are more likely to value children’s freedom of choice, play and creative expression (Bennett, 2007).

Significant portions of children’s daily activities take place in classrooms, yet the participation rights and social relations of young children remain impeded. With an increasing focus on preparation for school (Bennett, 2007), the Australian Federal Government’s vision for education has a strong emphasis on academic improvements for children with a ‘back to the basics’ reform agenda in the new draft national curriculum (Maiden & Kelly, 2010). Within the draft Australian Curriculum (ACARA, 2010), however, child participation is not identified as a key focus.

It is difficult to find studies investigating participatory processes in young children’s everyday affairs within the classroom and playground. MacNaughton et al. (2007b) propose that child participation is impeded because early childhood professionals are often viewed as child development experts. The challenge is to move understandings of teachers being ‘experts’ in child development who know what is best for children in a general sense, to being expert in ways to collaborate with children (MacNaughton et al., 2007b). Similarly, Bennett (2007) suggests that the balance of power in education is rarely in favour of the child, owing to teacher attention to tasks such as socialising children, organising the environment and ensuring children’s readiness for school, rather than attending to their rights to consultation and participation (Bennett, 2007).

The few international and national studies with a specific focus on child participation in early childhood education have found children’s influence to be limited. Pramling Samuelsson and Pramling (2009) note that, while it may be expected that early childhood education be responsive to children’s influences, evidence suggests otherwise. For example, Markström and Halldén (2008) observe, from their studies of Swedish preschools, that the very nature of preschool as an institution means that tensions exist between individual children’s interests and the interests of the larger group. The strategies used by children to exert their own influence in these settings are often overlooked. Sheridan and Pramling Samuelsson’s (2001) study of early childhood education and care settings in Sweden found that children rarely participate in and make decisions about
the overall organisation, routines, content and activities within preschool.

Another example from Sweden is Emilson’s (2007) study of young children’s influence in preschool. Examining episodes of ‘circle time’ in early childhood settings, Emilson found that opportunities for child participation and influence were dependent on teacher attitudes. Similarly, Bae’s (2009) study of children and teacher interaction in preschools in Norway found that participation correlates to how teachers follow children’s initiatives, respond to children and take children’s point of view. Danby, Farrell, Powell and Leiminer’s (2004) research examining Australian children’s decision making in their everyday lives suggests that time spent at school was governed more than was their time at home. Rather than child participation principles being embraced, children’s lives at school are impacted upon increasingly by adult-determined regulation and control (Danby et al., 2004).

Research investigating older children’s participation in schools also found it was restricted by adult control. For example, Tholander’s (2007) study of teachers’ practices found that co-constructing rules with students meant uncertain democratic relationships. He discussed how one teacher first invited students to collaborate in making a list of rules, and then ordered sanctions for misbehaving. This study showed that the practice of democracy was a role that children were in ‘preparation for’ rather than a matter they attended to in their day-to-day activities (Tholander, 2007). Wyse’s (2001) study of child participation in two secondary and two primary schools in England found that children’s views were not listened to. Despite the inclusion of a participatory body such as a school council, there was little opportunity for children to express their ideas and make decisions. Similarly, a study of older children’s participation in Australian schools, by Bolzan, Mason & Michail (2005), found that adults controlled decisions about who may participate and how, as well as the matters to be discussed (usually adult agendas).

Ways forward for early childhood education

Projects involving older school-age children in the United Kingdom report greater student learning, motivation and attainment, and a safer and more positive school environment as a result of child participation projects (Save the Children, 2007). For example, Davies, Williams, Yamashita and Man-Hing (2006) in their review of 75 studies of child participation programs in UK schools, found students who were in schools that emphasised democratic practices had improved academic achievement. This improvement was credited to an emphasis on student engagement in teaching and learning processes. Better teacher–student relationships and school–home relationships were also attributed to participatory methods.

While research shows the benefits of child participation for older children, participatory evidence for the early years remains limited (Brownlee, 2008). However, reviewing children’s conceptions of quality of early childhood education and care settings in Sweden, Sheridan and Pramling Samuelsson (2001) found a high correlation between quality of the early childhood setting, and the children’s ability to have influence over the program. Nyland’s (2008, p. 40) review of children’s participatory rights within childcare contexts in New Zealand, America and Australia stated that ‘participation encourages growth, well-being, and imagination’ as well as children as ‘self-regulated learners’.

Professionals within early childhood education and care settings have a responsibility to be proactive in their implementation of children’s rights, including child participation (Smith, 2007). Woodhead (2009) suggests that the implementation of children’s rights requires a shift in the view of the child. Australian early childhood education settings can take lessons from New Zealand, where child participation offers early childhood professionals the possibility of reframing their professional capabilities and knowledge bases. For example, the curriculum of New Zealand, Te Whāriki, promotes the autonomy of children and children as ‘active learners who choose, plan and challenge’ (Smith, 2007, p. 5).

By acknowledging the varied and complex interactions of children in their care, teachers will come to know each child as an individual member of society with personal views and influence (Cannella & Grieshaber, 2001). Similarly, MacNaughton et al. (2007b) note that as early childhood professionals redefine their expertise, they may develop more equitable and collaborative relationships with young children. Teachers, who change their practices and beliefs of their role from one as experts acting on behalf of children to one of collaborators with children, will advance concepts of participation (MacNaughton et al., 2007b).

Making the UNCRC a key document in strategic planning for early childhood education is one way to import a child participation focus into the early childhood setting (Smith, 2007). Another way to address child participation in early childhood education is to include it as a ‘protocol’ for curricula documents (Bennett, 2007; Smith, 2007). On the international scene, curricula documents have attempted to respond to the UNCRC in their attention to child participation. For example, a participatory role for children is a key focus of the Swedish curriculum. The Swedish curriculum document, Curriculum for the pre-school (Department of Education, 2006), promotes and actively encourages children to have an opportunity to express their own views in order to influence their own situation, form their own opinion and make choices.
There is a need to study and understand how children socially construct their everyday lives and how these interactions ‘fit’ with participation agendas. As Bae (2009) reminds us, while statements in policy and curriculum documents offer ‘possibilities’ for participation for children within educational practices, this does not mean that such participation will easily occur. Moves for increased recognition of child participation in early childhood settings are faced with the difficulty of translating that view into examples of what child participation might look like in the everyday activities of the classroom and playground. Graham and Fitzgerald (2008), researching the views of older children in Australian school settings, suggest that children view participation as an opportunity to instigate and manage their everyday relationships with others. Similarly, Björk-Willén’s (2007, p. 2155) study of the preschool activities of multi-lingual children in Sweden found that ‘participation in peer-group events are at the forefront’ of children’s concerns. Further research into the daily experiences of young children would show what participation might look like when translated to the everyday activities of the classroom and playground.

Examining actual instances of children’s interactions allows an investigation of how children draw on, and use, peer and adult structures in their everyday social practices. Such an examination is at a foundational level—how children manage their everyday participation in the early years setting with each other, and with the teacher. The amount of ‘relational space’ afforded to children by adults directly affects their opportunities to freely give ideas and have influence over decisions (Bae, 2009, p. 398).

**Conclusion**

In Australia, there has been some advancement towards a focus on child participation, particularly within policy frameworks. Overall, however, there is little ‘institutional and organisational change that encourages and facilitates children’s voice’ (Prout, 2002, p. 75). Missing is a sustained program of research examining the everyday interactions of children with a view to understanding the child participation agenda. Child participation in the early years cannot be viewed as a gimmick or an item to check off a list at the end of the day.

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Learning to measure length in the first three years of school

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MUCH RESEARCH ON EARLY measurement learning is small-scale and dependent on the items used. While such research is helpful for indicating the key aspects of learning length, it does not give teachers a clear indication of the expectations for student learning of them. This paper presents substantial data from a large project that used individual interviews to assess student learning against ‘growth points’ or key stages in children’s learning, over a range of domains including length. Data from interviews conducted twice a year with more than 1000 children in each of the first three years of school are used to indicate appropriate targets for student achievement. Basically it is suggested that the key targets for the learning of length in the first three years of school are, respectively, learning to compare, learning to use a unit iteratively, and measuring using formal units.

Learning length in school

Perhaps the first time students realise that the mathematical ideas they meet in school are different from those in their lives is when their teachers start to teach measurement. In their homes, children may have heard someone say ‘that bag is heavy’, ‘we have to wait a long time’, ‘this is a big bottle’, ‘it is a long way’, ‘you are growing tall’, ‘this room is big’, ‘that shoe is too small’, and so on. Of course, they may also have heard ‘one litre of milk’, ‘we have to wait one hour’, and even ‘the speed limit is 60 kilometres per hour’. As necessitated by the school curriculum, teachers seek to build on and give structure to those informal experiences. Unfortunately, in school the curriculum and teachers tend to isolate particular measurement domains, and formalise the aspects of measuring within each individual domain. Often teachers focus first on the domain of length measurement, and this emphasis is evident in the published curriculum and reports of research with young children, including this report.

This article draws on results from one component of a large-scale project, the Early Numeracy Research Project (ENRP) which sought to measure children’s numeracy learning in the first three years of school. The data reported are from individual interviews with more than 1000 students in each year of the first three years of school (children typically aged four to seven years), from schools with a spread of socioeconomic, geographic, and student language backgrounds. The data contribute important additional perspectives to the significant studies conducted with small samples of students (e.g. Bragg & Outhred, 2000; Kamii, 2006; McClain, Cobb, Gravemeijer & Estes, 1999; Nunes, Light & Mason, 1993). The sample size and the scope of our project are both a disadvantage and an advantage.

One of the disadvantages is that, being part of a much larger interview, the four items seeking data on the measurement of length could explore only selected aspects of the domain, and in the following some inferences are necessary about elements of learning length that are between the concepts assessed by the particular items. The advantage of these data from the four items is that the methods of data-collection using well-trialled items, with trained interviewers using appropriate equipment, in a comfortable one-on-one interview to large numbers of students, can give the reader confidence that the results represent the expected responses of students at these levels to such items. The results provide a useful indication to teachers, not only of the range of achievement they can expect from their classes to such items, but also of key concepts they can seek to achieve with all of the students in their class.
Basically the data suggest that the key issues for each of the first three years of school are, respectively, that:

- while some students can compare lengths on commencing school, others require specific experiences comparing lengths of objects that also allow exploration of conservation of length, transitivity and techniques of comparing lengths
- using both multiple (non-standard) objects or units, and using a single object or unit repeatedly as the basis of comparisons, including transitive comparisons, for quantification of length represents a challenge for some students
- there are both cognitive and procedural challenges for some students in using a formal unit (such as the centimetre) to compare or quantify the length of objects.

Of course, in the first three years of school there are many students who can use standard units to solve practical problems, and who can transfer length concepts to other measurement domains (such as mass and capacity), but the following focuses on those three initial challenges with learning length that students experience in the first three years of school, and on suggestions of how teachers can help all students to address those challenges.

A focus on length

During their primary school years students learn about several attributes of measure including length, area, angle and volume. Wilson and Osborne (1992, p. 91) state that:

Although measurement concepts are complex and cause children a variety of difficulties, the basic idea of direct measurement is quite simple. A continuous property such as area, length, or angles must be subdivided into discrete parts so they can be counted. Second, the unit is repeated, dividing the object into several subdivisions with perhaps a fraction of a unit left over. Finally the units are counted to produce a measurement of the object.

Stephan and Clements (2003) also argue that complex mental accomplishments are involved in the learning of measurement attributes including length, and add that this complexity may at times be acknowledged inadequately in typical measurement teaching due to the apparent simplicity. Although measurement has been described as the synthesis of subdivision and change of position (Piaget, Inhelder & Szeminska, 1960), there are also other related key ideas identified by researchers for developing understanding of measurement of length. They include comparison (direct and indirect), conservation, transitivity, identification of a unit, iteration of a unit, number assignment, and zero point, as discussed below within a structure that reflects the three issues that are the focus of this report: comparing lengths; use of a unit iteratively; and using standard units.

Comparison, conservation and transitivity

An understanding of comparison, that ‘like properties can be compared to see which is greater’ (Wilson & Osborne, 1992, p. 92), is critical to the measurement of length (e.g. Battista, 2006; Wilson & Osborne, 1992). Indeed, Kamii (2006) argued that it is essentially for the purpose of making comparisons that one measures. In considering lengths we make both direct and indirect comparisons.

Connected to this is conservation of length which relates to an object retaining its size when moved or subdivided (Wilson & Rowland, 1993). Piaget et al. (1960) identified successive modes of comparison, with visual comparison as the earliest stage, as constituting a progression towards conservation of length in spite of change of position. Piaget et al. stated that ‘conservation of length … is the fundamental prerequisite of all measuring’ (p. 66). They believed it is necessary for a child to conserve length to have an operational understanding of the measurement of length because, to measure the length of an object, one moves another object, and must know that the length of the moved object does not change in this process.

Clements and Stephan (2004) stated that researchers generally agree that conservation is necessary for a child to have complete understanding of measurement. Battista (2006) argued that children need to understand that a unit remains constant when measuring, thus implying the need for a child to conserve length. Nunes et al. (1993), who present a perspective on measuring different from the Piagetian approach, agree that understanding of conservation of a unit is a basic operation of measurement.

Piaget et al. (1960) believed that, while conservation of length is necessary for measuring length with understanding, and develops as the child learns to measure, it is not sufficient. Another key concept they identified as essential to measurement of length is transitivity, which is applied when comparing two items where direct comparison is not possible. Use of a third item allows comparison, and transitivity involves reasoning of the relationship between the lengths of the three items. Battista (2006) also discusses use of a third object such as a finger or string for indirect comparison.

In summary, there appears some agreement among researchers that comparison is important for the developing understanding of length measurement, and there appears to be some acknowledgement that conservation and transitivity are necessary and related. While there is debate about the ages (Stephan & Clements, 2003; Wilson & Rowland, 1993) and
order (Carpenter, 1976; Stephan & Clements, 2003) at which ability to compare, including conservation and transitivity, develops, we believe the data presented below offer strong indication of the ages at which teachers can intervene to support student learning.

Using a unit iteratively to measure

The second of our key early measurement ideas relates to using a unit when measuring. Clements and Stephan (2004) believe that ‘measuring consists of two aspects, identifying a unit of measure and subdividing (mentally and physically) the object by that unit, placing that unit end to end (iterating) alongside the object’ (p. 300). This subdivision is also described as partitioning (Stephan & Clements, 2003). Within this process the size of the unit remains the same, the units or subdivisions must be identical (which builds on conservation), the unit is seen as part of the whole, and the unit is translated successively or iterated. These mental relationships have been referred to as logico-mathematical knowledge as they do not have their source in the object (physical knowledge), or in social conventions (social-conventional knowledge), but originate in a person’s mind (Kamii, 2006).

Kamii (2006) argues that unit iteration is demonstrated when only one unit is used and moved along the length, the one unit is used repeatedly and is seen as part of the whole. She states her research results support the finding of Piaget et al. that unit iteration is constructed out of transitive reasoning. As she explains, where transitivity involves the comparing of whole units, unit iteration involves making a part–whole relationship between two wholes.

A further principle applied in the use of the unit is tiling; units must not overlap (Wilson & Osborne, 1992) and must fill the space without gaps (Lehrer, 2003). In using units, a count is made leading to the assignment of a number to a continuous property (Clements & Stephan, 2004; Wilson & Osborne, 1992). It is only with a unit that a number becomes meaningful in measuring.

In summary, whether the unit is used repeatedly, or whether multiple copies of the unit are used, the notion of subdividing a whole and counting the number of units is a consistent theme in the literature as the key stage following comparison, and this is evident in the data presented below.

Using standard units to measure

The third of our fundamental measurement ideas relates to using standard units (such as centimetres) to measure with standardisation facilitating communication of measures (Lehrer, 2003). Primary school children commonly use 30-centimetre and one-metre rulers as tools to apply the use of standard or formal units of length.

The ruler provides an abstract representation of the standard unit, the centimetre (Bragg & Outhred, 2000), in that it is ‘an indirect method of laying down units of length end-to-end’ (Thompson & Van de Walle, 1985, p. 8). The iteration and subdivision of units are already given on the ruler for the benefit of its users (Nunes et al., 1993). However, students may use rulers incorrectly or in a rote fashion, without an awareness of the component units or an understanding of their relationship to a linear scale (Bragg & Outhred, 2000; Kamii, 2006).

In summary, the understanding and use of conventional units and related tools such as 30-centimetre rulers is an important element of the learning of length measurement. Use of a 30-centimetre ruler can pose challenges for students, as illustrated in the data below. It appears from the literature that there may be benefits in linking informal units to the construction of a scale or ruler (e.g. Bragg & Outhred, 2000) and by teaching in a way that helps children develop understandings such as zero point, that is, when using a scale to measure, any point can serve as the zero point or origin on the scale (e.g. Kamii, 2006; Lehrer, 2003).

Further insights about children’s developing understandings of length measurement

A goal of instruction about measurement is for children to develop a theory of measure involving a web of connecting ideas, such as comparison, unit, iteration and tiling, as well as to develop practical knowledge of tools such as rulers (e.g. Lehrer, Jaslow & Curtis, 2003; Wilson & Osborne, 1992). To develop understanding within the complexity of measurement, and more specifically of length, principles are a key element of learning. It is not sufficient to teach techniques (Bragg & Outhred, 2000) as it is important for children to come to understand concepts and procedures of measure and their mutual relationships (Lehrer et al., 2003). These can be developed through the exploration of length concepts through problem-based situations such as using a range of different rulers or asking children to make their own rulers (Kamii, 2006).

The context of the research

In discussing students’ developing understandings of length, we draw on findings from the Early Numeracy Research Project (ENRP), a three-year research project conducted in Victoria, Australia, involving teachers and children in the first three years of school in 35 project (‘trial’) schools and 35 control (‘reference’) schools (for details see Clarke et al., 2002). Three key components of the ENRP were:

- the development of a research-based framework of growth points in young children’s mathematical learning (in Number, Measurement and Space)
■ a 40-minute, one-on-one interview
■ extensive professional development.

The impetus for the ENRP was a desire to improve children’s mathematics learning. To quantify such improvement a framework of pivotal growth points in mathematics learning, also described as key stepping stones along the path to mathematical understanding, was developed in nine domains including the three measurement domains of Time, Length, and Mass. The one-on-one interview consisted of 61 assessment tasks created to match the growth points. Within the ENRP, teachers interviewed each child in their class at the beginning and end of the school year; children were posed questions in each domain up to the point where they encountered difficulty. The teacher would then move onto the next domain, or sometimes to a detour.

Relevant elements of length-learning and associated interview items

Four growth points from the ENRP form the basis of the data presented below. For each growth point there was an interview item, each using particular equipment such as string, paperclips and a ruler. The following discussion presents the respective growth points, the interview item, and consideration of associated issues that are inferred from the students’ responses to the items. The interview items are shown as they were presented to the teachers, with italics indicating what the teachers were to do, and the normal text indicating what they were to say.

The comparing lengths growth point

The first of the ENRP growth points relevant for the discussion is:
■ Compares, orders, and matches objects by length.

The interview item was as follows:

The string and the stick
Drop the string and the skewer onto the table (See diagram at right).

a)  By just looking (without touching), which is longer: the string or the stick?

b)  How could you check? (touching is fine now)

c)  So … which is longer?

Following the work of Piaget and his colleagues (Piaget et al., 1960), this item explicitly addresses measurement by direct comparison. We took a successful response to suggest that the student was conserving length, even though we did not specifically assess understanding of conservation nor develop a growth point for this. Further, we did not include an item assessing transitivity, although clearly this is related to indirect comparison and forms part of the student’s learning in the early years.

The quantifying lengths growth point

The second of the ENRP growth points relevant for the discussion is:
■ Uses uniform units appropriately, assigning number and unit to the measure.

The interview item was as follows:

The straw and the paperclips
Get the straw and show the child the long paperclips.
Here are some paperclips. Here is a straw.

a)   Measure how long the straw is with the paperclips. (If child hesitates) Use the paperclips to measure the straw.

b)   What did you find? (No prompting)

If correct number is given (e.g. 4), but no units, ask ‘4 what?’

This item infers the use of non-standard but consistent units to quantify a length measurement. This includes the idea of iteration where the unit is seen as part of the whole and the unit is translated successively. As indicated in the interview item detailed above, we provided the children with multiple copies of a unit (8 paperclips) and did not assume the stance of Kamii (2006), that unit iteration is demonstrated through the use of one unit, such as one block, being used repeatedly. However, our approach did allow us to see the children who could use informal units and attend to measurement principles of iteration, tiling, identification of unit and number assignment, as compared to those who had not moved beyond comparing. For example, those children who laid out all the paperclips and said they were longer than the straw, or who laid just one paperclip next to the straw and said the straw was longer, were judged as not yet quantifying length. We see iteration using a single unit repeatedly as an associated idea, and one which can form part of the learning experience for the students at this level.

The using standard units growth point

The third of the ENRP growth points relevant for the discussion is:
■ Uses standard units for estimating and measuring length, with accuracy.

The interview item was as follows:
Using the ruler

Here is a ruler. (Give the ruler to the child in her/his hand.)

Here is a straw (20 cm).

a) Please measure the straw with the ruler.

b) What did you find?

If correct number is given (20) but no units, ask ‘20 what?’

Following the assessment of use of non-standard units, we investigated children’s use of standard units and related measurement tools. The present growth point and interview item refer to the use of the formal unit, the centimetre, and an appropriate measurement tool, the ruler, to quantify lengths.

Classroom teachers trained in interviewing and recording conducted the one-on-one interviews, using the script and pre-prepared equipment. The data from this project arise from intensive interviews with large numbers of children, with trained interviewers and experienced coders, with double data entry. The processes for assuring reliability of scoring and coding are outlined in Rowley and Horne (2000). As far as possible in such situations, the profile of responses presented here can be taken as a reasonable representation of how students in Victorian schools would respond to such tasks.

Our focus of interest in this article is on whether the data support the contention that the proposed length growth points describe goals for student learning over the first years of schooling, and on how teachers might help children reach these goals.

Results

To convey the sense of concept development that can be gained from the data, we first examine overall trends in the data, and then examine the three key learning stages of comparing lengths, unit iteration, and using standard units, using data from the most relevant year level.

Overall trends in the data

To examine the way the responses to the length items portray the increasing sophistication of the students’ strategies, Table 1 presents a profile of students’ achievement in the length domain over the first three years of school. In Victoria children start school at around five years of age. The data represent the percentage of the project school students at their highest achieved growth point by grade level in the March interview in their first year of school, and the November interview in each of the three years of the project, along with the equivalent reference school students at the end of their third year of school. Only students in project schools who participated in all four assessments are included in this analysis.

As can be seen, the students in the project schools demonstrated improvement over time on these items. In terms of progress on each of the key growth levels:

- at the end of the first year of school (Grade Prep in Victoria) only 5 per cent of students are not comparing lengths, suggesting that this key foundational concept is learned by most students after one year at school. There is still a need to consider the implications for the 5 per cent, or roughly one student per class, who have not learned to do this.

- by the end of the third year of school (Grade Two in Victoria), 12 per cent of project school students, and 17 per cent of the reference school students did not respond successfully to the unit iteration item, which required the students to count the number of paperclips needed to quantify the length of the straw. This seems to be an important issue for these students, since presumably this would be a prerequisite to the learning of all subsequent measurement concepts, and is an important focus for teachers’ attention. That 31 per cent of students in project schools did not respond successfully to the unit iteration item at the end of the second year of school (Grade One in Victoria) suggests this would be a suitable year level for specific teacher attention to ways of supporting this aspect of students’ learning.

<table>
<thead>
<tr>
<th></th>
<th>School entry (n = 839)</th>
<th>End of 1st year of school (n = 839)</th>
<th>End of 2nd year of school (n = 839)</th>
<th>End of 3rd year of school (n = 839)</th>
<th>Reference schools: End of 3rd year of school (n = 217)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not yet comparing lengths</td>
<td>30</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Comparing lengths</td>
<td>53</td>
<td>35</td>
<td>31</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Unit iteration</td>
<td>17</td>
<td>54</td>
<td>42</td>
<td>16</td>
<td>43</td>
</tr>
<tr>
<td>Using standard units</td>
<td>1</td>
<td>7</td>
<td>22</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>Beyond using standard units</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>19</td>
<td>7</td>
</tr>
</tbody>
</table>
72 per cent of the project school students were using standard units or beyond by the end of the third year of school (Grade Two in Victoria). The comparable number was only 39 per cent for the reference school students, suggesting that expectations for students generally should be somewhere between these figures for students who have been taught well. It also suggests that the third year of school is an appropriate level for specific attention to ensuring that students can progress toward using standard units.

Nearly all students moved to comparing lengths during the first year of school, but some did not progress beyond that by the end of the third year. This has implications for teaching.

It is interesting to note the extremes of achievement at the end of the third year of school, even with teachers who had had substantial professional development and active supportive professional learning teams at their schools. While on one hand 12 per cent of the cohort could not respond successfully to the unit iteration item (meaning they could not measure a straw with paperclips), on the other hand 19 per cent could solve quite sophisticated application problems. This also has implications for teaching.

Comparing lengths

The first length task involved presenting the students with a skewer and a length of string, and inviting them to say which is longer, first estimating then physically comparing, with the expectation that they will both hold the string taut and compare the lengths accurately, perhaps by having one end of the string aligned with an end of the skewer.

Table 2 shows the number of students in the first year of school (Grade Prep in Victoria) in each of the years of the data collection not comparing lengths of the string and the skewer. The reason for using the negative of the data is to allow exploration of the characteristics of the students who could not complete the task.

Table 2. Students (per cent) not Comparing lengths in the first year of school

<table>
<thead>
<tr>
<th></th>
<th>March</th>
<th></th>
<th>November</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>per cent</td>
<td>n</td>
<td>per cent</td>
</tr>
<tr>
<td>1st year of the project</td>
<td>1238</td>
<td>34</td>
<td>1524</td>
<td>6</td>
</tr>
<tr>
<td>2nd year of the project</td>
<td>1488</td>
<td>24</td>
<td>1483</td>
<td>4</td>
</tr>
<tr>
<td>3rd year of the project</td>
<td>543</td>
<td>21</td>
<td>566</td>
<td>7</td>
</tr>
</tbody>
</table>

While there is some variation in the March scores over the years, the November scores are consistent. About one-quarter of the students at the start of school could not perform this basic measurement task, but most of these were able to perform the task by the end of the year (at least in the project schools). Being able to complete this task is a reasonable indication of this fundamental measurement skill, and it is appropriate that teachers in the first year of school find out about each individual student’s capacity to perform such tasks and provide whatever experiences and support are necessary.

Note that the improvement in the March scores over the three years is not attributable to the project, given that the students are just beginning their first year at school in each case.

While the breadth of the entire interview limited the depth of the items in a particular domain, it did allow some comparisons between domains of mathematics. For example, we can gain insights into characteristics of the students in the first year of the project who could not compare the string and the skewer as follows:

- At the commencement of school, of the 34 per cent who could not compare the objects, 34 per cent could count a collection of 20 objects, and 15 per cent could add 9 and 4 more seen items counting them all.
- At the end of the first year of school, 71 per cent of the students who could not compare the skewer and the string could count a collection of 20 objects, 59 per cent could add 9 and 4 by counting each object, and a further 13 per cent could add 9 and 4 objects with the 9 objects hidden (e.g. by counting on from the 9).

The addition was presented as two groups of objects which were to be added. Initially nine objects were covered and four objects seen, and the total sought but, if not given, then the nine objects were uncovered. In both forms, this seems to be much more complicated than comparing the string and the skewer.

We can conclude that an ability to count does not imply an ability to compare lengths, neither does an ability to combine and count two groups, and even the imagining of a group where some counters are hidden does not seem to be related to a capacity to compare lengths.

This suggests that the development of this length concept is quite independent of the development of number concepts, and that mathematics (and science) programs in the first year of school should offer specific experiences on comparing lengths and conservation.

Note that the distribution of the responses of the girls and boys were indistinguishable.
Quantifying lengths (unit iteration)

The evidence on whether students could use unit iteration to quantify a length was determined by whether they could ‘measure the straw using the paperclips’. To do this, presumably, it is necessary for the students first to realise that it is possible, next that they can line up paperclips to match the length of the straw, that they can align them accurately, that they use only the number of paperclips necessary, and finally that they can state that the straw is four paperclips long. Table 3 presents the results of students in the second year of school (Grade One in Victoria) over the three years of the data collection who could not solve the unit iteration task.

Table 3. Students (per cent) in the second year of school not using Unit iteration

<table>
<thead>
<tr>
<th></th>
<th>March</th>
<th>November</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>per cent</td>
<td>n</td>
</tr>
<tr>
<td>1st year of project</td>
<td>1233  60</td>
<td>1508  25</td>
</tr>
<tr>
<td>2nd year of project</td>
<td>1505  60</td>
<td>1512  34</td>
</tr>
<tr>
<td>3rd year of project</td>
<td>509   53</td>
<td>538   25</td>
</tr>
</tbody>
</table>

The majority of students at the start of the year did not use the paperclips iteratively to quantify the length of the straw. About half of these same students were able to solve the item at the end of the year. By the end of the year there is a significant minority who still could not, indicating that it is an important challenge for students in the second year of school. Given that there is substantial theoretical support for the importance of the concept as a prerequisite for formal measuring, this can be a key focus for teachers of students in the second year of school.

Again, it was possible from the ENRP data to seek insights into the characteristics of the students who did not improve in the quantifying length task that involved unit iteration by comparing their performance in other domains. Of these students:

- nearly all could count a collection of 20 objects
- half could count up and back by ones from various starting points
- one-third could count by 2, 5, and 10
- 45 per cent could read, record and compare 2-digit numbers
- 66 per cent could count on, in responding to the item requiring imagining objects to count them.

So it seems the difficulties with using a unit iteratively are not because of a lack of counting skills, or an inability to imagine, or a failure to work with the numbers. In other words, this measurement skill is quite independent of number skills, and students need specific experiences in using units iteratively once they have shown that they can compare lengths of objects.

Using a standard unit

The students were asked to use a ruler to measure the length of a straw and to give the length of the straw in centimetres. For this, presumably, the students must know what a ruler is for, know what the marks (cm in this case) on the ruler are, be able to align the 0 on the ruler with the end of the straw (or compensate by using a different point of origin), and read the appropriate number that aligns with the end of the straw.

Table 4 presents the data on the students who could not measure the straw with the ruler in the third year of school.

Table 4. Students (per cent) in the third year of school not achieving the Using standard units growth point

<table>
<thead>
<tr>
<th></th>
<th>March</th>
<th>November</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>per cent</td>
<td>n</td>
</tr>
<tr>
<td>1st year of project</td>
<td>1168  82</td>
<td>1448  40</td>
</tr>
<tr>
<td>2nd year of project</td>
<td>1554  77</td>
<td>1538  37</td>
</tr>
<tr>
<td>3rd year of project</td>
<td>1279  65</td>
<td>1243  29</td>
</tr>
</tbody>
</table>

It seems there is a substantial number of students who could not perform the task at the beginning of the third year of school (Grade Two in Victoria), and about half of these students were able to measure the straw with the ruler by the end of the year. So students in the third year of school need specific experiences in measuring using standard units, and experiences need to be considered so as to create opportunities for the one-third of the students who may not achieve the skill under normal circumstances.

To gain some insights into the characteristics of the students who could not use the ruler to measure the straw at the end the third year of school in the project schools, the following is the performance of these 579 students in the first year of the project on number tasks at the November interview:

- all could count a collection of 20 objects
- one-quarter could count by 2, 5, and 10 from any number
- 79 per cent could read, create and compare two-digit numbers, and 45 per cent could do this for 3-digit numbers
- 86 per cent could count on
- 62 per cent could subtract a small single digit number
- 43 per cent could use mental strategies for addition and subtraction
- 21 per cent could solve multiplication problems without needing to see the objects.
In other words, the difficulties these students experience with using standard units are not because of counting difficulties, nor problems with reading the numbers, nor manipulating numbers overall, nor being able to operate with images. Indeed, many such tasks seem substantially more sophisticated than using the ruler to measure the straw. It is possible that teachers have emphasised the number skills in their programs, but it also may be that using standard units requires specific structured experiences.

Conclusion

The intention of this paper is to explore length understandings in light of experiences from the Early Numeracy Research Project (ENRP) and reflect upon the value of the fundamental ideas underpinning the learning of length in the early years of schooling.

In terms of the results presented above, we confidently recommend the following to teachers.

Teachers of children in the first year of school can reasonably aim that nearly all students are able to compare the length of two objects, to order three objects even if not necessarily directly comparing them, and begin to move towards quantifying lengths. It is relevant to note that in the ENRP an active decision was made not to have assessment items that measure the transitive property of length; nevertheless, structured activities that provide experiences in this element of length learning are important (e.g., asking students to compare the lengths of two objects that cannot be placed next to each other).

Teachers of children in the second year of school could emphasise activities that facilitate the movement of all students toward using informal units iteratively to quantify lengths, both using a single unit repeatedly and using multiple versions of the one unit. It is worth noting that approximately two-thirds of the students at this level are either using or will become ready for using standard units during the year.

Teachers of children in the third year of school should expect most children to be moving towards using standard units such as the centimetre. Again it is noted that many students are ready for more sophisticated tasks involving measuring length.

It is evident that the capacity to operate with numbers and these fundamental measurement concepts seem to be quite independent of each other, suggesting that teachers need to incorporate measurement in a structured way in their teaching programs.

It is noted that, even with well-supported teachers, there is great diversity of readiness after three years of school and, from the third year of schooling onwards, it is difficult to imagine that teachers can teach measurement without making specific provision for the differences in their planning.

It is important to consider the implications of these findings for teaching and teacher learning. Hattie and Timperley (2007) argued that the most important determinant of student learning is the feedback they receive. This includes the students knowing what they are meant to be doing, how well they are doing it, and what they will do next. If the teacher is clear about the particular learning goals, (s)he will be in a better position to communicate those goals to the students, and to provide ongoing feedback on their progress towards achieving those goals. Having clear goals also allows teachers to choose or create activities that can allow students to construct the fundamental ideas of, in this case, measurement of length for themselves.

Acknowledgements

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References


An analysis of New Zealand’s changing history, policies and approaches to early childhood education

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Massey University College of Education

NEW ZEALAND HAS AN INTERNATIONALLY unique approach to early childhood education, which includes a bicultural early childhood curriculum, a robust infrastructure of organisation and management overseen by the New Zealand Ministry of Education, and a growing reputation for innovation in early childhood teaching and learning. This paper examines how the current model of early childhood education emerged, the policy decisions that enabled current systems to be developed, the importance of the early childhood curriculum, teacher education and professional development, and recent developments during a time of recession in New Zealand. Some recommendations for early childhood education, based on the New Zealand experience, are proposed.

Introduction

As in many countries, early childhood education as a formal construct is relatively recent in New Zealand, although there has been formal and informal provision for children younger than school age for around 120 years. This paper will briefly explain how the New Zealand conception of ‘early childhood education’ developed and how it has been adopted by government and formalised via regulatory and financial systems. The paper will conclude with some speculation on the directions the National Government which came to power in 2008 is taking, along with recommendations based on the lessons learned in New Zealand.

A brief history of early childhood education in New Zealand

Early childhood education had its birth in New Zealand in 1889 in Dunedin, in the South Island, when the first kindergarten was established to cater for the children of the poor who were left to play on the street while their parents worked (Hughes, 1989). The initiative was based on Christian and philanthropic motivations by middle-class members of the Dunedin community. The first childcare centre was established by the Catholic Church in the capital city, Wellington, in 1908, again based on Christian motivations of caring for children of the poor whose mothers were working (Cook, 1985). For the first part of the twentieth century, kindergartens developed across the country, as they did in many Western nations, based on the philosophies of German philosopher Friedrich Froebel and notions of children learning through play in a natural environment and through involvement with educational materials he called ‘gifts’. Child care developed in a more ad hoc way with some established centres and a great deal of ‘backyard’ care or ‘baby farming’, where mothers took in other people’s children during the day (Cook, 1985; May, 1997).

The first Labour government in New Zealand in 1935 brought about sweeping changes in education in all sectors, making secondary school compulsory for all children and promoting progressive notions of education. These were based on Dewey’s theories, of young children learning through active participation with real experiences such as blocks, carpentry and water play. With the support of the then minister of education, Peter Fraser, and the visionary director general of education, Clarence Beeby, English educationalist Susan Isaacs was invited to New Zealand in 1937 to talk about the psychoanalytic notions of child development trialled in British nursery schools, such as the Malting House nursery. Such trials were
based on Freudian theories of the ‘natural child’ and the importance of children’s ‘free play’ in building healthy psychological development. With encouragement from government, the first nursery play centres were established in New Zealand, run initially by middle-class parent cooperatives throughout New Zealand, but also being adopted by working-class families (Stover, 2011).

Under the leadership of Beeby, ideas for post-war education were circulated in a publication in 1944 entitled Education for today and tomorrow (Mason, 1944, in Stover, 2011). This document posed challenging questions about ‘preschool education’, including the need for all-day nursery schools, collaboration between services, and teacher education. The appointment of a first-ever supervisor of pre-school services in 1946 signalled a change in kindergarten practices, whereby teachers were encouraged to let children ‘be free’ by giving them choices, to minimise routines, and to encourage ‘free play’ (May, 1997). Understandings of free play were published in a number of influential playcentre publications, which were used by the kindergarten training colleges for helping student teachers to understand how to promote ‘free play’ (Stover, 2011). In her analysis of the history of the role of play in New Zealand, Stover (2011) argues that ‘free play’ was in its heyday across the diverse services for young children from the 1950s to 1980s, although not always well-understood or accepted by families and the wider education community; and other services with distinctly different philosophies emerged during this time. In addition to the already-established kindergartens, childcare centres and playcentres, playgroups, Montessori preschools, Steiner kindergartens, Māori language total immersion centres (Kohanga Reo), and more recently various Pacific Island language nests emerged, creating a diverse and complex early childhood sector. As Loveridge and McLachlan have argued:

Early childhood education in New Zealand is the result of historical, cultural and political factors, as well as a response to dominant and emerging theories of how children learn. It has variously promoted social regulation, philanthropic concern for children, support for mothers, equality for women, cultural assimilation and survival, and economic outcomes. Services have emerged in response to these discourses and the sector has become diverse and complex (2009, p. 22).

Policy reform in the 1980s

New Zealand faced its next major overhaul of education in the mid-’80s, following the election of the fourth Labour government, under the leadership of Prime Minister David Lange. Labour took power in the face of a fiscal and financial crisis, which precipitated a number of major reforms, including many in education. One was the decision to move the governance of childcare centres to the Department of Education (now Ministry of Education) from the Department of Social Welfare, where it had previously resided, to join the kindergarten associations, which had traditionally resided in the Department of Education, under the governance of the State Sector Act and with full funding of kindergartens by the state. This decision was prompted by a number of serious complaints about the quality of child care and prompted a reconceptualisation of how all early childhood services should be funded and regulated (May, 1997). This reorganisation meant that both child care and education were funded from Vote Education funds, and all issues to do with children from birth became the responsibility of the newly formed Ministry of Education, while the funding of family financial support and social welfare became the responsibility of the Ministry of Social Development. This was a significant and important development, providing the financial and regulatory framework that enabled the establishment of an early childhood sector in New Zealand.

Te One (2003) argued that the education system had been seriously challenged in the years leading up to the fourth Labour government: ‘The education system was considered over-centralised and unresponsive to community needs, and to have failed to deliver social and educational equity; indeed the educational failure of Māori had become a “statistical artefact”’ (p. 19). Te One further argued that the Government undertook a bold social experiment, based on a philosophy of individualism and the supremacy of the market, which involved market-driven provision of services, including education. The rationale was that having children was a personal choice and educating them was a private responsibility. Hence education belonged in the private domain. Te One challenged the assumptions that families were ready, willing and able to exercise choice and that communities were in a position to provide them with choice.

As part of this rationale, however, in 1988 the Government established a working group to ‘provide a short restatement of the purpose, place, form and function of early childhood education’ (Department of Education, 1988a, p. iv). The resulting Education to be more and Before five: Early childhood care and education in New Zealand documents (Department of Education, 1988a; 1988b) were the early childhood equivalent of the compulsory sectors’ Tomorrow’s schools document (Department of Education, 1988c) released at the same time. One key element of Before five was the introduction of a contract with the Government called a ‘charter’, which was designed as a statement of objectives and practices, drawn up in consultation with parents, in keeping with the national guidelines for early childhood. In return, chartered early childhood services would receive funding for the centre as a bulk grant.
Before five also gave equivalent status to primary and secondary education, and, although controversial, it was accepted by both community- and privately owned early childhood services (Te One, 2003), enabling a legitimate teaching career pathway for teachers. Education to be more cites the outcomes of early childhood education as increased educational achievement and reduced need for special education, increased likelihood of employment, reduced delinquency and teenage pregnancy, and an economic outcome of paying for itself by saving the taxpayer $400–$700 for every $100 spent on early childhood. The rationale underpinning these documents was twofold: education was defined in economic terms as having long-term benefits for children and families; and for ensuring the Government’s long-term economic goals were realised. Education was thus a ‘lever’ for achieving state goals. The Government had two goals: to equip New Zealanders with twenty-first century skills; and to reduce systematic underachievement in education; sometimes known by the catchphrase ‘raise achievement and reduce disparity’ (Adams & Bethell, 2005, p. 144). The second agenda, achieved through the introduction of a ‘charter’ in each sector, concerned increasing accountability and government control.

The end result of these reforms in the late ’80s was the establishment of an identifiable sector, known as ‘early childhood education’, which was unified at a policy level, rather than in any commonality of philosophy or practice. That unification was to come about through the 1990s and beyond through the development of an early childhood curriculum, which, it has been argued, resulted from a series of residential courses run at Lopdell House in Auckland on the implementation of early childhood curriculum, which, it has been argued, resulted from a series of residential courses run at Lopdell House in Auckland on the implementation of policy initiatives in this newly identified sector of early childhood education (Te One, 2003).

Curriculum development in the 1990s

The intervention by the state in early childhood education in the late 1980s led to a succession of new statutory requirements, and a plethora of policy and guiding documents, including:

- a national curriculum for early childhood education, Te Whāriki (Ministry of Education, 1996)
- Quality in action (Ministry of Education, 1998)
- the Education (Early Childhood Centre) Regulations (1998)
- The quality journey (Ministry of Education, 1999)
- a Strategic Plan for early childhood, Pathways to the future (Ministry of Education, 2002)
- Kei tua o te pae: Early childhood exemplars (Ministry of Education, 2004)
- Self-review guidelines for early childhood education (Ministry of Education, 2007a)
- Foundations for discovery (Ministry of Education, 2005)
- Education (Early Childhood Services) Regulations (New Zealand Government, 2008)

The curriculum itself was developed by two academics, Helen May and Margaret Carr, now respectively professors of education at Otago and Waikato universities, in consultation with members of the Te Kohanga Reo Trust (representing indigenous Māori people) and representatives of the various early childhood groups. It was distributed in draft form for trial in 1993 and significantly revised and distributed in a final version in 1996. It has been in use ever since, but never evaluated, unlike the National Curriculum which was distributed in 1993 and evaluated twice by a representative of the Australian and British Councils for Educational Research, with a significantly revised version released in 2007. Of significance is that the new national curriculum document has been aligned to Te Whāriki to some extent. Te Whāriki, the early childhood curriculum, includes the following aspirational statement:

This curriculum is founded on the following aspirations for children: to grow up as competent and confident learners and communicators, healthy in mind, body, and spirit, secure in their sense of belonging and in the knowledge that they make a valued contribution to society (Ministry of Education, 1996, p. 9).

The curriculum is designed for children from birth to school entry, which typically is at the age of five (most children start school on their fifth birthday), but children do not legally have to attend school until they are six years old. Early childhood education is not compulsory in New Zealand, but it is highly recommended, and over 90 per cent of four-year-olds have some form of early childhood education.

The term curriculum is defined as the ‘sum total of the experiences, activities, and events, whether direct or indirect, which occur within an environment designed to foster children’s learning and development’ (Ministry of Education, 1996, p. 10). The curriculum is bicultural and includes a section written in Māori for the use of Kohanga Reo centres (Māori language immersion centres). The curriculum integrates care and education. The term whāriki means woven mat in Māori and implies that curriculum will be woven from its principles, strands and goals along with the different structures and philosophies of the early childhood services. The curriculum has four broad principles: empowerment, holistic development, family and community, and relationships. In addition it has five interwoven strands: wellbeing, belonging, contribution, communication, and exploration.
Currently, all licensed early childhood centres (those that have met Ministry of Education licensing criteria) are required to demonstrate that they are enacting a curriculum within their service, although use of *Te Whāriki* is implicit within licensing requirements, rather than an explicit requirement. Each centre is reviewed on a three-yearly cycle by the Education Review Office, the evaluation arm of the national education system, using a set of Evaluation Indicators designed for early childhood education (ERO, 2004). The resulting reviews are public documents, which parents can access as they are making decisions about use of an early childhood service. The reviews provide an overview of the strengths and weaknesses of each centre, rather than an analysis of children or their achievement. The review cycle is shortened if there are any issues or concerns identified at the three-year review. On-going and unresolved issues result in loss of licence and closure of centres. In addition, the Ministry of Education can respond to complaints about services and can review whether services are meeting licensing requirements between ERO reviews.

When you examine curricula from around the world, there is great diversity in what is presented; some are specific, some quite general. According to Scott (2008), there is great diversity in what is presented; some are explicit criteria would save teachers and students from muddle and confusion. In contrast, the *competence* model suggests that learners have some control over the selection, pacing and sequencing of the curriculum. *Competence* models have been more common in early childhood education. New Zealand’s early childhood curriculum, *Te Whāriki* (Ministry of Education, 1996) is a good example of this sort of curriculum and is essentially learner-centred in orientation rather than teacher-directed. It is associated with sociocultural theories of teaching and learning which are based on the child actively constructing knowledge through activity and play and through interaction with sensitive teachers and other children (for a more detailed analysis of *Te Whāriki*, see McLachlan, Fleer and Edwards, 2010). It is also quite explicitly based on Bronfenbrenner’s (1979) ecological systems theory, and relationships with families and communities is a key feature of the curriculum. However, the dominance of competence models of curriculum in early childhood education is changing with the advent of some countries’ curriculum policies, such as the Foundation Stage curriculum in the UK (Aubrey, 2004), which is more tightly aligned to the national school curriculum and is subject-specific. Recent changes in New Zealand government policy suggest movements towards performance models of curriculum (see Ministry of Education, 2008c); with an increased focus on literacy and numeracy achievement.

There is evidence from international longitudinal studies (see Barnett et al., 2008) that children who have early childhood experiences that are learner- or child-centred and based on a competence model have better long-term outcomes in terms of school achievement, behaviour, social competence, employment, avoidance of teenage delinquency and pregnancy. Much of our current understanding of the outcomes of quality early childhood curriculum is based on the outcomes of longitudinal studies of children in early childhood settings. Most of these studies (e.g. Abecedarian Project, 1999; McCain & Mustard, 1999; Osborne & Millbank, 1987; Schweinhart & Weikart, 1999) demonstrate clear links between the quality of an early childhood program and children’s later educational achievement. They also demonstrate long-term social outcomes, as well as short-term cognitive gains (Golbeck, 2001). Barnett et al. (2008) argue that further research is needed on the effectiveness of one model of curriculum design over another because there have been few studies which used random assignment to groups, and non-experimental studies have often confounded curriculum differences with other program characteristics or the characteristics of the children attending the program. However, they argue how some studies show that direct instruction models produce larger gains on achievement in subject content knowledge over the first couple of years but these gains do not persist over time. There is also
some evidence that curriculum effects differ according to child characteristics, specifically gender and ability at program entry, but this is not found in all studies. Finally, curricula produce differences in social and emotional outcomes, which may be more persistent than the cognitive outcomes. In particular, direct instruction models have been found to produce worse social and emotional outcomes for children than do learner-centred models of curriculum, with implications for behavioural difficulties. Although there is little formal evaluation of the outcomes of New Zealand’s early childhood education, there is some evidence from New Zealand longitudinal studies that children who have attended early childhood centres are more likely to make successful transitions to school and to achieve academically, as well as developing social competence (Tagoielagi-Leota, McNaughton, MacDonald & Ferry, 2006; Wylie, Hodgen, Hipkins & Vaughan, 2009).

It has been argued that many educators initially lacked the professional and theoretical knowledge to effectively implement New Zealand’s early childhood curriculum (Cullen, 1996; Nuttall, 2003). To this end, the Ministry of Education funded extensive professional development for early childhood teachers on Te Whāriki and more recently Kei tua o te pae (Ministry of Education, 2004), with the assessment exemplars designed to guide teachers on how to assess using Te Whāriki. Typically, this professional development was offered by a facilitator who worked with individual centres, rather than as workshops on specific topics, although these were offered by some professional development providers too. As well, the Ministry assisted in the development of specific teacher education programs to support Māori and Pasifika children and funded a large number of scholarships for students to study teacher education.

In addition, the Ministry funded 16 Centre of Innovation projects, which examined aspects of implementing the curriculum, as well as the Foundations for Discovery project aimed at investigating the use of ICT in early childhood centres. Some funding was also directed at evaluation of early childhood centres, using The quality journey document, which promoted the use of self-review methods of evaluation. Difficulties in implementing self-review in most centres led to revisiting The quality journey document, resulting in a revised set of guidelines for centres for using self-review. Despite the inherent difficulties in implementing (McLachlan-Smith, 2001; Nuttall, 2003; McLachlan, Carvalho, Kumar & de Lautour, 2006) and evaluating (Cullen, 2003) Te Whāriki, the early childhood sector has currently managed to hold onto its right to have a different curriculum from that of the National Curriculum (Ministry of Education, 1993) despite increasing pressure for a closer articulation (evidenced by the revised national curriculum, Ministry of Education, 2007b).

**Issues of quality and accountability in the millennium**

In 2002, the Ministry of Education completed a consultation process with the sector, which led to the publication of a strategic plan for early childhood for 2002–2012, entitled Pathways to the future. The Strategic Plan (Ministry of Education, 2002) included the following goals:

- Increase participation in quality early childhood services.
- Improve quality of early childhood services.
- Promote collaborative relationships.

The initiatives put in place to help to achieve these goals included scholarships for early childhood staff to pursue an early childhood teaching qualification, Māori and Pasifika teacher education qualifications, increased funding to centres for higher numbers of qualified staff, funding to support teachers to gain teacher registration, and a plethora of documents and professional development, as discussed above. It should be noted that a primary teaching qualification is not a recognised qualification for early childhood teaching in New Zealand, so many primary-trained staff had to retrain under this strategic plan.

The strategic plan included a regulatory change so that by 2005 all ‘persons responsible’ in a licensed early childhood centre needed to hold a benchmark three-year teaching qualification, i.e. Diploma of Teaching (ECT), Bachelor of Education or Teaching (ECT) or equivalent, and by 2012 all staff in licensed early childhood centres needed a teaching qualification; the reason given being a strong correlation between quality and teacher qualifications. Many services were seriously affected by these changes. As at 1 July 2009, 64.0 per cent (11,780) of teaching staff at teacher-led services were qualified. This was an increase of 14.3 per cent (1,475) from July 2008; of the remainder of staff, 53.2 per cent (3,523) who were not qualified were in study for a qualification that leads to teacher registration with the New Zealand Teachers Council. Finding qualified staff has been a serious issue for many areas, leading the Ministry to offer financial incentives to teachers for transferring to hard-to-staff areas. According to recent Ministry of Education statistics, as at 1 July 2009:

- The number of early childhood education services had increased by 14.6 per cent (454) since 2005, to 4,890 services. This included 525 more licensed services and 71 fewer licence-exempt groups.
- There were 4,123 licensed services.
- There were 767 licence-exempt ECE groups, one less than at 1 July 2008.
- There had been a steady decline in the number of kōhanga reo services since 1 July 2005.
There were 180,910 enrolments in licensed early childhood education services, an increase of 10.0 per cent (16,389) since 2005.

In 2007, the then Labour Government introduced 20 hours of ‘free ECE’ for three- and four-year-olds as part of delivering the first goal of participation. The Ministry’s argument about why this was necessary was:

... 20 hours a week Free ECE has been made available to encourage intensive participation in quality ECE. Children don’t benefit from quality ECE if their participation is not intensive enough to create positive education outcomes. New Zealand has high ECE participation rates but children attend for relatively few hours per week, at around 14–17 hours per week for 3 and 4 year olds. That means a lot of children are attending for 9 hours or fewer per week (Ministry of Education, 2007c).

The offer therefore aimed to ensure that parents help the Government to achieve its strategic and economic vision. What is implicit, however, is that parents and parent-led services are not seen as providing adequate experiences for young children. More recently, the newly elected (conservative) National Government extended the provision of the 20 free hours to parent-led and community-led services such as playcentre and Kōhanga Reo, a move applauded by parents struggling under the effects of recession. The move clearly supported parent-led services and language immersion programs and further underlined the perceived importance of early childhood to the current government, but in the same week funding for teachers’ professional development and Centre of Innovation and Foundations for Discovery research projects was slashed.

As part of the plan to increase quality, a change to the licensing requirements (Ministry of Education, 2006) was introduced. This consultation document argued that early childhood has a ‘changing landscape’ and the proposed regulations provided an ‘integrated regulatory framework’ for all ECE services (Ministry of Education, 2006, p. 4). It had been proposed that the new licensing criteria include a gazetted curriculum, which at the time would have been Te Whāriki, but this was not undertaken in the final version of the licensing criteria released in 2008. In this document, the following statement about curriculum is made, in which it implies that Te Whāriki will be used, but falls short of demanding it. It can be speculated that the diversity of early childhood services made this lack of standardisation necessary, as many of the language immersion programs, in particular, use a variety of other curriculum documents in addition to Te Whāriki. The curriculum statement from the new licensing criteria is as follows (Ministry of Education, 2008a):

1. The curriculum standard: general is the standard that requires every licensed service provider to whom this regulation applies to—(a) plan, implement, and evaluate a curriculum that is designed to enhance children’s learning and development through the provision of learning experiences, and that is consistent with any curriculum framework prescribed by the Minister that applies to the service.

A change of government and a change of direction—2009 and beyond

The change of government in 2008 led to a changed set of government priorities and to a degree of fear and trepidation about the future on the part of the sector. The new National Government took power in the face of worldwide economic recession and an unexpected enormous deficit left by the previous government. The briefing to the incoming Minister of Education (2008b) discusses the following policy choices and challenges for education:

- improving access to early childhood education
- enhancing the performance of the school system
- delivering high-quality Māori language education
- balancing quality and participation in tertiary education
- improving engagement, participation and learning for children with special education needs
- making better use of available resources.

Building on this, the Government released the following priorities in its Vote Education budget for 2009:

- extension of 20 free hours to Playcentre and Kohanga Reo
- reduce truancy
- support for schools with disruptive children
- funding for top performing teachers
- professional development to raise Māori achievement
- funding to increase literacy and numeracy standards
- voluntary bonding for low socioeconomic, hard-to-staff and isolated schools ($3500 per year).

In this budget the Government also cancelled all funding to the early childhood Centres of Innovation ICT projects, as well as signalling that professional development contracts for Te Whāriki and Kei tua o te pae: assessment exemplars would run out at the end of 2009 and would not be renewed. The Government signalled that future professional development would be aligned with government priorities and would commence in July 2010. These government priorities were revealed in the request for proposal in late 2009 as primarily aligned to lifting literacy and numeracy...
achievement; aiding transition to school and increasing participation; supporting language and culture; care of infants and toddlers; and achievement of children ‘at risk’. These changes suggested a significant policy shift from raising quality in all centres to a more targeted focus on raising achievement in specific children, communities and ethnic groups.

In addition, in the 2009 budget, the need for all early childhood staff to be qualified by 2012 was rescinded, as was the requirement for 80 per cent of staff to be qualified by 2010. Eighty per cent is the new target for 2012. In addition, the requirement for qualified, registered teachers working with children under two years was reduced to 50 per cent. A proposed change in adult–child ratios was also rescinded, leaving ratios at previously gazetted levels. The budget of 2010 delivered further bombshells, with changes including reducing funding for centres with fully qualified teachers to the 80 per cent level in line with the reduced licensing requirement from the 2009 budget, recognising primary-qualified teachers and overseas-trained teachers for the purposes of licensing, and not proceeding with the removal of the six-hour limit for funding. The issues concerning funding have meant that increased costs are being passed on to parents (Stover, 2010). Primary and overseas-trained teachers have typically had no training on the care and education of infants and toddlers, they do not know the curriculum document, and may employ inappropriate pedagogies with very young children. There is already evidence of inappropriate literacy practices occurring because of these issues (ERO, 2010).

Recently, the Finance Minister, Bill English, stated on national radio that the cost of early childhood education has trebled in the past six years. He said the Government is moving to balance the support parents receive with the need to contain future costs. It could be argued that current government policy has swung almost full circle back to its early origins of provision for the children of the poor. The Government is declaring on one hand that early childhood education is valuable for achieving educational, social, cultural and economic outcomes, but on the other saying that parents who can afford to provide this should do so and that government funding is really only available for vulnerable children and families and for managing social and economic risk.

Clearly the days of funds being available to the whole sector are at an end, and in times of diminished resources the Government is targeting resources at children and communities who are perceived will benefit the most. It is unlikely that these moves will be welcomed by the sector, but they are consistent with the practices of other governments internationally, such as the American Head Start and British Sure Start programs, which target funding at children of the poor on the basis of economic analysis. As Professors Helen May, Margaret Carr and Anne Smith (2010) said in a recent press release:

For some years New Zealand has been internationally regarded as a flagship in creating the necessary infrastructure of early childhood policy around issues of quality, qualifications, access and curriculum. There was still more to do, and the undermining of these policies is dispiriting, and even embarrassing, as there is continuing worldwide interest in our policy initiatives.

Conclusion

This paper has examined the predominant themes in the development of the early childhood sector in New Zealand over the past 120 years, with a stronger emphasis on the policy reforms from the mid-1980s onwards. There is little doubt that early childhood education has become an accepted part of raising children in the same period, in which there have been commensurate changes in family structures and women's employment patterns. Early childhood education has traditionally fared better in New Zealand under a more socially oriented Labour Government, as the brief history illustrates, and most significant changes have occurred under governments whose policies include promoting the benefits of supporting children and their families. However, although the current Government is clearly reducing its financial support of early childhood, it is still operating within an economic analysis of the benefits of early childhood education to achieving outcomes for the state. It is hoped we can be assured that funding will not ever be completely removed, but it is unlikely to be increased only on the basis of scientific evidence of the importance of early experiences in brain development, language and cognition, because it does not fit comfortably with the cost-benefit analysis framework the current Government is utilising.

Finally, what has been achieved through the major changes in the sector in New Zealand over the past 35 years is a sector that is inclusive in spite of its differences in structures and philosophies. The curriculum document and its assessment techniques, as well as the requirements for teacher education in the strategic plan, have had a unifying effect and have helped to develop a strong, professional and cohesive early childhood network in New Zealand.

Some conclusions that can be drawn about why the New Zealand early childhood education system has been so successful, may provide insights for other countries:

- Coordination of all issues concerning care and education of children under the governance of the Ministry of Education provides a cohesive framework for supporting children and their families in the early years.
A robust regulatory and evaluation framework and substantial funding of fully licensed centres supports quality early childhood services and positive outcomes for children.

A coherent policy framework for early childhood education and a strategic plan for a 10-year period provides clarity of vision for the sector and a clear framework for evaluation of effectiveness.

A requirement for specific early childhood teacher education of at least three years duration highlights the importance of education for children under age five and means that all teachers have understandings of what care and education mean for infants, toddlers and preschool children and can implement appropriate curriculum and pedagogy.

A national early childhood curriculum developed through intensive consultation with members of different types of early childhood services provides a flexible framework which is inclusive of diverse philosophies.

A research program, aimed at shedding light on implementation of the curriculum, strengthens confidence in the effectiveness of the curriculum for supporting children’s learning.

Evaluation of strategic plan achievements at regular intervals can assure parents, teachers, policymakers and government that children’s needs are being met and that money is being spent well.

A set of resources developed to support teaching practice and assessment can aid teachers’ understandings of how to implement curriculum and assessment.

Ongoing programs of professional development can help ensure that teachers maintain currency in their understanding of recent theories and research related to children’s learning. Aspects which New Zealand could have improved include a stronger relationship with the other ministries that support children and their families (Social Development and Health), as this would ensure that families are not working with multiple agencies to get support for children; and a commitment to longitudinal research on the outcomes and benefits of the curriculum, as this would provide a stronger evidential base on the outcomes of the approach to early childhood education. As has been argued elsewhere (e.g. Cullen, 2008), New Zealand research in early childhood education has been for too long focused on processes, and evidentially based research on outcomes is of paramount importance, especially in times of recession when funding is short and policy-makers are making decisions about where to target it. New Zealand has a strong and proud history of early childhood education, but one which its educators now have to take action to protect.

**References**


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Introduction

Because of their immense curiosity, thirst for knowledge and questioning attitude, young children are innate scientists (Howitt, Morris & Colvill, 2007). Science becomes a part of children’s everyday experiences in their attempt to make sense of their own personal world. This same scientific curiosity should be present in the early childhood centre or classroom. The role of the early childhood professional is to nurture this curiosity by providing opportunities, in a safe and caring environment, for young children to explore, question, observe, discover and share their wonder of the world (Howitt et al., 2007).

Science, however, is a subject that teachers tend to avoid in the classroom (Harlen & Holroyd, 1997; Watters & Ginns, 2000). Various reasons have been given for this, including early childhood professionals’ limited scientific knowledge and lack of confidence and competence to teach science (Appleton, 2006; Harlen & Holroyd, 1997), their lack of understanding of what science looks like at the early childhood level and where science occurs in everyday situations, and their inability to extend or capitalise on young children’s thinking (Fleer, 2009b; Fleer & March, 2008). The lack of support for the place of science in early childhood education (with the emphasis instead focusing on literacy and numeracy), along with the lack of resources for supporting science education, have also contributed to the limited implementation of science within early childhood education (Eshach & Fried, 2005; Fleer & March, 2008; Peterson & French, 2008). Fleer (2009a) considered teachers’ philosophical beliefs and assumptions about how children learn science to be a further limiting factor in the delivery of science in early childhood settings. These issues are considered to be even more of a concern for pre-service teachers as they interact during practicum with experienced teachers.
who question the value and place of science (Fleer, 2009a), with a subsequent lack of suitable role models for observing effective science teaching and learning in the early childhood years (Skamp & Mueller, 2001).

The purpose of this paper is to present a detailed case study of how a pre-service teacher implemented forensic science within a preschool (four-year-old) classroom as a form of guided scientific inquiry. It not only highlights how a complex topic can be modified for preschool, but how young children can readily engage in inquiry-based learning. The first part of this paper introduces inquiry learning, and the important place of such learning in science. The fundamental principle of forensic science, along with the current image of forensic science in school education, is then described. Following this, the context of the study positions this paper within a wider research project. The paper then introduces the case study research design, and presents and discusses the findings from the case study where forensic science was implemented in the preschool classroom. The paper concludes with a discussion of the sociocultural context of learning, highlighting the connection between everyday concepts and scientific concepts within the forensic science program.

Science as a sociocultural practice

In this paper, science learning is viewed as socially negotiated and situated in specific contexts and practices. Such a sociocultural approach to learning acknowledges the place of personal, social and cultural aspects in children’s learning and the interaction between individuals, social groups and contexts (Robbins, 2005). Additionally, sociocultural practices of science acknowledge that learning occurs through the co-construction of ideas, sharing of knowledge, modification of ideas and knowledge, and consensus of the interpretation of data (Samarapungavan, Mantzicopoulos & Patrick, 2008).

Inquiry-based learning

Contemporary learning theory states that learning is most effective when students are active participants within the learning process, when the learning proceeds from experiences to explanations, when students’ existing knowledge is used as the platform to develop new explanations, and when teachers are prepared to support students in the learning process (Anderson, 2002; Hackling, 2007). An inquiry-based approach to learning, where students are actively involved in finding answers to their own questions, incorporates all of these conditions. Learning science through an inquiry approach involves students in asking questions, exploring and investigating phenomena through the manipulation of materials, gaining experiences and making observations, and then developing explanations for those experiences (Hackling, 2007). At the heart of inquiry-based learning is the student trying to make sense of the phenomena under study (Crawford, 2009). As such, this approach actively engages students in learning, encourages curiosity and excitement of discovery, develops knowledge and understanding of scientific ideas, supports students in using data as evidence, and allows students to experience working like a real scientist (Anderson, 2002; Crawford, 2007).

Within early childhood education, inquiry learning appears to commonly follow that of guided inquiry. A guided inquiry approach provides structured experiences of the phenomenon and leads to the collection of observations that can be used to develop explanations for the phenomenon (Hackling, 2005). Guided inquiry therefore involves guided and collaborative participation (Hedges, 2000) between the teacher and children through steps that may involve manipulating materials; making observations or measurements; or recording, discussing or interpreting observations (Hackling, 2005). Guided participation acknowledges the role of children as ‘active agents and communicators in their own learning’ (Hedges, 2000, p. 18).

One of the key issues in guided inquiry is to select an appropriate context and learning experiences that allow young children to create meaningful new knowledge, based on the cognitive resources they bring to the task (Samarapungavan et al., 2008). These authors further commented on the need to provide appropriate instructional support, as young children are ‘universal novices’ (p. 903), lacking experiences with science as a discipline as well as having limited cognitive tools for literacy and numeracy. Such support included modelling aspects of inquiry, guiding science discourse, and assisting young children to better understand the scientific inquiry process (Samarapungavan et al., 2008).

There appears to be limited research on the outcomes of inquiry learning on young children. However, a few relevant studies were located. Samarapungavan et al. (2008) examined United States kindergarten (no age given) children’s science learning, using a guided inquiry approach into the life cycle of the monarch butterfly. Their results indicated that kindergarten children were able to successfully engage in the practices of scientific inquiry and to conduct empirical investigations to extend and revise their biological knowledge. As measured through an analysis of portfolios, they found the children were highly proficient in generating questions, making predictions, observing and recording data, and communicating their findings, while proficient in using empirical evidence to extend, elaborate or revise their knowledge. Also in the United States, Peterson and French (2008) examined preschool (three- and four-year-old) children’s explanatory language through science inquiry in a five-week unit on colour mixing. Through
analysis of discourse the children were found to engage as conversational partners, scientific investigators and dynamic co-constructors of explanations. These results demonstrate that young children can successfully engage in scientific explanation and inquiry.

The approach taken in this research was to explore how a forensic science unit of work was implemented in a preschool classroom to provide opportunities for the children to engage in knowledge building and the scientific inquiry processes of generating questions and predictions, observing and recording data, using equipment, using observations as evidence, and representing and communicating findings.

**Forensic science**

Forensic science has a high profile. *CSI, Silent Witness* and *Cold Case* are not only common words today, but also television series watched by thousands of people each week around the world. While murder, blood, body parts and maggots are highly attractive to children, early childhood teachers consider them as inappropriate images and ideas to be using in their classrooms. If the traditional images associated with forensic science cannot be used with younger children, how and why should this topic be taught?

Forensic science describes the application of scientific methods and knowledge to legal problems (Siegel, 2009). A fundamental principle of forensic science has been popularly summarised by the phrase ‘every contact leaves a trace’. This phrase has been termed Locard’s Exchange Principle for the forensic scientist Edmond Locard, who was a pioneer in the area of trace evidence (Siegel, 2009). Every time objects come into contact with each other there is an exchange of information. This information could be fingerprints, hairs, fibres, soil or blood. For example, when young children eat ice cream and then place their dirty hands on a clean surface, information is left behind in the child’s fingerprints. Alternatively, if a white, long-haired cat sits on the lap of a person wearing dark-coloured pants, the information left behind is the cat’s white hairs. In the same way dust, hairs, glass fragments and even pollen present at a crime scene can be found on the clothing or shoes of a criminal. It may be transferred between the criminal and a victim or object and can establish links between objects and/or people and a crime scene. The information left behind becomes evidence for the forensic scientist. This trace evidence has also been called the ‘silent witness’, thus giving name to the popular television series.

Forensic science has been taught in secondary school for the past five to 10 years, with an emphasis on molecular science, chemistry and biology. Forensic science has also been taught in upper primary school over the past five years as an introduction to the scientific method, including the principles of forensic science, fingerprint analysis, basic paper chromatography, and crime scene investigation (Howitt, Lewis & Waugh, 2009). In contrast, forensic science does not appear to have been used as a vehicle to teach at the early childhood level.

**Context of study**

The forensic science resources implemented in the preschool classroom in this research were developed as part of the Collaborative Science Project conducted between 2008 and 2010 at Curtin University in Perth, Western Australia, with funding from the Australian Learning and Teaching Council. The Collaborative Science Project took a cross-discipline approach to better preparing pre-service early childhood teachers to teach science. Collaboration between science academics, teacher-educators and pre-service teachers was used to develop five science modules and implement them in an early childhood Science Education unit. The information presented in each module aimed to provide a broad range of possible ideas and activities that could be used with three- to eight-year-old children. The modules were designed to be adaptive and flexible, rather than a set teaching program, so teachers could use them in a manner that suited their particular students and context (Howitt et al., 2009). The five modules were subsequently developed into a book, *Planting the seeds of science* (Howitt & Blake, 2010).

The pre-service teachers then had the opportunity to trial and evaluate these modules in the early childhood classroom during their practicum. Thus, the Collaborative Science Project aimed to increase pre-service teachers’ science content knowledge along with their confidence and competence towards teaching science, as well to develop a new early childhood science resource. For a more detailed description of the collaboration between the scientists, teacher-educators and pre-service teachers, refer to Howitt et al. (2009). In this study the first author, Christine, was the science teacher-educator; the second author, Simon, was the analytical chemist specialising in forensic science; and the third author, Emily, was the pre-service teacher who implemented forensic science in her preschool practicum classroom.

The five modules were implemented in a 12-week Science Education unit during the third year of a four-year Bachelor of Education (Early Childhood Education) degree during Semester 2, 2008 at an Australian university. The weekly three-hour workshops consisted of a mini-lecture followed by a range of hands-on activities. The science learning experiences presented within the workshops were characterised by active participation, placement within an authentic early
childhood context, discussion of children’s views of science, and learning within a social constructivist environment. The pre-service teachers were then required to complete a three-week practicum in an early childhood classroom. While the pre-service teachers were encouraged to teach science using the newly developed modules, this was at the discretion of the cooperating teacher.

We’re going on a (forensic) bear hunt! was the name of the forensic science module. The purpose of this module was to introduce children to the fundamental principle of forensic science, every contact leaves a trace, allowing them to solve a mystery relating to a set of bear footprints found in the classroom. This was achieved through the completion of various basic forensic activities where they collected evidence using their observational, descriptive and classification skills. Throughout the module questioning was used to encourage the children to think about the evidence they had collected.

Simon took an active role in the development of the forensic science module, working closely with various teacher-educators from the project. Simon and Christine then team-taught the forensic science workshop. Through a PowerPoint presentation, Simon introduced the pre-service teachers to the alternative conceptions associated with forensic science, the role of forensic science, and the two fundamental principles associated with forensic science. The three common types of fingerprints were then introduced, the pre-service teachers being provided with the opportunity to obtain and identify their fingerprints as loops, whorls or arches. Simon’s presentation finished with a case study of an English murderer and how he was identified through forensic science. The workshop that followed presented a range of six activities taken from the forensic science module, where both Simon and Christine assisted the pre-service teachers.

Methodology

This research was based on an interpretive paradigm that values the creation of meaning and is characterised by a concern for the individual and their view (Cohen et al., 2000). Such a paradigm aims to understand how people make sense of their world and what they experience through interpreting events, contexts and situations (Merriam, 1998). A qualitative case study research design was used to describe how Emily implemented forensic science in the kindergarten classroom, her perceptions of the program in terms of teaching and learning, the children’s engagement in scientific inquiry processes, and how the children responded to the program. Case studies provide an holistic means of describing and interpreting phenomena in context, thus providing an in-depth understanding of the phenomena (Merriam, 1998).

Emily was a 22-year-old pre-service teacher who chose to implement forensic science in her preschool classroom while on her three-week practicium during Term 4, 2008. Emily had a positive attitude towards teaching science, owing to her experiences of science in both primary and high school. However, prior to completing the Science Education unit Emily admitted she knew little about how to teach science to young children. Two of her major concerns were how to make science activities age-appropriate, and how to use questioning effectively when teaching science. Emily fully supported young children being actively involved in their own learning, and expressed a desire to effectively engage children in science teaching and learning.

The preschool was part of a large metropolitan primary school located in a low socioeconomic area in Perth, Western Australia. The current case study was based on one mixed class of 20 children who attended preschool four half-days (three hours) per week. Their ages during the study ranged from four years-four months to five years-two months. This class was normally taught by an experienced teacher of 20+ years and an educational assistant with 10+ years’ experience. Inside the classroom was a large mat area, a reading corner, a play area containing blocks, three small desks for activities, and a kitchen which housed a wide range of resources. Outside the classroom was a large grassed area, with a covered sandpit in the middle, that was shared by three different preschool classes.

In this study, the children were acknowledged as equal and active participants (Christensen & Prout, 2002). To manage the ethical considerations when dealing with such young children, issues of access, consent, the researcher’s role, and the relationship with the children were all addressed. Along with written consent from the principal, teachers and parents, verbal consent was also obtained from the children. Photographs were taken of children’s drawings, with permission, so each child could keep their original. The children were familiar with a digital camera in the classroom, being encouraged to use it when something interested them. Multiple and flexible methods of data collection (described below) were used in order to better capture the children’s experiences, to minimise the power relationship between the researcher and children, and to allow the children to decide on the nature and extent of their involvement. These methods emphasised a respectful and listening approach to the children.

Emily developed her program from both the forensic science module and the experiences provided in the forensic science workshop. She carefully considered the sequence of her program as she was restricted to six half-day lessons over the three-week practicium. In these six lessons the children were introduced to three different types of evidence (footprints, fur, and paw prints);
planned and conducted a fingerprint investigation; went on a bear hunt; and took part in a teddy bears’ picnic. In the first three lessons, the bear evidence was initially presented to the children. This was followed with an activity where the children could relate this evidence to themselves. A more detailed description of the teaching program can be found in Table 1. The instructional goals for the program, in terms of inquiry skills and knowledge, are listed in Table 2.

Table 1. The six lesson forensic science program

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Topic</th>
<th>Learning experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Footprints</td>
<td>Discover bear footprints. Trace and compare own footprints to the bear footprints.</td>
</tr>
<tr>
<td>2</td>
<td>Fur/Hair</td>
<td>Discover fur on the teacher and around the classroom. Use gloves, tongs and snap-lock bags to collect the fur evidence. Develop a pictogram of children’s hair colour.</td>
</tr>
<tr>
<td>3</td>
<td>Paw prints/Fingerprints</td>
<td>Discover honey paw prints. Introduce the concept of fingerprints to the class. Make a set of own fingerprints.</td>
</tr>
<tr>
<td>4</td>
<td>Who left the evidence? Plan investigation</td>
<td>Bring the evidence together. Draw a picture of who left behind the evidence, with explanation. Plan a class investigation on ‘What foods can we make fingerprints with?’</td>
</tr>
<tr>
<td>5</td>
<td>Conduct investigation Bear hunt</td>
<td>Conduct and evaluate investigation. Go on a bear hunt outside. Discover what the bear was doing in the classroom.</td>
</tr>
<tr>
<td>6</td>
<td>Teddy bears’ picnic</td>
<td>Whole class teddy bears’ picnic.</td>
</tr>
</tbody>
</table>

In order to develop the detailed case study, data was collected from a wide range of sources. These included interviews with Emily; a copy of her teaching program; children’s responses to in-class questions, anecdotal comments, and drawings; and observations in class. Each of these is described in more detail below.

Emily was interviewed on two occasions: at the start of the Science Education unit (August 2008) and immediately after her practicum (December 2008). Semi-structured interviews were held, with Christine being the interviewer. Emily was asked to describe how she developed her forensic science program, how she implemented the program, and how she perceived the children’s engagement. She also provided a copy of her teaching program at this interview.

The children’s responses to in-class questions within the forensic science teaching program were recorded by Emily to gain an insight into their thinking. Emily also recorded children’s anecdotal comments relating to the forensic science program. These could have originated from the child’s home or from the classroom. Some of these comments were captured during the interview with Emily. Towards the end of the teaching program, the children were asked to draw who they thought had left the evidence behind. Emily annotated any comments the children made to accompany their drawings.

In the last week of the practicum, Christine observed the children perform a fingerprint investigation during one lesson. Observations included the children’s engagement with the process along with their interpretation and evaluation of the investigation. Christine was flexible throughout the observation process, alternating between participant observer and non-participant observer. During this time Christine also had informal conversations with the teacher, educational assistant and Emily about the forensic science program. Field notes were written after the observations and conversations.

Based on this wide range of data sources, the first five lessons were analysed in terms of the scientific inquiry skills introduced to the children, and the children’s understanding of key ideas in relation to living things and everyday materials. Following Samarapungavan et al. (2008), this research aimed to determine young
children’s ability to be involved in scientific inquiry in investigations, rather than their ability to describe or define scientific inquiry or its components. Thus, this paper provides an interpretation of what it means for young children to be involved in and understand the scientific inquiry process through forensic science.

**Findings**

The findings from this case study are presented in chronological order that equates to Emily implementing her teaching program. The first five lessons are presented as descriptions of the major events that happened in the classroom. Table 3 presents a summary of the inquiry skills and knowledge observed in the classroom.

**Lesson 1: Discovering footprints**

The children’s excitement indicated that something was different. They were gathered around the classroom computer. Two ‘prints’ were on the floor and another two ‘prints’ were on the computer table (see Figure 1). Once the excitement had settled down, Emily asked the children three questions: What are these? Who left them? What were they doing in the classroom? These same three questions were asked with each new piece of evidence in each lesson.

The children’s responses were enthusiastic and varied, and are summarised in Table 4. While it was clear the children had prior knowledge that enabled them to surmise these were prints of some sort, a wide range of answers was provided as to what may have left the prints and what they were doing in the classroom.

Table 3. Summary of the inquiry skills and knowledge observed in each lesson

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Content observed</th>
<th>Inquiry skills</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Footprints</td>
<td>Observe and record</td>
<td>Living things</td>
</tr>
<tr>
<td></td>
<td>Fur/Hair</td>
<td>Explore, question, predict</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Paw prints/ Fingerprints</td>
<td>Explore, question, predict</td>
<td>√</td>
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<tr>
<td></td>
<td>Who left the evidence? Plan investigation</td>
<td>Explore, question, predict</td>
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<tr>
<td></td>
<td>Conduct investigation</td>
<td>Question, predict</td>
<td>√</td>
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<tr>
<td></td>
<td>Bear hunt</td>
<td>Explore, question</td>
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<tr>
<td></td>
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<td>Explore, question, predict</td>
<td>√</td>
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<td>Question, predict</td>
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<tr>
<td></td>
<td>Fur/Hair</td>
<td>Explore, question, predict</td>
<td>√</td>
</tr>
</tbody>
</table>
Table 4. Children’s responses to the three questions relating to the footprints

<table>
<thead>
<tr>
<th>Question</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are these?</td>
<td>Footprints, handprints, fingerprints, dog prints, monster footprints, wolf footprints, bear prints, tracks</td>
</tr>
<tr>
<td>Who left them?</td>
<td>Bear, cat, dog, monster, people, dinosaur, polar bear, big monster, bad giant with a foot, tiger, giant monster, pre-primary kids</td>
</tr>
<tr>
<td>What were they doing in the classroom?</td>
<td>Wanted to stick them on there, walking, using their magic, finding something to eat, stealing (the computer), making the room beautiful, sneaking in, trying to break the table, it’s a mystery!</td>
</tr>
</tbody>
</table>

To relate the floor prints to the children’s experiences, they were invited to compare their own foot outline to the found footprint, by tracing around their foot and cutting around the resulting outline. Pencils, coloured paper, scissors and magnifying glasses were provided. The children readily removed their shoes and socks, traced their own foot onto the paper and cut around the outline. The class moved over to the found footprints to make the comparison. Without any prompting from Emily, the children placed their paper footprints on top of the found footprints (see Figure 2) and discussed with each other their findings: ‘Mine’s bigger’, or ‘Mine’s the same size’. With magnifying glasses in hand, the children eagerly observed a variety of objects to note how the glass made objects bigger.

All evidence collected during the program was progressively attached to an ‘evidence wall’, that was part of one classroom wall. Emily found this necessary to remind the children of what they had covered on the previous days.

Lesson 2: The fur evidence

Emily ‘planted’ pieces of fake fur on her clothes and at the dress-up rack. The children discovered the fur on her clothes and were encouraged to look for more fur evidence. Using gloves and tongs, they collected the fur, placed it into ‘evidence’ (snap-lock) bags, and observed it closely (see Figure 3). This activity led the children to looking throughout the entire classroom for ‘clues’. They discovered fur everywhere (including in the kitchen and in the book corner), even when it had not been placed there specifically by Emily. Ideas about where the fur had come from included ‘the bear pulled the fur off his skin and threw it there’, ‘a big huge furry bear put it on the coats’, ‘the monster tried the coat on like a king’, ‘to trick us the monster picked up the hair off the coats and put it in the kitchen’, and ‘maybe it was reading the books’. Over the period of the program the children continued looking for and finding a wide
range of objects on the floor (such as feathers, food and material), which they considered to be clues to help solve the classroom mystery.

To relate this experience to the children, Emily helped them to develop a class hair colour pictograph. Using photos of the children’s head/hair and an existing template for the pictograph, each child found their photo, identified their hair colour, and added the photo to the appropriate column on the pictograph. The class then counted the number of children with each hair colour, and discussed the most common and least common colours.

Lesson 3: Discovering paw prints

A messy ‘paw print’ was found in the classroom. The children were invited to use their senses of touch, smell and sight to identify the substance on the print. They were provided with cottonbuds to take a small sample of the substance. They went straight to the magnifying glasses to allow a closer look at the evidence. Most predictions of what the substance might be centred on honey. The children were finally allowed to test their predictions by tasting the substance (Emily having first checked for allergies). The messy handprint was indeed a honey handprint. Ideas of where the honey came from included ‘the bees made the honey and left it’, ‘bad honey man’, ‘when the bear came in he dropped it’, ‘sneaking in and dropped the honey’, ‘bear paws with honey’, and ‘eating the honey’.

To relate this experience to the children, Emily introduced them to the concept of fingerprints and how easy it is to leave marks behind that can indicate where you have been. The children were then invited to make their own set of fingerprints with blue ink, and observe what they looked like with the magnifying glasses.

Lesson 4: Who left the evidence?

To draw the previous three lessons to a suitable conclusion, Emily reminded the children about the evidence they had collected, by referring to the evidence wall. She then asked each child to draw a picture of who left the evidence behind. Each child was asked to provide an explanation of his/her drawing in relation to the evidence. Emily then wrote these comments onto the drawing.

All children drew a picture. Six children drew a bear, three drew a wolf/tiger/cat, three drew a monster, two drew bees, two drew dinosaurs, one drew a person, and one drew a ghost. Two children believed a different animal/person was responsible for each piece of evidence.

Table 5 presents a summary of the children’s drawings and explanations in relation to the three types of evidence. Only six children drew pictures that related to the evidence. Three children drew one type of evidence, two children drew two types of evidence, while one child drew all three types. Footprints were the main form of evidence drawn, occurring in 83 per cent of the drawings. Fur occurred in half of these drawings, with paw prints/honey occurring in 33 per cent. Figure 4 shows a drawing with two types of evidence presented.

Table 5. Summary of children’s drawings and explanations in relation to the three types of evidence

<table>
<thead>
<tr>
<th>Evidence</th>
<th>Drawings related to evidence</th>
<th>Explanations related to evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footprints</td>
<td>5 83</td>
<td>13 87</td>
</tr>
<tr>
<td>Fur</td>
<td>3 50</td>
<td>6 40</td>
</tr>
<tr>
<td>Paw prints/honey</td>
<td>2 33</td>
<td>7 47</td>
</tr>
<tr>
<td>Children responding</td>
<td>6 15</td>
<td></td>
</tr>
</tbody>
</table>

As highlighted by Ehrlén (2009), the children’s explanations were found to be more detailed than their drawings. Fifteen children mentioned evidence in their explanation of their drawings (see Table 5). Of these, eight children mentioned only one type of evidence, three children mentioned two types of evidence, while four children mentioned all three types. Once again, footprints were the main form of evidence mentioned in the children’s explanation, occurring 87 per cent of the time. Fur and paw prints/honey occurred 40 per cent and 47 per cent (respectively) of the time in the children’s explanations.

Pooh bear because he eats honey. He has footprints everywhere he goes (Explanation with drawing, child 1).

The bear left the honey footprints. The bear took it (the hair) off his skin and threw it on your coats. I want to talk about clue one. The bear left the footprints (Explanation with drawing, child 2).

A monster in a monster house. He was sneaking in and sloped honey on his foot and his hands. He took the hair off him and put it everywhere (Explanation with drawing, child 4).

A bear. He is trying to get the footprints (Explanation with drawing, child 5).

With assistance from Emily, the children then planned an investigation around the question: What foods can we make fingerprints with? The class decided which food they wished to use in the investigation and (again after checking for allergies) Emily obtained the food. The five selected foods were Vegemite, butter, jam,
honey and flour. Food was chosen for this fingerprint investigation as it allowed the children an opportunity to connect with their everyday experiences of eating at home, how dirty fingers can leave marks, and the importance of cleaning hands after eating. Food also allowed the children to consider a wide range of options, and decide as a class which to select.

Lesson 5: Conduct the investigation

To conduct the investigation in an orderly manner, Emily spread a different food onto the bottom half of five plastic sheets. In groups of four, the children were encouraged to place their finger into the food and then press their dirty finger into the top half of the plastic sheet to leave a fingerprint. Magnifying glasses were provided to allow the children to observe their fingerprints in detail. The children were also encouraged to use a different finger for each food to assist in developing their fine motor skills. After the children made their fingerprints, many of them licked their fingers. Once finished, each child washed their hands and completed a worksheet that Emily had developed, which asked them to circle those foods that made prints, and then pick which food they thought made the ‘best’ fingerprint. Of the 17 children present during the lesson, the children’s response to this last question was: Vegemite (9), jam (3), honey (2), flour (2) and butter (1).

The children then went on a bear hunt in the playground. As they made their way around the play equipment, along the bike path, and across the sandpit, they discovered more evidence ‘planted’ by Emily, including fur, honey handprints and footprints. They finally arrived at a makeshift bear cave where they found a note from a friendly bear explaining that he had been in the classroom to admire the children’s work; that he had left the footprints, fur and honey; and that he couldn’t be there now as he was out collecting honey.

Discussion

The discussion relates to the opportunities provided to develop the children’s inquiry skills and knowledge through the forensic science program. It concludes with a discussion of the sociocultural aspects of the program.

This series of lessons readily embraced the scientific inquiry skills. Exploration, questioning and prediction were a continual part of the lessons, as each piece of evidence was inspected in detail. While nearly all children predicted that a print had been left behind in Lesson 1, their responses on what had left the footprint ranged from reasonable (bear, cat, dog, tiger or humans), incorporating the children’s own personal interests (dinosaurs), to highly imaginative (monsters or giants). The children found it harder to justify what this unknown thing was doing in the classroom. Once again, responses ranged from logical (stealing the computer, trying to break the table, or sneaking in), attempting to understand how the prints were made, through to a realisation that this was a mystery to be solved (‘it’s a mystery!’). This last comment reflects the understanding of one child as to the purpose of the forensic science lessons.
Observation and recording information formed a large component of all lessons. Discovering and discussing each piece of evidence required the use of particular observational skills. While the emphasis was on sight and touch, smell and taste were also incorporated in the lessons. Recording was made in a variety of ways appropriate for this young age group. Many of the children’s ideas associated with the various pieces of evidence were recorded by Emily and written down for display and discussion.

In addition, the children used an array of new equipment within the forensic science sequence of lessons. This included magnifying glasses, gloves, snap-lock bags, tongs and cottonbuds, along with the evidence wall. The magnifying glasses became a favourite item of equipment. Emily made them readily available in each lesson and ensured that every child had a turn to observe in detail any piece of evidence that interested them.

Evidence is fundamental to forensic science, the scientific concept being that every contact leaves a trace. Once the children were provided with the opportunity and equipment to collect evidence, the program took on a life of its own. In their play time, Emily found that the children displayed self-discovery by looking for their own evidence.

They went looking for clues and I left them in charge of their own discovery. And they found lots of things. They came back with feathers and pieces of food that they found (Interview Dec 2008).

Further, Emily recounted an anecdote to support the children’s transferability of their learning. Referring to the night before, one boy informed Emily that ‘When you get out of the bath and you stand on the bath mat you leave a footprint’ (Interview Dec 2008).

The use of observation as evidence was present throughout the lessons by the nature of the forensic science topic. However, the children’s ability to relate their conclusions to the evidence varied: some children clearly related their conclusions to the evidence, while others simply wanted their original idea (such as dinosaur) to remain correct. Similarly, some children could only relate their conclusions to one piece of evidence, while others combined all three pieces. This illustrates preschool children’s ability to remember isolated parts, but not necessarily see the ‘whole picture’ (Kearns & Austin, 2010). As Samarapungaven et al. (2008) found, the children’s answers to various questions highlighted their attempts to develop logical casual relations and to interpret those relations through the evidence found in the classroom.

Each lesson provided an opportunity for the children to represent and communicate their findings in a manner that allowed them to become more familiar with their own bodies. The comparison of the children’s feet, hair and fingerprints to the evidence allowed for multiple representations, direct connections to the children, and time and opportunity to communicate findings. Class and individual discussions, along with graphs and individual drawings, added to the range of forms of representation and communication.

The forensic science program provided an ideal context for developing children’s inquiry skills. The sequential learning experiences introduced three types of evidence with which the children readily connected. The equipment used to collect evidence assisted and encouraged the children to investigate more closely. Many and varied opportunities were presented for the children to communicate and represent their findings. The interactions between Emily and the children were focused on the fundamental principle of forensic science. A resolution to the class mystery was reached, to the satisfaction of all the children. The research presented in this paper highlights how capable and active young children are: to learn from observation and participation with peers and teachers, and to develop new skills and knowledge.

Fleer (2009b) highlighted the importance of connecting everyday concepts and scientific contexts to extend children’s thinking and practice, and the important place of richly based contexts to achieve such connections. The learning experiences associated with the forensic science program provided opportunities for the children to connect forensic science knowledge with themselves personally and with their everyday experiences. This included recognition of footprints and fingerprints and the knowledge that such prints occur in sand, when you get out of the bath, and when you have dirty hands. These are contexts which occur in children’s daily lives, highlighting the sociocultural aspects of their learning, and the everyday context in which science takes place.

**Conclusion**

The forensic science program provided a highly contextualised setting for scientific inquiry. It presented a topic that was engaging, relevant and interesting to young children while also providing opportunities for them to participate in scientific inquiry processes (generating questions and predictions, observing and recording data, using equipment, using observations as evidence, and representing and communicating findings) and knowledge building. These findings further support the importance of context in early childhood science teaching and learning, and connecting science with children’s everyday experiences. Additionally, the forensic science bear hunt context provided opportunities for the children to extend their imagination, develop their oral language, and act like scientists.
This case study has clearly illustrated that, with guidance, and given an appropriate context, four-year-old children can readily participate in scientific inquiry.

**Acknowledgements**

This research was made possible by funding obtained through the Australian Learning and Teaching Council, Grant Number CG8-724. Thanks are extended to the school, teacher and children who participated in this research.

**References**


Introduction
Melissa, a reluctant eight-year-old writer, created this single storyboard frame in response to an oral reading of a chapter in Roald Dahl’s popular novel, *The BFG*—Big Friendly Giant (Figure 1).

Figure 1. ‘There at the window ... was ... the Giant Person, staring in. The flashing black eyes were fixed on Sophie’s bed’ (Dahl, 1982, p. 8).

This close-up image of the giant’s flashing eye, made salient by its proportions and framing within Sophie’s open dormitory window, translates Roald Dahl’s original text with generative creativity. This process required inventing connections between two sign-systems or modes—written words and images.

Transmediation
Melissa’s translation of semiotic content across sign-making systems constitutes a process of transformation called transmediation—a central process of knowledge generation in young children’s text creation (Siegel, 2006). Transmediation denotes the translation of content from one sign system into another. Suhor (1984, p. 250) coined the term to describe the structure of sign-systems and their conventions—written word, drawing, dance, music, web design, video production—and the connections between them for making sense of human experience.

Transmediation is fundamental to meaning-making. The term has gradually receded in the literature with the dominance of work by Kress and van Leeuwen (1996), who describes the same process of shifting ‘semiotic material’ across modes, but refers to this principle

‘I’m making it different to the book’:
Transmediation in young children’s multimodal and digital texts
Dr Kathy Mills
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YOUNG CHILDREN SHIFT MEANINGS across multiple modes long before they have mastered formal writing skills. In a digital age, children are socialised into a wide range of new digital media conventions in the home, at school, and in community-based settings. This article draws on longitudinal classroom research with a culturally diverse cohort of eight-year-old children, to advance new understandings about children’s engagement in transmediation in the context of digital media creation. The author illuminates three key principles of transmediation, using multimodal snapshots of storyboard images, digital movie frames, and online comics. Insights about transmediation are developed through dialogue with the children about their thought processes and intentions for their multimedia creations.
as ‘transduction’ within his social semiotic account of learning. Kress describes transduction as a process in which something that is configured or shaped in one or more modes is reconfigured, or reshaped, according the affordances of a different mode (Kress, 2003, p. 47).

In this paper, I return to the original nomenclature, ‘transmediation’ to acknowledge the genesis of the concept in the literature by Charles Suhr (1984; 1992), extended by Semali (2002), Semali and Fueyo (2001), Siegel (1995; 2006) and others (Short, Kauffman & Khann, 2000; Wright, 2007). Each sign system or mode has unique organisational principles, involving elements and conventions that do not have precisely equivalent meanings (Semali & Fueyo, 2001). The term ‘modes’ and ‘sign-systems’ are used interchangeably here to describe socially and culturally shaped resources or semiotic structures for making meaning. They are organised, regular, socially specific means of representation, such as writing, drawing, dance, image, music or mathematics (Kress & Bezemer, 2008, p. 171; Suhor, 1984). The lack of equivalence between modes is the catalyst for transmediation, which is represented in Figure 2 as a process involving the transformation of knowledge by varying degrees.

Figure 2 represents the continuous process of transmediation as a continuum of meaning transformation. I demonstrate how transmediation in children’s textual practices can range from the simple transfer of semiotic content, such as drawing a picture to match the words in a story, to a substantial transformation of semiotic content, such as drawing a picture that depicts a newly invented narrative. Given that modes or sign-systems have different materiality, shaped by histories of cultural work, there can never be a perfect translation from one mode to another (Kress & Bezemer, 2008).

Figure 2. Transmediation: Transformation of knowledge by degrees

### Semiotics and multimodality in children’s digital composing

It has been well-established that children combine multimodal symbolic systems, such as talking, drawing, singing and role-playing, long before their communicative interests can be served by the written linguistic forms of their culture (Kress, 1997; Kress & Bezemer, 2008; Siegel, 2006). Multimodality is defined here as the interrelationship of two or more modes (Mills, 2010c). Print-based reading and writing has always been multimodal, since these practices require the interpretation or design of images, words, spatial layout, and other modes of representation (Jewitt, 2005; Jewitt, 2006). However, in the new media-based environment, there is heightened interest in the role that multimodal ensembles of images, sounds, animations and other modes play in meaning-making (Mills, 2009). Rather than regarding written language as the sole channel for learning and generating knowledge, it is argued here that young children learn and communicate through multiple sign-systems or modes—each of which offers a distinctive way of making meaning (Kress & Bezemer, 2008). The increasing ease of producing multimodal and digital texts, such as web pages and podcasts, provides impetus for understanding the semiotic process of transmediation.

Research into children’s composing processes within social semiotic frameworks has begun to focus on digital media, extending semiotic principles established in studies of print-based writing to the incorporation of multiple media in compositions (Ranker, 2009). These have included exploring sign-making in video-interaction (Adami, 2009), young filmmakers’ deployments of semiotic tools (Gijie, 2010), young writers’ incorporation of multimedia to their writing as compositional elements (Dyson, 2001; Ranker, 2007), and the semiotic potentials of combining modes in digital storytelling (Hull & Nelson, 2005). These studies have contributed to understanding how children combine, shift or transform meanings in multimodal contexts of digital composition.

The multiplicity of communications channels and media tied to the expansion of mass media, multimedia and the internet has transformed the way children are socialised in textual practices (Mills, 2010a; New London Group, 2000). In a digital age it is evident that speech and print-based writing are necessary, but not sufficient for young children’s communication interests. Many young children are becoming socialised into digital forms of communication before they begin formal schooling, such as using drawing software and interactive websites. These social practices frequently require users to transmediate meanings flexibly across different modes and media (Mills, 2010b; Jewitt, 2008).
Purpose and theoretical framework

In this study I ask, "What are the principles that govern the semiotic process of transmediation when children compose digital and multimodal texts?" I aim to show how children as meaning-makers of digital texts—storyboard frames, documentary films, and online comics—shifted semiotic content from one mode or sign-system to another through transmediation. I analyse the epistemological significance of transmediation as a form of knowledge reproduction or transformation in children's digital composing.

Social semiotics provides a conceptual framework in this study because explanations of textual forms must attend to their social origins (Bezemer, 2008). I attend to the potentials and constraints of sign-making systems—storyboards, moving images, written words, dramatic performance, online comic creation, and digital editing. I equally give attention to the potentials and constraints of media—both printed media, such as children's storyboard drawings and writing, and electronic media, such as online comics and digitally edited documentary films. I demonstrate three key principles of transmediation that are fundamental in understanding children's multimodal and digital meaning-making.

1. Transmediation is more than the simple reproduction of knowledge, and involves a process of knowledge transformation by degrees.

2. Transmediation involves a process of continual adaptation of intentions for representing knowledge in response to the possibilities and limitations of sign-making systems, including the affordances of digital systems.

3. Transmediation is central to digital text production because it involves translating semiotic content via the discrete sign-making systems inherent in software interfaces.

Research description—Design-based research

The findings reported here were observed in the context of a four-year, design-based research project. Design-based research is interventionist—it investigates the possibility for educational improvement rather than merely examining what already exists (Brown & Campione, 1994; Cobb, Confrey, diSses, Lehrer & Schauble, 2003). A variety of print and digital media collaborative projects were generated with interested teachers across the school. The aim of the research reported here was to theorise the students' shifting of meanings—transmediation—across sign-systems in the context of media-based textual design.

Three teachers and their students (Year 3, average eight years old) received training and support from the university researchers, including six hours per week (two hours per class) of teaching and in-class support by a specialist media arts teacher and literacy researcher. The students were introduced to a range of digital media design projects during the literacy block within the timetable each week, and the researcher visited the school three times per week as a participant-observer and support person for teaching and assessment within the English curriculum. The outcomes were also matched to Media Essential Learnings that form part of the Queensland Art Curriculum (Queensland Studies Authority, 2007).

Site description

The primary school has a student population drawn from suburbs in an economically and socially disadvantaged region of Southeast Queensland, including the school's adjacent State Housing Authority area. The mean Year 3 writing scores of the student cohort were 30 per cent below the national mean for all Year 3 students in Australia. Approximately 10 per cent of the students were Aboriginal or Torres Strait Islanders, Pacific Islanders, and English as a Second Language (ESL) learners.

Description of intervention

The data in this study was collected in the second year of a digital media intervention, which was preceded by 18 months of building rapport with school staff and teachers—providing regular media workshops, professional development, curriculum planning, and in-class learning support for students in writing. A series of digital media-based lessons was taught by a specialist media arts teacher-researcher, in collaboration with a literacy educator from the university and three classroom teachers. The teachers came to the study with varied levels of teaching experience, from two years to senior, with little previous experience of the digital software introduced in the research. The program included introducing students to the features of new digital text types—blog pages, podcasts, micro-documentaries, web profiles, digital stories and online comics. They were also introduced to new metalanguages to describe media texts (e.g. shot types, cutaways, transitions), and technical proficiencies with a suite of Apple™ media software.

In the first six months of the media-based program, the media arts teacher-researcher had the primary responsibility for implementing the digital lessons, which were planned in collaboration with teachers and researchers. In the second six months, the responsibility for implementing media-based literacy was gradually released to the classroom teachers, who each took the program in unique directions.
By the fourth quarter, the teachers were planning and implementing media-based writing lessons without assistance, revisiting and extending the media-based practices introduced in first semester.

**Data collection and analysis**

The data sets for this component of the project included: a) More than 200 print and digital artefacts produced by the Year 3 students—drawings, storyboards, scripts, digital movies and comics; b) Audio-recorded focus groups and dialogue with individuals about transmediation; and c) Sixty focused lesson observations. Screen shots of work samples reproduced in this article were selected from the total corpus of data, which repeatedly demonstrated the processes of transmediation. Multimodal semiotic analysis was used to compare similarly intended meanings across multiple corresponding texts, such as students’ movie storyboard frames, script segments, movie frames, and comments about the design process.

**Findings**

**Transmediation: Degrees of transformation**

Described below is a task in which students were required to draw a single image adapted from *The BFG*, by Roald Dahl. Over several weeks, the children had listened to the reading of the first half of the novel, in which a giant captured Sophie, an orphan. The giant’s arms had extended through the window to snatch her from the bed in the dead of night, to take her to his cave in the Giant Country. The teacher of this lesson explained that they would ‘picture things’ from *The BFG* and ‘show it as a storyboard’. She explained that the purpose of storyboards is to plan ‘frames’ for their movie to ‘get our idea across’. To prepare the students for this task, the children participated in an oral retelling of the main events in the narrative. After a discussion of different shot types (e.g. long shot, medium shot, close-up), students were given a blank frame in which to draw their storyboard image, requiring them to recall a key event in *The BFG*. Lauren produced the drawing shown in Figure 3 below.

![Figure 3. BFG arm coming to get Sophie](image)

Lauren’s storyboard frame matches the words of the narrative: ‘The next moment, a huge hand came snaking in through the window. This was followed by an arm, an arm as thick as a tree trunk, and the arm, the hand, the fingers were reaching out across the room towards Sophie’s bed’ (Dahl, 1982, p. 8).

Lauren’s text demonstrates how the content of one sign system—words—was mapped onto the ‘expression plane’ of image via drawing (Wright, 2007). This cross-channel of communication involved inventing connections and weaving between two very different symbolic forms. The meanings contained in Dahl’s sentences and words were shifted fluidly to recognizable iconic images that reinterpreted the text through a transformative process. Lauren described her drawing as a ‘long shot’ of Sophie in her room at the orphanage. If translated into a scene within a film, she anticipated that it would be accompanied by sound effects of ‘heavy breathing’.

Lauren explained that she had included a lamp and a torch beside the bed ‘in case Sophie got scared in the dark’. When I inquired about her representations of a cupboard, bedside table, and the arrangement of furniture in the drawing, Lauren explained that these were features of her own bedroom—‘I’m making it different to the book’. Thus Lauren drew upon her own experiences, and the material texts of her own life-world, to generate a visual text that interacts with Dahl’s text in a way that had never occurred in precisely the same way before. This representation involved more than a simple reproduction or transfer of semiotic content from word to image, since the process of crossing modes involved imagining what was not made explicit by words alone.

![Figure 4. Sophie getting snatched.](image)

Rachel’s image in Figure 4 exemplifies the transmedial process of meaning-making as she adapted the text: ‘She flew across the dormitory and jumped into her bed and hid under the blanket ... still as a mouse ...’
The fingers were reaching out across the room towards Sophie’s bed’ (Dahl, 1982, p. 8).

Rachel wrote that the accompanying music would be ‘scary and shaking’. Her image drew upon her knowledge of a ‘dormitory’ as a shared sleeping space in the orphanage, making text-world-text connections. This act of translating meaning from one sign-system to another allowed Rachel to engage in generative and reflective thinking as she projected her visualisation of the room using a one-point perspective drawing.

A line dividing the wall from the floor created a single vanishing point. Rachel visualised beds aligned along the wall, diminishing in size according to distance. While other characters were not mentioned in this section of the novel, Rachel inferred the presence of other orphans also preparing for bed, envisaging the ordering of time and activity in orphanages. She invented these connections between word and image, making new meanings. It illustrates the generative potential of transmediation, even in a limiting case in which students were required to produce a seemingly literal translation of events in a novel.

Figure 5. Hand and bed

Jack’s drawing provides an example of how the process of transmediating words to images can involve incremental changes in understanding for the learner (Figure 5). When we first approached Jack he said, ‘Mine is just a hand and the bed. I don’t know what else to draw’. We encouraged Jack to add background objects to contextualise the scene. He proceeded to add cracks in the wall, a patch on the giant’s elbow, and a spider’s web to communicate the passage of time. By translating his understanding of The BFG into another sign-system, experimenting with image enabled Jack to find an entry into the text. The movement across modes played an important role in deepening his understanding of possible meanings, resulting in the augmentation of knowledge. Drawing serves an important meaning-making resource for young students who are learning to write (Harste, Woodward & Burke, 1984; Moore & Caldwell, 1993; Norris, 2004).

Even when children reproduce content using a different sign-system, there is potential for generative and reflective thinking. This is because text users create new connections between multiple modes. Reinterpreting semiotic content from its original representation as a novel requires more from the students than the simple transfer or reproduction of meaning. It involves interpreting meaning between symbol systems, with varying degrees of transformation.

Transmediation: A continual process of adaptation to affordances

In this section, I illustrate the centrality of adaptation in transmediation using filmic conventions. I draw from the students’ collaborative production of digital micro-documentaries, also based on The BFG. The micro-documentaries were to include an introduction by a narrator, an observation, re-enactment of events, and an interview of the main characters. The students were encouraged not to reproduce events in The BFG, but to change the story by imagining different events from those in the plot.

Transmediation involves a search for commonality between sign-making systems (Siegel, 2006). In the following example, meanings were shifted from still-image drawings to moving-screen images. Both still and moving images can be classified by shot type (e.g. close-up, medium, long shot). When asked to compare the shot types, the students identified that they had relied on the use of medium shots in the final movie as opposed to the combination of medium and long shots in the storyboard.

Brianna, Ethan and Sarah translated the content of their storyboard to create a final micro-documentary that was very similar to their original intentions. The children were asked to compare their storyboard to the final movie, and to explain any differences they observed.

Researcher: Did the shot types end up looking like these ones when you filmed it in your movie?

Children: No. I don’t think so.
Ethan: Because all of them are medium shots in the movie.

Researcher: So you said that you were going to do medium shots, and you said that you’d do a long shot there—the Queen with Sophie?

Ethan: Because you couldn’t see from that far away. You couldn’t see their body or their face—all you could see was a black shadow.

Researcher: Right. So the lighting made it a bit difficult to see their face?

Ethan: But when you went close you could see it more.

When transmediating semiotic content—from words and drawings in the storyboard, to moving images on the screen—the students adapted to the affordances and constraints of the filmic medium. Ethan revealed that his decision to use a medium shot instead of the intended long shot was a conscious decision to adapt to the unanticipated lighting conditions and constraints of the filmic medium. This example illustrates that generative possibilities in transmediation arise out of the heterogeneity of modes.

When transmediating semiotic content from the storyboard script to spoken word children frequently modified the dialogue. For example, in the illustration above, the group had scripted the Queen’s words: ‘Let’s go and pack your stuff.’ When Brianna played the role of the Queen in this scene, she changed the mood of the sentence from imperative to interrogative, formulating it as a question. She modified the vocabulary choice, and used an imitation of a thick Scottish accent. The shifting of meanings from written to the spoken word was instantiated with originality rather than reproduction. Similarly, Lauren explained that they changed their script when they acted to ‘get it more in character’. Realising the affordances of speech for projecting the personality of a character, they adapted the script to better communicate their intended meanings.

These examples highlight the tension between similarity and difference when transmediating semiotic content from one form to another. Transmediation establishes an anomaly for the learner in the absence of one-to-one correspondence between sign-making conventions (Siegel, 2006). This tension invites learners to invent a way to cross this gap by engaging in both evaluative and generative thinking.

Researcher: And what about shot types—were you thinking much about shot types?

Rachel: We were thinking about, like, doing medium shots and stuff, but some of it, it just didn’t look right (on the screen) so we changed it a bit.

Researcher: Right. So when you saw it on film it looked different to what you expected?

Rachel: Yeah, like the marriage—it was supposed to be a long shot but it didn’t look right so we did a close-up.
Transmediation involves a process of continually anticipating, evaluating, and revising their intentions as they shifted meanings across modes. In the example above, the girls modified the use of shot type to better realise their intended message in a screen-based format. They later reasoned that the close-up shot overcame the absence of costumes to portray their respective roles in the marriage ceremony. The girls used the framing of the screen composition to conceal their school uniforms, requiring the viewers to imagine the wedding costumes. This example clearly illustrates how drawing still images and filming the moving image with a digital camera have different potentials for meaning. Moving image combines the affordances of image, which is spatially organised, with a temporal organisation—it unfolds in time (Bezemer & Kress, 2008). These modes offer distinct resources, so that in the process of transmediating meanings from drawings to film, there are ‘gains’ (e.g. close-up shots can be used for selectivity) and ‘losses’ (e.g. imagined actors and props in drawings must be materialised in film) (Bezemer & Kress, 2008).

Having utilised filmic media and conventions for the first time, the children reflected that there were affordances of filmmaking that were unanticipated. They were familiar with communicating through drama, but the use of digital editing techniques, such as inserting cutaways, titles, transitions and credits were remote from their world of experience. The children had to learn ‘how to put it together’—an apt way of describing movement across and between modes as they forged new connections.

Filming an innovation of The BFG as a micro-documentary provided the opportunity for the children to represent ideas through multiple modes, supporting more complex and creative thinking, because each sign-system has different potentials for meaning. The transmedial work from novel to storyboard to film allowed different modes to become tools for thinking, imagining and publicising their ideas (Short et al., 2000).

**Transmediation: Fundamental to digital text creation**

The role of digital technologies in understanding transmediation has been little explored in the literature—the dominant emphasis has been on writing, drawing and telling (Cox, 2005; Siegel, 1995; Wright, 2007). I argue here that transmediation is central to digital text production because it involves translating semiotic content via the discrete sign-making systems inherent in software interfaces.

In the context of observing students engaged in digital media production, it was recognised that each digital interface is more than a simple tool for sign-making, akin to a pencil or paintbrush. Theorists of semiotics have conceptualised digital technologies as mediating tools. Yet what has not been acknowledged is that each digital interface requires users to understand a discrete sign-making system (e.g. icons, navigational tools, drop-down menus) with an inherent logic that must be understood in order to mediate meaning.

I also argue that crossing from print to digital modes adds an important layer of complexity to text and knowledge creation. The machinery of the computer is indeed a tool, but each of the ever-expanding array of media software systems draws upon independent iconic systems of meaning. Arguably, while software systems possess some common features, icons and meanings, they also contain meanings that are unique.

To illustrate how transmediation functions in the context of digital text production, I will use another case in which the direct reproduction of semiotic content was all that was seemingly required. The children were required to handwrite a comic that contained only three frames, and then present it digitally via a popular online comic creator (makebeliefscomix.com). The teacher provided the children with 50 minutes of direct instruction in the classroom, using an online projection of the comic creator website on her electronic whiteboard (Figure 8). To prepare students for the short time in the library, she required them to initially draft their comics on blank paper.

Figure 8 Screen adapted with permission from Make Beliefs Comix©.
Margaret: What would I click on if I wanted to change the size of the characters—Barbara?

Barbara: Scale.

Margaret: That’s right. If you click on scale, and then on the object, you can make it bigger or you can make it smaller (demonstrates object increasing and diminishing).

Margaret: Ok. I want to ... flip him around and face him the other way. What do I need to click on Jack?

Jack: Flip.

Margaret: Click on ‘flip’ and click on him (the object to apply the action). What if I want to get rid of him? Tristan—ah, Ethan?

Ethan: Um, just delete.

Margaret: Click on delete. He’s still there.

Ethan: Then click on him.

Margaret: Click on him. OK. I’m going to put him back up there. All right. I want to ... move him around. Tristan—how do I make him move?

Tristan: Move.

Margaret: And you can click on him to make him move. Ok. Now I want a speech bubble. What do I want to do—Abigail?

Abigail: Go to that talk balloon.

Margaret: Click on ‘talk’ and I can come over here (menu window) and choose different sizes of speech bubbles to fit my words. And it’s important ... to take note of which way that arrow is facing to change the size.

The comic creator interface required users to become familiar with a digital sign-making system that contains unique icons and functions for mediating textual production. The teacher quickly reviewed the students’ new knowledge of a digital symbolic system that was both similar to, and different from, other sign-making systems. A digital interface contains an original system of meaning-making which must be acquired or learned through instruction and use. Students became familiar with this interface in a similar way to learning other modes, such as written English, musical notation or perspective drawing.

The transmedial work involved in translating a print-based comic to a digital presentation of similar content via an online comic creator is illustrated here. While the teacher anticipated that the children would reproduce their draft in an equivalent form via the digital software, less than a quarter of the children identified their final digital comic as the same or similar to their original draft. For most children, it was easier to create a different comic than to work within the constraints of the iconic user options for creating digital symbols of characters and objects.

Rachel chose to persist with her original comic design and work within the constraints of the online comic creator. Rachel’s print-based comic centred on a character she had observed in the menu during the teacher’s online comic example who had bees in her ‘sixties beehive’ hairstyle (Figure 9).

Figure 9  Bad hair day—draft comic

Rachel said she needed to adapt her original comic because ‘I couldn’t get her, like, the bees out of her hair’ (Figure 10). The central problem in Rachel’s comic was resolved by following the cartoon friend’s suggestion to ‘stop using that honey shampoo’. In the final frame of the draft, Rachel had drawn the character without the bees in her hair, but the digital comic creator did not have an image of the same character without bees. Rachel explained that, to solve this problem, she used a different cartoon character that looked similar. To ensure that readers understood that this new icon was the same character, she explained in the accompanying dialogue that the character had changed her ‘whole look’.

Figure 10  The shampoo problem
Here, Rachel used substitution to replace intended objects that were unavailable in the menu, with the available digital images generating new ideas. The absence of a ready-made link between the content and expression plane created an anomaly that set generative thinking in motion (Siegel, 1995). In this way, Rachel strategically worked within the constraints and possibilities of the mediating technology to transmediate semiotic content from print to a digital format.

A second example is the ‘talk bubble’ that Rachel included to conceal unwanted cat-like ears on the cartoon. She wanted the personified cartoon animal to be fully human. She overcame the lack of equivalence between modes by strategically covering symbols that did not communicate her intended meanings.

These examples of online comic creation demonstrate that transmediation involved a process of continual adaptation of intentions for representing knowledge in response to the possibilities and limitations of the sign-making systems, including those embedded in digital software. Children engage in a continual process of problem solving as they seek ways to work within the constraints and possibilities of the digital conventions to communicate meaning.

**Conclusion**

Transmediation is fundamental to digital text production, requiring the recasting of meaning through the context and expression plane of multiple semiotic structures. The multimodality of meaning-making by young children, and in society, necessitates that students learn to transmediate flexibly between modes.

Transmediation involves transformation by degrees. Even when retelling scenes from a novel through drawing, or translating a print-based comic to a digital format, a degree of transformation is discernable. This is because each sign system has unique organisational principles, involving elements and conventions that do not have precisely equivalent meanings. The potential for generative thinking is heightened as children made connections between multiple modes (Siegel, 1995, p. 458).

Transmediation is a process of continual adaptation of intentions for representing knowledge, demonstrated in filmmaking. It involves discovering the possibilities and limitations of sign-making systems and their meaning potentials. The search for commonalities across different modes, which do not have one-to-one correspondence, creates anomalies for the learners. This process of transmediation involves generative thinking and problem solving as new connections are made between expression planes.

Transmediation is central to digital text production, observed in the context of online comic creation. This is because it involves translating semiotic content via discrete sign-making systems inherent in the digital interface. Children need to learn the sign-system in the digital interface (e.g. flip, move, delete) to mediate their intended meanings. The digital interface contains a set of iconic meanings, with an internal logic that needs to be learned before its mediating potential for encoding texts can be realised.

The increasing availability of digital technologies for textual production generates new possibilities for transmediation in young children’s compositions. Teachers are providing children with rich opportunities for shifting meanings across multiple modes, rather than relying exclusively on the written word. Young children make sense of their world through multiple sign-making systems, long before they have developed sophisticated control of written text (Kress, 1997). As linguist Michael Halliday (1975) argues, rather than asking what a student knows, consider how many ways are available for this child to know. Encouraging children to engage in digital media creation allows them to go beyond the simple reproduction of literary content to the transformation of meaning and knowledge; as Lauren proudly declared: ‘I’m making it different to the book’.

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All names are pseudonyms.

**References**


Introduction

Disadvantaged populations have been identified as being at high risk of delays in motor skill acquisition and physical inactivity for reasons including limited neighbourhood facilities, less ability to afford commercial physical activity, and poor neighbourhood safety (Giles-Corti & Donovan, 2002; Kavanagh et al., 2005; Najman, Bor, Morrison, Andersen & Williams, 1992; Sanigorski, Bell, Kremer & Swinburn, 2007; Speakman, 2004). Further, children who perceive themselves as competent in physically active play are likely to engage in and enjoy it (Cavill, Biddle & Sallis, 2001; Locke, 1996; Ziviani et al., 2006), suggesting the importance of developing skills in active play early in childhood.

‘Active play’ is a term used for physical activity or gross motor activity for children under five years, and fundamental movement skills are the basic movements learned through participation in active play as a child. Walking, running, rolling, and jumping are the primary fundamental movement skills on which other fundamental movement skills such as kicking and throwing (McClenaghan
Children develop these skills in increasing complexity from approximately 12 months to five years of age (McClenaghan & Gallahue, 1978). The term ‘play’ is important in relation to children’s physical activity because it is through play that children learn. Studies have found that interventions to enhance childhood fundamental movement skills using methods that are meaningful, fun and play-based result in significantly greater fundamental movement skill development compared to interventions using direct instruction-based implementation.

The aims of this pilot study were to: 1) assess the fundamental movement skills of disadvantaged children; 2) evaluate the feasibility and effectiveness of adapting an existing parenting and child development program to incorporate additional weekly ‘active play’ activities (the intervention); and 3) examine the acceptability of the intervention.

Methods

The development of the intervention

The Active Play Program (APP) (Stagnitti et al., 2008) is a component of the Romp & Chomp project which is a community-based obesity prevention program for children under the age of five years in the Barwon–South Western region of Victoria (Bell, Simmons, Sanigorski, Kremer & Swinburn, 2008; de Silva-Sanigorski et al., 2010). The APP is a resource for use by early childhood workers to increase the active play levels of children attending early childhood care and educational services. It comprises simple activities categorised developmentally into fundamental movement skill components (for example roll, run, jump, kick, hop, gallop). The activities are designed to be fun and engaging for children and used flexibly within a range of early childhood services.

The pilot study focused on the implementation of the APP within an existing community-based parenting program (Parents Learning Actively with Youngsters (PLAY)) to enhance children’s development and parent–child interaction through an organisation called Glastonbury Child and Family Services (referred to herein as ‘Glastonbury’). The PLAY program consists of five weekly activities matched to each child’s needs to assist them in multiple areas of development (language, attention, fine motor and gross motor). A staff member from Glastonbury visits the families in their homes or a playgroup each week and models the play activities. Families are encouraged to spend at least 15 minutes each day sharing the activities with their child until the next weekly visit. For this intervention pilot study, one APP activity was fitted into each week of the existing PLAY program. The play activities chosen were considered to meet two factors: the developmental needs of the children; and providing each child with experiences from the range of fundamental movement skills for their age group. Table 1 shows the differences in the content of the PLAY program before and after adaptation with the active play activities.

Table 1. Skill area proportions of the PLAY program

<table>
<thead>
<tr>
<th></th>
<th>Gross Motor</th>
<th>Fine Motor</th>
<th>Other*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original program</td>
<td>24%</td>
<td>37%</td>
<td>39%</td>
</tr>
<tr>
<td>Intervention program</td>
<td>37%^</td>
<td>31%</td>
<td>32%</td>
</tr>
</tbody>
</table>

*Mainly language development.

The intervention program gross motor activities were 13% stationary, 69% locomotion and 18% object manipulation activities.

Participants

There was a range of participants in this study. Parents completed surveys to capture the family environment, sociodemographics, and child characteristics and behaviours; children participated in clinical assessments of gross motor ability using the Peabody Developmental Scale – 2nd Edition (PDMS-2), and workers from Glastonbury were involved in a focus group to assess the feasibility and acceptability of the intervention.

Parents and children

Figure 1 is a flow diagram of the child participants in this study and illustrates how this study fitted in with a larger study. The larger study was a three-year evaluation of the implementation of APP activities into the PLAY program. Of the 128 children involved in the PLAY program, the parents of 87 children gave consent to be surveyed pre- and post- their involvement in the study and for their children to be involved in further testing. Of the 87 children with parental consent, all completed the survey and 26 children had the PDMS-2 assessment. The small number of participants with the PDMS-2 assessments related to the logistics, capacity and time frame for the pilot study.

Table 2 shows descriptive characteristics of those who participated in the clinical (PDMS-2) assessments (n = 26). The participants who are the focus of this pilot study are the 26 children who were available to participate in the clinical assessment.

Glastonbury Child and Family Services workers

There were five participants from Glastonbury, aged 30 to 49 years (mean age: 43.2 years (SD: 6.9 years)) and four were female. Two staff held a Diploma Community Services (Children’s Services), one held a Diploma of Teaching Early Childhood, and two were trained as...
mentors by Glastonbury. Their experience of working with children ranged from two to 23 years, with a mean of 11.3 years (SD: 10.6 years). These five Glastonbury staff implemented the intervention and took part in a focus group (see details below).

Instruments

The Peabody Developmental Scale – Second Edition

The PDMS-2 is a norm-referenced standardised assessment of both gross and fine motor skills. This assessment is composed of six subtests to measure the motor abilities that develop from birth through to five years of age with published procedures and marking criteria for each item in the scale (Folio & Fewell, 2000). Empirical research has established adequate levels of reliability and validity for the PDMS-2 (Folio & Fewell, 2000). For the purpose of this study, only the three gross motor subtests were conducted (stationary, locomotion, and object manipulation).

Demographic, behavioural and environmental parent survey

This survey captured demographic, behavioural and environmental data on the child and their family.

Focus group

The Glastonbury PLAY workers (n = 5) participated in a focus group to provide feedback about their experience of implementing the APP activities into the PLAY program. The focus group discussions were held two months after the follow-up PDMS-2 assessments were completed. Two researchers (MM & RK) facilitated the focus group and asked the Glastonbury workers a series of key questions that explored their experiences of how well the program adaptations for the intervention were accepted by the service and the participating families.

Ethics

Ethical clearance for this study was obtained from the Deakin University Human Research Ethics Committee.
Clinical data were found not to be normally distributed and Mann-Whitney U tests were used, first to determine if the children’s baseline PDMS-2 scores differed significantly from the norms specified by the PDMS-2. Second, a Wilcoxon Signed Ranked Test was used to analyse changes in the children’s PDMS-2 scores pre- and post- their involvement in the intervention program. Data were analysed using the Statistical Package for Social Sciences (SPSS) Version 14.0 (SPSS Inc., Chicago, IL, USA). The focus group discussion was digitally recorded, transcribed, and verified through checking the key issues identified from the transcripts by the researchers. All transcripts were coded, then codes were categorised and placed into themes.

Results

Intervention program

After adaptation for the intervention, the proportion of APP activities targeting specific gross motor function in the PLAY program increased from 24 per cent to 37 per cent (see Table 1). These gross motor activities targeted a range of fundamental movement skills. Of the 37 per cent gross motor activities in the adapted program for the intervention, 69 per cent related to development of locomotion skills; 18 per cent to object manipulation skills and 13 per cent to stationary skills.

Table 2. Descriptive characteristics of participants

<table>
<thead>
<tr>
<th>Family characteristics</th>
<th>Child participants ( (n=26) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child’s gender (%)</td>
<td>Male 65.4</td>
</tr>
<tr>
<td></td>
<td>Female 34.6</td>
</tr>
<tr>
<td>Child’s age in months</td>
<td>Mean in months ± SD 37.4±11.1</td>
</tr>
<tr>
<td>Mother’s education (%)</td>
<td>Non-completion of high school 42.3</td>
</tr>
<tr>
<td></td>
<td>Completed high school 30.8</td>
</tr>
<tr>
<td></td>
<td>Tertiary education 26.9</td>
</tr>
<tr>
<td>Father’s education (%)</td>
<td>Non-completion of high school 72.7</td>
</tr>
<tr>
<td></td>
<td>Completed high school 22.7</td>
</tr>
<tr>
<td></td>
<td>Tertiary education 4.5</td>
</tr>
<tr>
<td>Child’s living arrangements (%)</td>
<td>Single parent 30.8</td>
</tr>
<tr>
<td></td>
<td>Two parents 65.4</td>
</tr>
<tr>
<td></td>
<td>Other 3.8</td>
</tr>
<tr>
<td>Number of children in the family</td>
<td>Mean ± SD 2.5±0.8</td>
</tr>
<tr>
<td>Screen time per day</td>
<td>Mean minutes ± SD 134.1±97.3</td>
</tr>
</tbody>
</table>

Table 3. The baseline PDMS-2 standard scores of the children at baseline and follow-up assessment and by gender

<table>
<thead>
<tr>
<th>Variables</th>
<th>PDMS-2 Norm</th>
<th>Baseline assessment participants</th>
<th>Follow-up assessment participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>All Participants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stationary</td>
<td>10</td>
<td>20</td>
<td>9.4</td>
</tr>
<tr>
<td>Locomotion</td>
<td>10</td>
<td>23</td>
<td>8.4 (*p = 0.002)</td>
</tr>
<tr>
<td>Object manipulation</td>
<td>10</td>
<td>25</td>
<td>8.6 (*p = 0.004)</td>
</tr>
<tr>
<td>Gross Motor Quotient</td>
<td>100</td>
<td>23</td>
<td>92.6 (*p = 0.01)</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stationary</td>
<td>10</td>
<td>16</td>
<td>8.8</td>
</tr>
<tr>
<td>Locomotion</td>
<td>10</td>
<td>14</td>
<td>8.0 (*p = 0.01)</td>
</tr>
<tr>
<td>Object manipulation</td>
<td>10</td>
<td>16</td>
<td>8.4 (*p = 0.02)</td>
</tr>
<tr>
<td>Gross Motor Quotient</td>
<td>100</td>
<td>14</td>
<td>90.5 (*p = 0.03)</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stationary</td>
<td>10</td>
<td>9</td>
<td>10.3</td>
</tr>
<tr>
<td>Locomotion</td>
<td>10</td>
<td>9</td>
<td>8.9</td>
</tr>
<tr>
<td>Object manipulation</td>
<td>10</td>
<td>9</td>
<td>8.9</td>
</tr>
<tr>
<td>Gross Motor Quotient</td>
<td>100</td>
<td>9</td>
<td>95.9</td>
</tr>
</tbody>
</table>

Notes: PDMS-2 = Peabody Developmental Motor Scales, 2nd Edition
\( n \) = number of participants; SD = standard deviation.
Child participant characteristics and motor skills

The characteristics of the participants (n = 28) are presented in Table 2. The sample was of low socioeconomic status. The following table, Table 3, summarises the baseline standard PDMS-2 scores.

At baseline (pre-intervention), the children’s PDMS-2 scores were significantly below the PDMS-2 norms in the locomotion and object manipulation subtests and for the gross motor quotient scores (p < 0.05). The boys’ PDMS-2 scores were also found to be significantly below the PDMS-2 norms. At follow-up (post-intervention), there was a significant difference for the overall Gross Motor Quotient (GMQ; p = 0.007), locomotion (p = 0.009) and object manipulation (p = 0.035) improvements. There was no significant increase found for stationary skills. Although not shown here, there were no significant associations between the PDMS-2 scores and the child’s age, confirming that the test is age-standardised in this population. Over the course of the 22-week intervention, 10 children dropped out of the study. Of these, one child refused to participate and nine left the study owing to unrelated issues (see Figure 1 for a breakdown of reasons for leaving the study). The reduction in numbers from baseline to follow-up was not related to the intervention program.

Focus group results with worker participants

Two themes emerged from the focus group discussion. The main theme was the acceptability of the APP activities in the intervention program and adaptations required to better suit the PLAY program and the Glastonbury clients in the future. Despite the need for adaptations, the intervention program was acceptable to the staff, and the most successful activities were those that introduced classic outdoor play (for example quoits, skittles, hula hoops). Examples of comments made by staff are below:

I think [active play activities] fit very well into the broader scheme of things. I think the parents were used to having five activities and they just handled that extra activity quite well.

I think [active play activities] fitted into the program, really quite well and in a lot of ways the activity was designed to fit into the rest of the flow of the activities, the program was, so … I think that was really quite well done.

… setting up the bowling, some of the kids just hadn’t done bowling before and they were just beside themselves. They just loved it … even skipping ropes. How much fun did they have with those?

Staff reported that equipment and space were generally not a concern. Comments were made such as:

… if there wasn’t enough room [inside] you’d move outside into the yard or a joining area … [and] if they didn’t have skittles we’d ask them to get some empty milk cartons or soft drink bottles.

The second theme was related to the characteristics of the families who participated in the program. Staff identified that some of the APP activities required adaptations to better suit the PLAY program, including more variety, simpler instructions, and adaptation for suitability for only two players. The families’ characteristics were related to why particular activities were thought to have worked well or required adaptation. The characteristics discussed were parent’s limited literacy skills and education; the presence of many single-parent families; that the families often don’t feel obliged or motivated enough to complete the active play activities; that the families did not understand that fundamental movement skill (FMS) activities require repetition; and that modelling was sometimes required to show parents how to play with their children. Examples include:

… some of [the active play activities] were a bit too repetitive … because you felt like you were doing the kangaroo jumping and that sort of thing, so many times.

I think in some cases the way that [the active play activity] was written up was quite comprehensive and perhaps beyond some of our families, so without us going through and saying, you know, this is what you do, I don’t think they would actually sit and actually read the instructions and be able to follow them.

I think … that we need to keep in mind that a lot of the times in the families it’s just the mother and the child or the father and the child so to have something where you’re … like playing the game ‘Duck, Duck, Goose’ where you need more than two people to play it’s really not appropriate for our families.

Discussion

This mixed-methods pilot study has shown that children from disadvantaged families have delays in their development of gross motor skills. Despite this, an intervention targeting object manipulation, locomotion and stationary skills significantly improved the children’s skill level. Further, the incorporation of the APP activities into the Glastonbury child development and parenting PLAY program was feasible and acceptable to the early childhood workers implementing the program. Valuable feedback was also gained on ways to improve the intervention for use with this group and also inform the use of the program in other children’s settings.
The children in this study were from families of low socioeconomic position, and their level of fundamental movement skills was significantly below the reference levels on the clinical test used. This means the children were unable to perform skills such as throwing, kicking, jumping or hopping at the level expected for their age and gender. These results are consistent with previous studies which showed delays in fundamental movement skill acquisition in children from disadvantaged families. Children who lack the necessary fundamental movement skills and active play experiences have been shown to have negative experiences such as stigmatisation and teasing, and low confidence which may contribute to a lifetime of avoidance of physical activity (Locke, 1996; Poulsen & Ziviani, 2004). Achieving competence in fundamental movement skills before commencing school is recognised as important so that children feel confident, socially accepted, and maintain a positive attitude towards physical activity throughout life (Boreham & Riddoch, 2001).

The intervention tested in this pilot study involved weekly modelling of activities to be performed daily to develop a range of fundamental movement skills over a five-month period. The program was designed to be fun, developmentally appropriate and meaningful for children aged less than five years. Such programs have been found to be more successful than skill-training interventions (Akbari et al., 2009; Apache, 2005). Post-intervention the children’s level of fundamental movement skills had increased to the age-appropriate level. These results are of clinical significance for children’s development and highlight that this may be a critical time for intervention. It is known that preschool children develop rapidly (Cech & Martin, 2005) with 90 per cent of the growth of the brain occurring by three years of age (Sunderland, 2007). Importantly, the skills that improved post-intervention were those targeted by the intervention activities. For example, nearly 70 per cent of the active play activities were locomotive-based (running, jumping, skipping etc.) and improvements in the children’s locomotive subtest scores were greater than for object manipulation and stationary subtest scores.

The early childhood workers identified a number of improvements to the intervention program to make it more suitable for the families they worked with. These broadly fell into three areas: reducing the repetition of play activities, making adaptations to accommodate fewer participants, and clarifying instructions. Each of these is explained in more detail below.

1. Workers recommended reducing the repetition of the ‘active play’ activities. This finding highlights the need to convey to those implementing the program the important and deliberately repetitious nature of the activities, as it is known that it can take a considerable number of trials to master a single skill (NSW DET, 2008). The acquisition of fundamental movement skills requires a child to be involved in frequent repetition of play activities as it can take hundreds of attempts to master a single skill (NSW DET, 2008).

2. There was a need to make adaptations to accommodate fewer participants. A number of the play activities in the intervention program require three or more participants. This was an issue, as at least one-third of the families involved were single-parent families. Having a deeper understanding of the target group for the intervention now allows refinement of the intervention to include adaptations or alternatives for the activities where there are fewer than three people available.

3. Clarifying instructions was recommended by the Glastonbury workers, as they felt a number of their families had difficulty understanding some of the instructions. For this reason, the Glastonbury workers found demonstrating or modelling the play activities the most effective delivery method as it showed parents how to play with their children. This is consistent with a previous intervention study where the use of role-plays, videotapes to show specific examples of procedures, handouts adapted to parents’ reading levels, and the use of modelling were found to be effective (Hancock, Kaiser & Delaney, 2002).

Strengths and limitations

The strength of this study is the involvement of families of significant socioeconomic disadvantage and the application of the intervention under real-world conditions. However, the limitations include the small sample size and lack of a control group. A larger randomised controlled trial will be needed to fully test the effectiveness of the intervention. A further limitation is that the PDMS-2 was norm-referenced on a sample of American children and there are no known studies to determine if the norms of Australian children coincide with those of the PDMS-2. It may be that this study underestimates the level of delay in fundamental motor skill acquisition.

Conclusion

Developmental delay in fundamental movement skills is a public health concern that can be observed very early in a child’s life. Addressing this issue is important for increased competence and enjoyment and promoting active lifestyles for children. This pilot study has shown that a community-based intervention delivered by early childhood workers is effective. Importantly, the improved skill development potentially increases children’s engagement in physical activity,
which is important for lifelong good health and reduced risk of chronic disease. Addressing this issue in children from disadvantaged families also has the potential to decrease the unequal distribution of physical inactivity across the social gradient and reduce health inequalities. A large-scale trial to confirm the findings from this pilot study is warranted.

Acknowledgements

We thank the Glastonbury Child and Family Services staff and families who participated in this study, VicHealth Australia for providing the financial grant for this project, and Deakin University for providing additional funding and support. We also acknowledge the valuable contributions made by Narelle Robertson and Leisure Networks in the development of the study.

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The Early Years Learning Framework Professional Learning Program

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Early childhood teachers’ professional development in music: A cross-cultural study

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Deakin University

Marjory Ebbeck
University of South Australia

THIS PAPER DEALS WITH PROFESSIONAL teacher development. It specifically focuses on a research study of early childhood teachers’ views and involvement in teaching music to young children. It presents findings from a comparative study of 38 teachers in three childcare centres in the Hong Kong Special Administrative Region and 24 teachers in four childcare centres in South Australia. Two research questions are discussed and answered: (1) What are early childhood teachers’ levels of involvement in professional development in music? (2) Are there any significant relationships, that is differences and commonalities, in the findings between teachers’ levels of involvement in these two cultural contexts? A unique research tool entitled Teachers’ Music Development Scale was devised to collect data and measure teachers’ involvement in music development. Specific findings and their implications are presented in the paper.

Background

Professional development has been widely recognised as one of the significant elements in the effective implementation of quality curricula in early childhood education (e.g. Clark & Huber, 2005; David, 2004; Giroloametto & Weitzman, 2007; Lobman, Ryan, McLaughlin, & Ackerman, 2004; NAEYC, 2003). Professional development can be defined as ‘the individual’s ability to conceptualize and carry out activities which further personal growth in teaching’ (McAlpine & Harris, 2002, p. 9). It can also be viewed as one’s ‘changes in knowledge, skills and attitudes for the improvement of professional practice’ (San, 1999, p. 20). Contemporary researchers remind us that professional development can be conducted in various forms (e.g. attending a workshop, seminar, and/or conference, and reading professional literature), but researchers consistently emphasise that effective professional development should be teacher-centred, ongoing, and able to foster collegiality, collaborative inquiry and critical discourse (Ball & Cohen, 1999; Cochran-Smith & Lytle, 1993; Diaz-Maggioli, 2004; Nieto, 2003a, 2003b).

In this era of accountability, policy-makers view professional development as the key to increasing teacher quality and improving student learning (Barrett, 2006, p. 6). Within the early childhood education field, in both Eastern and Western contexts, professional development has been emphasised in different government documents. In the Hong Kong Special Administrative Region (HKSAR), for example, the local early childhood curriculum guidelines state that teachers should ‘attach importance to professional development through continuous study, and strengthen their communication and co-operation with other teachers and fellow educators. This will help promote effective co-ordination within a pre-primary institution and foster the achievement of the aims of early childhood education’ (Education and Manpower Bureau HKSAR, 2006, p. 46). Additionally, under the recent Pre-primary Education Voucher Scheme in HKSAR (Education Bureau, 2008b; Student Financial Assistance Agency, 2008), local eligible non-profit-making early childhood centres are given a grant known as Teacher Development Subsidy (TDS) from the 2007/2008 to 2010/2011 academic years so as to support teachers’ professional development (Education Bureau, 2008a, p. 1). In South Australia there is also a section named Professional Development in its local curriculum guidelines, South Australian Curriculum, Standards and Accountability (SACSA) Framework which aims at supporting leaders and educators to
implement the curriculum effectively (DETE, 2001). More recently the development and implementation of the National early childhood curriculum—Belonging, Being and Becoming: The Early Years Learning Framework for Australia (DEEWR, 2009)—has created a new demand for professional development. This is part of the Australian Government’s reform agenda for early childhood education, bringing with it specific needs for professional development (Commonwealth of Australia, 2010).

Music is well-recognised as one of the essential elements in young children’s development. In the formal educational system of most modernised countries (such as HKSAR, Australia, UK and Singapore) music is included in the early childhood curriculum guidelines as one of the fundamental learning experiences. Academics have also consistently emphasised the positive impact of music on young children’s holistic development, including social-emotional wellbeing (e.g. Baker & Mackinlay, 2006; Young, Street, & Davies, 2007), neurological development (e.g. Balaban, Anderson, & Wisniewski, 1998; Ho, Cheung, & Chan, 2003), and enjoyment of music (e.g. de Vries, 2004, 2007). Hence, early childhood teachers are generally expected to integrate music into their programs to enhance children’s holistic development.

Specifically, from the viewpoint of music education, the importance of professional development has also had a longstanding emphasis within the profession (e.g. Bowles, 2003; Conway, Hibbard, Albert, & Hourigan, 2005; Walls, 2008; Wonkling & Henry, 1999). An early but important report of the Music Educators National Conference (MENC) Task Force on Music Teacher Education for the 1990s (Olson, 1987) devoted a chapter on planning for career growth which characterised professional development as a lifelong process for both pre-service and in-service teachers within the music context. The report highlighted self-growth by portraying teachers as individuals who seek change and advancement, rather than merely fulfilling requirements for renewal of their teaching licences. More recently, Barrett (2006) stressed the important role of professional development in music education, especially as part of the current educational reform.

However, most available literature on teachers’ professional development in music has been conducted in the Western context (e.g. Bauer, Reese, & McAllister, 2003; Kerchner & Abril, 2009; Koutsoupidou, 2010). There seems to be very few research studies done in the Eastern context or from a cross-cultural point of view. In addition, most available literature on professional development in music teaching is not centred on the early childhood context (e.g. Bauer, 2007; Bowles, 2003; Conway, Hibbard, & Hourigan, 2005). Indeed, Gruenhagen (2007, p. vi) confirmed that research on the professional development of music educators in the early childhood context is ‘almost non-existent’.

In addition, research by Ebbeck and McDowall (2003) stated that early childhood programs in South Australia had limited focus on teaching the arts and that there had been a reduction in arts components, including music, while there had been an increase in the mathematics and science components. A similar situation can also be found in the HKSAR context (Chan & Leong, 2006). This has created limited levels of confidence in music teaching in both the East and the West (Ebbeck & Yim, 2007; Russell-Bowie, 2001). Hence professional development for teachers can be a way for them to increase their music education understanding.

This study used a cross-cultural approach to broaden our understanding of early childhood teachers’ professional development in music in both the East and the West. Such a study could also deepen understanding of cultural traditions, adding new insights for the early childhood music field.

A research study

This study was designed to examine and compare early childhood teachers’ views and involvement in professional development in music in the HKSAR and South Australia. The two research questions were:

1. What are early childhood teachers’ levels of involvement in professional development in music in HKSAR and South Australia?
2. Are there any relationships between early childhood teachers’ levels of involvement in professional development in music and their cultural contexts?

Sample

Participants in the research were 62 generalist early childhood teachers in seven childcare centres in HKSAR and South Australia. These participants were not music specialists. The average class size in HKSAR was 30, with children aged 3–5 years, and a staff–child ratio of 1:15. The average class size in South Australia was 20, with children aged 3–5 years, and a staff–child ratio of 1:10. Teacher-participants were distributed with 38 teachers from three childcare centres in HKSAR and 24 teachers from four childcare centres in South Australia. Teacher-participants were selected by convenience sampling (Cohen, Manion, & Morrison, 2007; Collins, Onwuegbuzie, & Jiao, 2006; Kumar, 2011). All teacher-participants had experience in conducting and/or supporting group musical activities with children in their centres. All centres were community-based in the metropolitan areas and were selected for the purpose of minimising any possible organisational and geographic
impact within each cultural context. In addition, the agreement of these teacher-participants and their centres to participate voluntarily in the research also contributed to the sample selection.

Method

The overall study used a mixed mode research approach but this paper reports on the quantitative data only (Brewer & Hunter, 1989; Creswell, 1994; Johnson & Christensen, 2004; Tashakkori & Teddlie, 1998, 2003). A research instrument named the Teachers’ Music Development Scale (TMDS) was devised by the first researcher to collect quantitative data. The 6-item scale is intended to measure teachers’ involvement in professional music development. The six items are:

1. Attending music-related workshop(s)/conference(s)
2. Reading music-related book(s)/article(s)/website(s)
3. Watching music-related video(s)/TV program(s)
4. Discussing music-related topic(s) with colleague(s) or friend(s)
5. Practising music performance skill(s)
6. Collecting music-related teaching material(s).

The statement on TMDS is ‘Please indicate below any participation in the following activities in the past year’. Teacher-participants expressed their involvement in professional music development on a 4-point Likert-type scale that ranges from 1 (Never) to 4 (Always). TMDS was translated into the Chinese language from its initial English version for teachers in HKSAR by using a blind-back-translation strategy (Bracken & Barona, 1991). The average percentage of match between the two versions of TMDS was 94 per cent, which is considered acceptable (Brislin, 1980). The scale was also pilot-tested on five teachers, using convenience sampling in each cultural context, resulting in no amendment.

Within the current data set, an exploratory factor analysis based on data from 62 teachers from both HKSAR and South Australia samples retained one factor solution that explained 36.8 per cent of the total variance extracted. Table 1 represents the factor loadings of this analysis.

The reliability of TMDS using Cronbach’s 0 was 0.60 for HKSAR and 0.68 for South Australia. The overall reliability for both HKSAR and South Australian samples (n = 62) using Cronbach’s 0 was 0.65. Such reliability levels were just below optimal, but were still deemed to be acceptable.

<table>
<thead>
<tr>
<th>Factor/statement</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Collecting music-related teaching material(s)</td>
<td>0.75</td>
</tr>
<tr>
<td>2 Reading music-related book(s)/article(s)/website(s)</td>
<td>0.72</td>
</tr>
<tr>
<td>3 Watching music-related video(s)/TV program(s)</td>
<td>0.62</td>
</tr>
<tr>
<td>4 Discussing music-related topic(s) with colleague or friend(s)</td>
<td>0.53</td>
</tr>
<tr>
<td>5 Practising music performance skill(s)</td>
<td>0.53</td>
</tr>
<tr>
<td>1 Attending music-related workshop(s)/conference(s)</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Eigen value 2.21

Note: n = 62

Results

Figure 1 shows that teachers in South Australia tended to have higher levels of engagement in five of the six types of professional development in music than teachers in HKSAR. From the study, the most popular type of professional development in music among teacher-participants in HKSAR was ‘Reading books/articles/websites’. In South Australia, ‘watching videos/TV programs’ was the most popular type. Coincidently, in both HKSAR and South Australia, ‘attending music-related workshops/seminars/conferences’ was the least popular professional development type, although it is usually recognised as the most common mode of professional development.

Figure 1. HKSAR and South Australian teachers’ engagement in professional development in music
One-way ANOVA analysis (Table 2) further showed that significant differences were found in three types of professional development between the two cultural contexts: (1) Watching music-related video(s)/TV program(s); (2) Discussing music-related topic(s) with colleague(s) or friend(s); (3) Practising music performance skill(s). Such findings imply relationships between teachers’ cultural contexts and their involvement in professional music development.

Figure 2 further indicated that teachers in South Australia had a higher overall level of involvement in professional development in music than teachers in HKSAR. An independent sample T-test analysis showed that such a difference was significant, $F(1, 60) = .12$, $p > 0.01$, $d = -0.80$, between teachers in HKSAR ($n = 38$, $M = 11.58$, $SD = 2.23$) and teachers in South Australia ($n = 24$, $M = 13.67$, $SD = 2.94$). This finding implies a relationship between teachers’ cultural contexts and their overall involvement in professional music development.

Table 2. Mean differences between HKSAR and South Australian teachers’ engagement in professional development in music

<table>
<thead>
<tr>
<th>Variables/statistic</th>
<th>Cultural contexts</th>
<th></th>
<th></th>
<th></th>
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<tr>
<td>Attending music-related workshop(s)/seminar(s)/conference(s)</td>
<td>HKSAR</td>
<td>38</td>
<td>1.66</td>
<td>0.48</td>
<td>1.90</td>
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<td>0.66</td>
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<tr>
<td></td>
<td>South Australia</td>
<td>24</td>
<td>2.29</td>
<td>0.81</td>
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<td>2.16</td>
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<td></td>
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<td>0.76</td>
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<td>Discussing music-related topic(s) with colleague(s) or friend(s)</td>
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<td>0.55</td>
<td>21.72*</td>
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<td>Practising/acquiring music performance skill(s)</td>
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<td></td>
<td>South Australia</td>
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<td>2.17</td>
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<td>Collecting music-related teaching material(s)</td>
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<td>1.87</td>
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<td>2.04</td>
<td>0.81</td>
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</tbody>
</table>

Note: $n = 62$, *$p < 0.05$. df = (1, 60). All means were expressed out of 4. d represents Cohen’s effect size (Cohen, 1960).
Discussion and implications

Results showed that ‘reading books/articles/websites’ was the most popular type of professional development in music among teacher-participants in HKSAR. In South Australia, ‘watching videos/TV programs’ was the most popular type. Among the six types of professional development in music as indicated in TMDS, significant findings were found in three professional development activities in music between the two cultural contexts: 1) Watching music-related video(s)/TV program(s); 2) Discussing music-related topic(s) with colleague(s) or friend(s); and 3) Practising music performance skill(s).

Reading music-related books/journals/websites

Within HKSAR, ‘reading music-related books/journals/websites’ was found to be the most popular type of professional development in music among teacher-participants. Reading is widely recognised as a useful way for teachers to acquire individually appropriate knowledge and/or to reflect on their teaching practices. The importance of reading can be mentally visualised in the Chinese proverb ‘A book holds a house of gold’ and the German proverb ‘A book is like a garden carried in the pocket’ (sources unknown). Researchers also found that reading professional magazines, journals and other materials can have a positive impact on teaching practices (Campbell & St J. Neill, 1994; Herzog & Koll, 1990; Smith & Lev-Ári, 2005). Nevertheless, Commeyras and DeGroff (1998) remind us that teachers may generally tend to read practitioner-focused journal articles, books and professional newspapers rather than research journals or electronic resources.

In HKSAR, however, there seems to be a lack of localised and regularly published practitioner magazines/journals/books/websites, particularly in early childhood music education. Most of the available music-related websites are mainly based on Western contexts (e.g. www.isme.org; www.vosa.org). Even though one might argue that, while Chinese professional magazines/reading materials are available from Taiwan and mainland China, both the localisation and heterogeneity of teaching materials should still be a main goal for enhancing the quality of education. In addition to the translated materials from Western resources, there is a need for more culturally relevant audio and/or visual materials for local teachers in HKSAR. In South Australia, comparatively speaking, localised (e.g. Kazimierczak, 2004) and/or up-to-date country-wide music reading materials (e.g. Russell-Bowie, 2008) are more available to practitioners. However, the present study showed that reading professional materials may not be a popular activity for South Australian early childhood teachers. No significant difference was found in this matter between HKSAR and South Australia. Therefore, an examination of possible cause and consequence of South Australian early childhood teachers’ professional reading habits may be needed.

Watching music-related videos/TV

The research found a relationship between teachers’ cultural contexts and their involvement in ‘watching music-related videos/TV’ as professional music development. South Australian teachers had a significantly higher level of engagement in ‘watching music-related videos/TV’ than did those in HKSAR. Such a cultural difference may be because of the greater availability of music-related TV programs for adults in Australia. In South Australia, during the research period (academic year of 2007–2008), music-related TV programs for adults such as Australian Idol, Dancing with the Stars, So You Think You Can Dance and It Takes Two were regularly available in free local TV channels. In 2008, besides the aforementioned ongoing programs, Battle of the Choirs was also on television during prime time in South Australia. All these music-related programs not only entertain the general public, but also popularise music among the locals by broadening South Australians’ understanding of musical genres and repertoires. In fact, watching TV is the most popular leisure activity for Australians. A report (ABS, 2008, paragraph 4) showed that 87 per cent of Australians watched TV for an average of nearly three hours (179 minutes) per day (down slightly from the 1997 figure of 182 minutes). Such a statistic supports the results of this study that ‘watching videos/TV’ is Australian teachers’ most popular activity for professional music development. Watching video/TV programs has indeed been recognised as one of the appropriate types of teachers’ professional development (Villegas-Reimers, 2003).

In HKSAR, relatively speaking, music-related TV programs for adults during the research period were fewer. Programs are generally produced with the purpose either solely for fun/entertainment (e.g. Minutes to Fame or Jade Solid Gold) or for professionals (Asian Youth Orchestra Hong Kong Concert 2006, Art Odyssey or Young Chinese Performers). Although one may argue that TV programs in-between these two extremes are still available (e.g. We are the United Asian by Radio Television of Hong Kong RTHK), these types of programs are generally not shown on a regular basis nor in prime time when local early childhood teachers could easily access them. Moreover, statistically speaking, HKSAR people spend less time watching television (162 minutes per day) (Census and Statistics Department HKSAR, 2003, p. 21) than is done in South Australia. A recent research study (Lee, Chang, Chung, Dickie, & Selker, 2007) confirmed that television is still ‘one of the most popular entertainment resources in the modern life. TV is a machine actively participating in our daily life and providing information’ (p. 329). The term ‘information’ may further indicate knowledge for teachers’ professional development in music. Also, watching educationally relevant television
can be regarded as one of the informal experiences of professional development for teachers (Ganser, 2000). Therefore, television producers in both cultural contexts should consider the possible direct and indirect impact of music-related TV programs on early childhood teachers’ professional development.

**Discussing music-related topics with friends/colleagues**

The present research found a relationship between teachers’ cultural contexts and their involvement in ‘discussing music-related topics with friends/colleagues’ as professional music development. These topics include their music teaching and learning experiences with young children, and their personal musical experiences. Such discussions enable teachers to share their music-related experiences and ideas in a socially interactive and peer-supportive environment. Results showed that South Australian teachers had significantly higher levels of engagement in ‘discussing music-related topics with friends/colleagues’ than did those in HKSAR. Such a finding may be owing to the different work arrangement between the two cultural contexts. In South Australia, early childhood teachers within the selected centres in this study were allocated specific and clear personal break times (e.g. morning/afternoon coffee breaks and lunch times) during work time. Teachers, therefore, were provided with opportunities to interact with colleagues/friends.

Within the selected centres in HKSAR, however, such breaks were relatively few and unspecified. Because of the invisible pressure from the overloaded timetable for children and their administrative workload, HKSAR teachers rarely interact with colleagues during working hours, except at formal staff meetings. As well as this different work arrangement between the two cultural contexts, research by McAllister and Irvine (2000) and Tang (1996) shows that ‘discussion’ is a relatively more common learning mode in the West than in the East. Another research study based on the Australian and Asian contexts also provides similar findings (Ramburuth & McCormick, 2001). Therefore a short break with a cup of coffee/tea seems not only to be important for teachers’ wellbeing but may also be indirectly beneficial to children’s musical learning. There is a need to encourage and to strengthen a discussion-based culture among early childhood teachers in both cultural contexts, especially as researchers (Atherton, 1999; Bransford, Brown, & Cocking, 1999; Halstead & Taylor, 2000) have found that such a learning mode is effective and efficient.

**Practicing musical skills**

The present research found a relationship between teachers’ cultural contexts and their involvement in ‘practising musical skills’ as a form of professional development. South Australian teachers had significantly higher levels of engagement in ‘practising music-related skills’ than did those in HKSAR. Such a cultural difference may be because of South Australian teachers’ more frequent opportunities to interact with professional musicians. In SA, inviting professional music performers to centres is quite a common practice. Teachers are not only encouraged to interact with professional performers, but are also able to learn musical skills from them. Welch and Adams (2003) confirmed that the learning of musical skills can be enhanced by ‘appropriate guidance and feedback from an “expert” teacher’, and ‘expert’ teaching could be from ‘a peer, a specialist music teacher or just someone who is more expert in a particular aspect of music’ (p. 10). Although practice is likely to have the greatest benefit when it is regular, systematic and structured, Green (2001) indicated that musical skill can also be developed and practised informally.

In HKSAR, however, inviting ‘expert’ music performers to come to childcare centres is relatively uncommon within the selected centres owing to more limited resources and networks. One may argue that there are some available links between local ‘expert’ music organisations and educational settings, such as the recent program entitled HSBC Insurance Creative Notes 09/10 by the Hong Kong Philharmonic Orchestra (2009). Similar arguments can be found in recent research by local educators who identified several available professional outreach and/or school-visit programs in HKSAR (Ho & Law, 2009). Nevertheless, these ‘music-in-education’ programs by professional musicians mainly focus on students and/or teachers in local primary or secondary educational settings.

**Conclusion**

This cross-cultural study has shown that early childhood teachers are interested in and benefit from undertaking professional development which can extend their generalist training in music. It has identified the similarities and differences in music professional development in the cultures studied and highlighted teachers’ differing needs for increasing their music skills. The study affirms the need for more research in and support for the provision of skilled and expert models for early childhood teachers in order to support the development of their musical skills. Such research could include replicating the study presented here with a larger sample and investigating further the music education components of pre-service early childhood teacher training programs in Australia.

In addition, a better allocation of resources for facilitating teachers’ engagement in professional dialogue with these skilled and expert models, both inside and outside childcare centres, may also be desirable. Music professional development will continue to be important for the early childhood field and needs constant updating.
References


Introduction

Infant sleep disturbance is one of the most common complaints of parents (Boyle & Cropley, 2004). Jenni and O’Connor (2005) propose that many problems with infant sleep are based on culturally constructed definitions and resulting parent expectations, and are not necessarily based in sleep biology. Across different cultures, ideas vary about how, where and why infants should sleep. As a result of these differences, much of what is considered problematic sleep behaviour is problematic only in relation to society’s expectations (McKenna, 2000). Jenni and O’Connor posit that cultural norms interact with sleep biology to determine the boundaries between ‘normal’ and ‘problematic’ sleep. They consider sleep to be a biologically driven behaviour shaped and interpreted by cultural values and the beliefs of the parents.

Culture guides parental decisions regarding infant sleep. In turn, parental decisions influence infant sleep behaviour, including arousal, sensitivity to the mothers’ presence, amount of sleep, night-time crying, and the use of transitional objects (aids) (McKenna, 2000). The expectations of infant sleep in the Western world may be further contributing to sleep problems, as parents feel a powerful concern for what looks morally acceptable (McCune, Richardson & Powell, 1984) and thus put further pressure on themselves and their infant to conform to cultural expectations. McKenna (2000) reports that the rigidity with which parents are socialised to hold on to infant sleep expectations can actually predict the relative likelihood that infant sleep problems will manifest themselves.

Frequent night waking and difficulties falling asleep are the infant sleep problems most commonly reported by parents (Jenni & O’Connor, 2005). While definitions vary as to what constitutes a problem in sleep behaviour, it is clear, from research into infant sleep in the Western world, that, if untreated, sleep problems can become chronic, with implications for the mental health and wellbeing of the child. Frequent and disruptive night-waking late in the first year of life has been found to predict sleep problems at age three, which are in turn related to other behavioural problems at that age (Baird, Hill, Kendrick & Inskip, 2009). Sleep disturbances have been found to be strongly associated with a variety of childhood problems, including other behavioural problems (O’Brien & Gozal, 2004), poorer neuro-behavioural functioning (Sadeh, 2004) and poorer intellectual and academic functioning in older children (Buckhalt, El-Sheikh, Keller & Kelly, 2009). Child sleep problems have also been shown to have relationships with depressive and anxiety disorders, autism and attention deficit hyperactivity disorder.

Assisting infants to achieve self-regulated sleep: The KIDSCODE® Baby Process

Lisa Ford

THE KIDSCODE® BABY PROCESS is a three-day, in-home intervention aimed at assisting parents to support their infant in developing self-regulation and achieving sleep easily. The program also aims to help parents to reduce their own stress, anxiety and depressive symptoms. This pilot study evaluated the outcomes of the KIDSCODE® Baby Process for families with an infant sleep problem. Ten families with an infant aged between six weeks and 15 months participated. Findings indicate that, after completing the KIDSCODE® Baby Process, infant night-time sleep increased significantly in quantity. Infant sleep was also found to improve in quality. One week after the intervention, the number of night wakings, the number of aids needed to settle to sleep, and the time taken to settle infants to sleep had all reduced significantly. Parents were able to maintain these changes over time. Following intervention, mothers also had significantly more sleep, and stress, anxiety and depression reduced significantly for both mothers and fathers over the month following intervention.
improve dramatically when parents reduce their involvement in sleep-settling routines. It has also been shown that infants' sleep can be influenced by the way parents handle their baby's settling-to-sleep routine. This approach aims to slow down parent behaviour and allow parent insight into their own thought processes and behaviours. Parents also receive face-to-face and telephone support in the months afterwards. In order to ensure the emotional safety of families struggling with their infant's sleep, the intervention process can be facilitated only by practitioners trained in KIDSCODE®.

The KIDSCODE® Baby Process

One intervention which attempts to address the balance of parental involvement and help infants to achieve self-regulated sleep is the KIDSCODE® Baby Process. This infant sleep intervention aims to assist parents to understand and change their cognitions and interactions in order to create change in their infant's ability to self-regulate and transition to sleep independently, while still feeling secure. This reference to independent transition to sleep describes the infant's ability to fall asleep without dependence on parent proximity or active soothing. The program involves three full days of in-home therapy, which allows the parents time to experience the changes in their infant's behaviour as they change their own thought processes and behaviours. Parents also receive face-to-face and telephone support in the months afterwards. In order to ensure the emotional safety of families struggling with their infant's sleep behaviour, the intervention process can be facilitated only by practitioners trained in KIDSCODE®.

The KIDSCODE® Baby process is theoretically based on the premise that, from birth, children have an innate ability to learn and adapt to their environment (Roberts, 1999). Grace-Baron, Lipsitt and Goodwin (2006) agree that all human beings manifest reflexes, learning capacities, motivations and propensity for avoidance. Only in Western cultures are infants thought to need ‘learn’ to sleep (McKenna, 2000). KIDSCODE® tries to establish a balance of parental involvement, in order to allow the child to develop self-regulatory skills, and use their innate intelligence in regard to sleep and other behaviours. The KIDSCODE® approach aims to slow down parent behaviour and allow parent insight into their interactions with their child. This allows the infant space to self-regulate, and access their innate feed-sleep-play cycle, which in turn facilitates calmer infant behaviour.

The past two decades have seen the emergence of a focus on the role of cognitions in family life, with increasing exploration of the links between cognitions,
actions and emotions of family members (Tikotzky & Sadeh, 2009). The KIDSCODE® process looks at how these cognitions in family life can impact on infant behaviours and self-regulation.

The KIDSCODE® program comprises an adult module and an infant module. Parents are introduced to these modules over the three days of in-home therapy and experience the changes that occur as the principles are applied to daily life.

Parent module

Parents are first guided through the adult module which helps them to change their behaviours in order to create a balanced and calm approach to interactions with their child. This then allows the child space to navigate situations independently, using their innate intelligence rather than relying on parental involvement. The aim is to reduce interactions between parent and child which result from anxiety, stress or unhelpful thoughts. The practitioner draws a model which shows parents the difference in themselves and their interactions when their thoughts are calm. Parents also see how their actions change when they are anxious and how their baby responds to this. The model is easily applied to daily life so that parents can monitor and respond to their stress levels and anxieties and learn to develop calm within themselves and their interactions. Over the three days, parents have many opportunities to observe the model in practice, and to see and feel their own anxiety when their baby isn’t settling. Through the process, parents begin to see how their thoughts are affecting the situation, and as a result choose to make changes.

Infant module

The KIDSCODE® process also incorporates an infant component which provides parents with a series of strategies for responding calmly to their child’s sleeping difficulties and behaviours without causing dependence on the parent. The process provides a series of kinesthetic strategies that allow the parents to connect to the infant and support their child in achieving sleep independently while still feeling supported. The process also addresses any problems with feeding and crying. Which strategies are used and how often depends on the baby and how anxious, and how resistant to being calm they are.

The process claims it does not focus on adding tools and instructions but rather on removing excess stimulation. Throughout the three days, parents learn how their baby experiences sensory overload from too much stimulation, and how to help them restore calm. Harkness, Super, Keefer, van Tijen and van der Vlugt (1995) found that Dutch babies slept an average of two hours longer than American infants. The authors attribute this difference to the social values that underlie infant sleep: while Dutch parents believe children must not be over-stimulated during the day or night, American parents worry that their children are not getting enough stimulation. Harkness et al. also found that parent-infant sleep struggles common among American families were not as familiar to the Dutch.

Assisting sleep

The process acknowledges that some amount of night-waking and difficulty settling is normal. It also acknowledges that use of aids can assist sleep transitions. In fact, in Western cultures the use of transitional objects is considered a natural stage through which most children pass (Jenni and O’Connor, 2005). While definitions of sleep problems will vary from parent to parent, and from culture to culture, KIDSCODE® posits that, if parents are finding sleep behaviour to be interfering significantly with child and family functioning, and the parent is concerned enough to ask for help, then a problem exists for that family. The Baby Process is all about restoring balance so that parents feel they can cope, rather than trying to completely eliminate sleep behaviours such as night-waking and use of aids.

KIDSCODE® founder, occupational therapist Jenny Roberts, claims the program cannot be learned from a book or a website; it must be experienced. Every parent and child has different needs and the practitioner must be able to adapt the process to meet those individual needs.

While the KIDSCODE® Baby Process aims to improve the ease with which babies get to sleep, it has not yet been established whether the program results in any measurable improvements in the amount or quality of infant sleep. The aim of this study was to consider the outcomes of the KIDSCODE® Baby Process for a small number of families who are having difficulty with their infant’s sleep; to identify whether there was increased quantity/improved quality of sleep. The quality of the sleep was measured by considering the time taken to get to sleep, the number of aids needed to assist sleep, and the number of night-wakings.

The study also aimed to identify if, following the process, there was a reduction in parents’ levels of stress, anxiety and depression. As first-time mothers are particularly influenced by the quality and quantity of their infant’s sleep (Quillin & Glenn, 2004), and more susceptible to high levels of stress (Oronoz, Alonso-Arbiol & Balluerka, 2007), only families with a first-born infant were invited to participate in the study.

Method

Participants

Ten English-speaking families with a first-born infant aged between six weeks and 15 months were invited to participate in the study. A newspaper advertisement
invited families having difficulty with their infant’s sleep to contact an independent researcher. Inclusion criteria were then discussed over the phone in order to determine if families were eligible.

To participate, the parents must have been experiencing difficulty settling the baby, and the baby must be unable to attain sleep without parent assistance (for example, rocking or feeding to sleep, or dependence on sleep aids). Infants also needed to meet one of the following criteria: only sleeps for short periods during the day and this is problematic; wakes frequently during the night; or has colic. Those families who indicated sleep and settling difficulties impacted so much on daily functioning that they felt they were at a point of crisis were given priority for participation.

One family did not complete the one month follow-up data collection as they could not be contacted, so their results were excluded from analyses. One single-parent family also participated, resulting in a total of nine mothers and eight fathers participating for the full length of the study.

Materials
Parents were asked to separately complete the Depression, Anxiety and Stress Scales (DASS) (Lovibond & Lovibond, 1995) to determine their general level of stress, anxiety and depression in the past week. The DASS is designed to measure on three scales the negative emotional states of depression, anxiety and stress. Parents also completed the Parental Stress Scale (Berry & Jones, 1995) to derive a measure of stress that is directly related to parenting their child. The Parental Stress Scale comprises 18 items representing positive and negative themes of parenthood. Each item is self-rated on a 5-point scale in terms of the degree to which parents agree with that item. All item scores are then summed to compute the Parental Stress Score. Possible scores range between 18 and 90 and higher scores indicate greater stress. The Parental Stress Scale has been found to have satisfactory internal (0.83) and test-retest (0.81) reliability.

Mothers also completed a basic sleep diary over three days and nights, to help monitor their infant’s sleeping habits. Thomas and Burr (2009) suggest that a three-day period is optimal for reliable results. The diary required parents to track the hours of night/day sleep, the aids used to help settling to sleep, and the number of night wakings. Night sleep covered 12 hours, from 7:00pm to 7:00am. Day sleep covered the period from 7:00am until 7:00pm. Information about the amount of sleep parents had, and the amount of time it took to settle the infant to sleep, was also obtained through a written questionnaire.

Procedures
This study received ethical approval from the Tasmanian Human Research Ethics Committee, constituted under the Australian National Health and Medical Research Council. All parents provided written consent for participation. Participating families were visited by the independent researcher at home and completed the questionnaires and the sleep diary one week prior to the commencement of the KIDSCODE® Baby Process. Parents kept the infant sleep diary over the three days and nights following this baseline data collection. Families then completed the in-home KIDSCODE® Baby Process with a qualified practitioner (an individual trained and licensed in the methodology of the KIDSCODE® Baby Process) over a three-day period. One week later, parents completed the same series of questionnaires and infant sleep diary as completed at baseline data collection. These were completed again one month after the three-day process. This one month follow-up documented the sustainability of any changes which had occurred. All data was collected by the same researcher and the questionnaires were completed in the same order for all parents.

After the three-day in-home process, parents were provided with one month of telephone follow-up support by the KIDSCODE® practitioner on an ‘as-needed’ basis. This follow-up support involved the practitioner contacting the parents by telephone two weeks after completion of the KIDSCODE® Baby Process to determine how the family was coping, and answer any questions in relation to their child’s sleep. Support was also offered when parents proactively sought the practitioner’s assistance.

Statistical design
Repeated measures ANOVAs were used to assess changes over time in all of the measures. Missing data was excluded from analyses on a case-wise basis and an alpha level of 0.05 was used.

Results
Infant settling and sleep
Infant sleep was measured by the infant sleep diary which parents kept for three days. The hours of night-time and daytime sleep were combined and averaged for each infant, to create a single night and single day sleep value for that period. The time taken to settle to sleep was based on parent report. Table 1 displays the means and standard deviations for the number of hours of infant day and night sleep, and the time taken to settle to sleep.
Repeated measures ANOVAs revealed that a significant main effect for time existed for both daytime sleep, $F(2, 16) = 13.69, p < 0.001$, and for night-time sleep, $F(2, 16) = 5.10, p = 0.02$. When the means displayed in Table 1 are considered, there appears to be a trend for an increase in the hours of night sleep over time. This trend was examined using trend analysis and found to be statistically significant, $F(1, 8) = 6.15, p = 0.04$. Pair-wise comparisons revealed that night sleep did not increase significantly from pre-intervention to one week post-intervention ($p = 0.07$), nor from one week to one month post-intervention ($p = 0.18$). However, a significant difference is noted from pre-intervention to one month post-intervention ($p = 0.04$), indicating that a more gradual and cumulative increase has occurred over time. Pair-wise comparisons were also made to determine when significant increases in infant sleep occurred. Day sleep was found to increase significantly from pre-intervention to one week post-intervention ($p = 0.01$). It then reduced significantly from one week post- to one month post-intervention ($p < 0.01$).

A significant main effect for time existed for the time taken to settle infants to sleep, $F(2, 14) = 17.61, p < 0.001$. In examining the means, there appears to be a trend for the time taken to decrease. Trend analysis revealed this trend to be statistically significant, $F(1, 7) = 18.00, p < 0.01$. Pair-wise comparisons revealed that there was a significant decrease in time taken to settle to sleep between pre-intervention and one week post-intervention ($p < 0.01$). There was also a further significant decrease between one week and one month post-intervention ($p = 0.04$). The mean time it took parents to settle their infant to sleep before the intervention was 55.5 minutes. One week following intervention, this time was reduced to 14.5 minutes. One month after intervention, it took parents a mean time of 9.5 minutes to settle their child to sleep.

The number of night wakings and the number of aids used, measured by the infant sleep diary, were also analysed to determine if changes in these variables occurred over time. Scores across the three days of diary keeping were combined and averaged to create single scores for each infant at each time point. Table 2 displays the mean number of aids used during 24 hours to assist settling to sleep, and the mean number of wakings which occurred per night, over the period of pre-intervention and post-intervention probes.

### Table 1. Mean hours of day and night infant sleep, and time taken to settle to sleep at pre- and post-intervention probes ($n = 9$)

<table>
<thead>
<tr>
<th>Time</th>
<th>Day sleep (SD)</th>
<th>Night sleep (SD)</th>
<th>Time to settle (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>4.24 (1.41)</td>
<td>8.90 (1.63)</td>
<td>0.92 (0.52)</td>
</tr>
<tr>
<td>One week post</td>
<td>5.39 (1.60)</td>
<td>10.24 (0.84)</td>
<td>0.24 (0.19)</td>
</tr>
<tr>
<td>One month post</td>
<td>4.07 (1.56)</td>
<td>10.49 (0.67)</td>
<td>0.16 (0.17)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

### Table 2. Mean number of aids used and number of night wakings per 24 hour period, pre- and post-intervention ($n = 9$)

<table>
<thead>
<tr>
<th>Time</th>
<th>Aids (SD)</th>
<th>Night wakings (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>7.52 (4.10)</td>
<td>2.85 (1.28)</td>
</tr>
<tr>
<td>One week post</td>
<td>2.44 (2.52)</td>
<td>1.26 (0.43)</td>
</tr>
<tr>
<td>One month post</td>
<td>2.30 (2.72)</td>
<td>1.07 (0.97)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

Analyses revealed a significant main effect of time for the number of aids used to settle to sleep, $F(2, 16) = 12.17, p = 0.001$. The means displayed in Table 2 suggest a decrease in the number of aids used over time. Trend analysis indicated that this linear trend was statistically significant, $F(1, 8) = 13.81, p < 0.01$. Pair-wise comparisons were also made to determine when significant changes occurred, and revealed a significant decrease in the number of aids used from pre-intervention to one week post-intervention ($p < 0.01$). A significant decrease from pre-intervention was still evident at one month post-intervention ($p < 0.01$), indicating the sustainability of this change. However, there was no further significant reduction in the number of aids used from one week post- to one month post-intervention ($p = 0.75$).

The number of night wakings was also analysed, and a significant main effect of time was found, $F(2, 16) = 17.87, p < 0.001$. There appears to be a decrease in the number of night wakings over time, and this linear trend was found to be statistically significant, $F(1, 8) = 28.45, p = 0.001$. Pair-wise comparisons revealed a significant decrease in the number of night wakings from pre-intervention to one week post-intervention ($p < 0.01$). While there was no further significant decrease from one week post- to one month post-intervention ($p = 0.55$), scores remained lower, with a significant decrease from pre-intervention still evident at one month post-intervention ($p = 0.001$).

### Parent sleep

The amount of sleep for mothers and fathers was also analysed to determine if changes in parent sleep quantity occurred following intervention. Table 3 displays the means and standard deviations for hours of mothers’ and fathers’ sleep from pre-intervention to post-intervention.
Table 3. Mean hours of mother and father sleep per night at pre- and post-intervention probes

<table>
<thead>
<tr>
<th>Time</th>
<th>Mothers’ sleep (SD) (n = 9)</th>
<th>Fathers’ sleep (SD) (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>6.13 (0.99)</td>
<td>7.31 (1.49)</td>
</tr>
<tr>
<td>One week post</td>
<td>7.44 (1.66)</td>
<td>7.56 (1.02)</td>
</tr>
<tr>
<td>One month post</td>
<td>7.94 (1.50)</td>
<td>7.75 (0.89)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

Fathers’ amount of sleep did not change significantly over time, $F (2, 14) = 0.53, p = 0.60$. But there appears to be a trend for increase in hours of sleep for mothers over time. This was analysed with trend analysis and found to be statistically significant, $F (1, 7) = 13.17, p < 0.01$. Pair-wise comparisons were also made; there was a significant increase in mother’s sleep between pre-intervention and one week post-intervention ($p < 0.01$). Increased sleep was maintained, with a significant difference from pre-intervention still evident at one month post-intervention ($p < 0.01$), but no further significant increase between one week and one month post-intervention ($p = 0.26$).

Parenting stress

Parenting stress was measured by the Parental Stress Scale (Berry & Jones, 1995). Table 4 displays the means and standard deviations for mothers’ and fathers’ parenting stress scores over three time points (one pre-intervention and two post-intervention).

Table 4. Means and Standard Deviations for parenting stress scores pre- and post-intervention

<table>
<thead>
<tr>
<th>Time</th>
<th>Mothers (SD) (n = 9)</th>
<th>Fathers (SD) (n = 7)</th>
<th>Total (SD) (n = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>36.89 (11.68)</td>
<td>34.14 (10.93)</td>
<td>35.69 (11.07)</td>
</tr>
<tr>
<td>One week post</td>
<td>33.67 (10.48)</td>
<td>31.86 (8.09)</td>
<td>32.87 (9.26)</td>
</tr>
<tr>
<td>One month post</td>
<td>32.33 (13.45)</td>
<td>29.14 (6.38)</td>
<td>30.94 (10.75)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

A repeated measures ANOVA with a between-groups factor of gender (mother/father) and a within-groups repeated measures factor of time (3 levels) was performed, finding no significant interaction between gender and time $F (2, 28) = 0.11, p = 0.90$, and indicating that mothers and fathers in the present sample did not differ significantly in their level of reported parenting stress. Regardless of gender, the participants experienced significant changes in reported parenting stress. From Table 4 it is apparent that there is a decrease in parenting stress from baseline over time. This trend was tested for significance and was found to be statistically significant, $F (1, 14) = 8.68, p = 0.01$.

As well as trend analysis, pair-wise comparisons were made to determine the significance of changes at different time points. This revealed that parenting stress did not decrease from pre-intervention to one week post- ($p = 0.06$), and from one week to one month post- ($p = 0.22$). However, there was a cumulative decrease in parenting stress which resulted in a significant reduction from pre-intervention to one month post-intervention ($p = 0.01$).

Parents’ general stress, anxiety and depression

Parents’ general levels of stress, anxiety and depression (not related specifically to parenting) were measured using the DASS. Tables 5, 6 and 7 display the means and standard deviations for maternal and paternal stress, anxiety and depression (respectively) over three time points (one pre-intervention and two post-intervention).

Table 5. Means and Standard Deviations for maternal and paternal stress pre- and post-intervention

<table>
<thead>
<tr>
<th>Time</th>
<th>Mothers (SD) (n = 9)</th>
<th>Fathers (SD) (n = 8)</th>
<th>Total (SD) (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>12.44 (11.76)</td>
<td>8.88 (7.97)</td>
<td>10.76 (10.02)</td>
</tr>
<tr>
<td>One week post</td>
<td>7.78 (8.97)</td>
<td>5.00 (5.04)</td>
<td>6.47 (7.31)</td>
</tr>
<tr>
<td>One month post</td>
<td>7.33 (9.81)</td>
<td>5.00 (5.15)</td>
<td>6.23 (7.82)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

Table 6. Means and Standard Deviations for maternal and paternal anxiety pre- and post-intervention

<table>
<thead>
<tr>
<th>Time</th>
<th>Mothers (SD) (n = 9)</th>
<th>Fathers (SD) (n = 8)</th>
<th>Total (SD) (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>6.44 (8.44)</td>
<td>1.88 (1.55)</td>
<td>4.29 (6.50)</td>
</tr>
<tr>
<td>One week post</td>
<td>3.11 (6.05)</td>
<td>0.63 (0.74)</td>
<td>1.94 (4.49)</td>
</tr>
<tr>
<td>One month post</td>
<td>2.22 (4.71)</td>
<td>0.50 (0.76)</td>
<td>1.41 (3.48)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation
Table 7. Means and Standard Deviations for maternal and paternal depression pre- and post-intervention

<table>
<thead>
<tr>
<th>Time</th>
<th>Mothers (SD) (n = 9)</th>
<th>Fathers (SD) (n = 8)</th>
<th>Total (SD) (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-intervention</td>
<td>9.67 (12.85)</td>
<td>5.00 (7.45)</td>
<td>7.47 (10.61)</td>
</tr>
<tr>
<td>One week post</td>
<td>4.11 (6.74)</td>
<td>0.88 (1.81)</td>
<td>2.59 (5.18)</td>
</tr>
<tr>
<td>One month post</td>
<td>4.78 (9.15)</td>
<td>1.25 (1.39)</td>
<td>3.12 (6.78)</td>
</tr>
</tbody>
</table>

Note: SD = Standard Deviation

In order to determine if significant main effects or interactions for time and gender existed, a repeated measures ANOVA with a between-groups factor of gender (mother/father) and a within-groups repeated measures factor of time (three levels) was performed for each of the three domains. Pillai’s Trace indicated that, for all three domains, no reliable effects were present (Stress: Pillai’s Trace = 0.26, F (2, 14) = 2.40, p = 0.13, Anxiety: Pillai’s Trace = 0.286, F (2, 14) = 2.8, p = 0.10, Depression: Pillai’s Trace = 0.300, F (2, 14) = 3.01, p = 0.08).

Pair-wise comparisons were considered to determine if any significant changes occurred between time points for each of these variables. For stress, there was a significant decrease in scores between pre-intervention and one week post-intervention (p = 0.04), and no further decrease or increase after this time (p = 0.79). Anxiety decreased significantly between pre-intervention and one week post-intervention (p = 0.03), but no further significant changes occurred between one week and one month post-intervention (p = 0.20). For depression, scores decreased significantly between pre-intervention and one week post-intervention (p = 0.03). Again, no further significant changes occurred between one week and one month post-intervention (p = 0.38).

Two case examples which provide an indication of change that can occur over the time of intervention are those of family ‘X’ and family ‘Y’. Family ‘X’ appeared to experience a reduction in stress, anxiety and depression over the time of intervention. For the mother, pre-intervention, depression was in the extremely severe range, stress in the severe range, and anxiety in the normal range. One week post-intervention, all three were in the normal range. One month post-intervention, scores were still in the normal range. The father experienced moderate stress and depression pre-intervention, and at both one week and one month post-intervention, these were in the normal range. For family ‘Y’, there also appeared to be a reduction in DASS variables over time. Pre-intervention, the mother’s scores were in the severe range for stress and anxiety. Depression was found to be in the moderate range. One week post-intervention, stress, anxiety and depression were all found to be in the normal range. Scores were still in the normal range at one month post-intervention. For the father, stress and depression were in the moderate range pre-intervention, and at both post-intervention time points, these were in the normal range.

It is important to note that parents differed in their initial DASS scores and also in the level of change experienced over time.

Discussion

After completing the KIDSCODE® Baby Process, families achieved increased quantity and improved quality of infant sleep, increased quantity of maternal sleep, and decreased parenting stress for both mothers and fathers. It is important to note that the degree of change related to the intervention and the degree to which it is related to temporal changes cannot be fully determined owing to the lack of a control group.

During the first year of life, sleep evolves to be more stable and last longer (Harkness et al., 1995). Thus, infants in the current study may have changed in sleep behaviour over the one month of data collection without completing the intervention. However, it is difficult to predict what changes would have occurred naturally. McKenna (2000) asserts that, realistically, infant sleep development is different from family to family. Sadeh and Anders (1993) support this notion that patterns of normal infant sleep development are extremely variable. These authors propose that infant sleep development is dependent upon a myriad of variables (including infant temperament, growth rate and neurological status at birth) significant to each child.

In the current study, infant night sleep increased gradually after intervention, with a significant increase evident by one month after completion of the process. Infant day sleep increased significantly and immediately following intervention, but reverted to pre-intervention levels over time. An increased quantity of night sleep may have resulted in reduced need for day sleep. Mothers’ sleep also increased significantly in the week following intervention. This was maintained until one month follow-up. No significant changes occurred to the amount of fathers’ sleep.

Quality of infant sleep also improved following the KIDSCODE® Baby Process. This was characterised by a significant reduction in the number of night wakings, in a significant reduction in the number of aids used, and in the time taken to settle infants to sleep, all of which occurred within a week of the intervention. Findings indicate that this improved quality was maintained by parents for at least one month following intervention.
A reduction in night wakings might be indicative of an improved ability to sleep through; however, it could also be because of improved self-regulation, in which infants still wake, but do not need to alert their parents and are able to re-settle themselves.

After completing the KIDSCODE® process, the amount of time taken to settle infants to sleep significantly reduced, and continued to reduce over the month following intervention. Before intervention, it took an average of 5.5 minutes for parents to settle their infant to sleep. One week after intervention, the average time was 14.5 minutes. One month after intervention, it took an average of 9.5 minutes for infants to settle to sleep.

One of the ways the KIDSCODE® Baby Process aims to improve sleep is through helping parents to recognise how stress, anxiety or depression affect their thoughts and subsequent interactions with their infant, and how to cope with this.

Parents’ stress, anxiety and depression all decreased significantly following intervention. For one mother, depression reduced from the extremely severe range, and stress from the severe range, to be in the normal range just one week after intervention. For another mother, anxiety and stress fell from the severe range to the normal range within a week of intervention. For two fathers, stress and depression reduced from the moderate range to the normal range after intervention. For all of these individuals, stress, anxiety and depression remained in the normal range at one month post-intervention, indicating these changes are sustainable over this time.

These findings demonstrate that, following intervention, some parents were able to reduce their clinically significant levels of stress, anxiety and depression to the normal range within just one week. However, families did differ in their responses, and further investigation into the ability of the process to address parent psychopathology is needed. It is likely that improvements in infant sleep also contributed somewhat to improvements in parent psychopathology.

Parent psychopathology during pregnancy may also be important to consider in future infant sleep research, as there is some evidence that prenatal maternal depression or other psychological distress may play a role in the development of infant sleep problems. Armitage et al. (2009) report that babies born to depressed mothers had little evidence of an in-born 24-hour circadian rhythm soon after birth, but other babies did. They suggest that infant sleep may be affected by the mother’s level of cortisol, which is increased during pregnancy and after delivery in depressed mothers. Baird and colleagues (2009) found that babies are at a 23 per cent increased risk of night-waking problems at six months of age, and 22 per cent increased risk at 12 months, if born to women who suffered from depression, anxiety or other significant psychological distress prior to conception. These findings were independent of whether mothers suffered from post-natal depression. These studies indicate that recognising and treating psychological distress before and during pregnancy may promote improved infant sleep (Baird et al., 2009). While the KIDSCODE® Baby Process is designed for delivery after pregnancy, it may also be helpful to use the parent component as a pre-natal program for parents at risk of, or currently experiencing, psychological distress.

The significant changes that occurred in infant sleep and parent psychopathology following intervention appear to be sustainable by parents over a short period (one month). Longer-term follow-up studies are needed to examine the sustainability of results beyond this time. The current study lacked a control group, and the sample size was also small, thus results are considered to be preliminary and should be interpreted with some caution. A larger scale, randomised, controlled study is needed to further examine the outcomes of the intervention. While infant sleep development is extremely variable (Sadeh & Anders, 1993), age-matching of infants between experimental and control groups in a large sample size may provide a gauge against which natural sleep development can be differentiated from changes owed to intervention. Including qualitative measures of parents’ perceptions of the KIDSCODE® Baby Process would also assist understanding of the process’s potential benefits for families.

The findings of the current study support the notion that changing parents’ thought patterns and sleep-time interactions may help to improve infant sleep. By improving an infant’s ability to self-regulate and achieve independent sleep, it may be possible to reduce later behavioural and emotional problems.

Acknowledgement

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References


A preliminary exploration of children’s physiological arousal levels in regular preschool settings

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Eira Suhonen
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Margaret Sims
University of New England

LEARNING NEW THINGS IS challenging. In these moments, children are functioning in the upper limits of their acquired capability: in Vygotskian terms, children are functioning in their zone of proximal development (ZPD). Acting in the ZPD is cognitively loading and stress-provoking, thus the ability to function optimally in this state of increased stress has fundamental effects on the development of learning abilities. Physiological measures of arousal have become more common and pave the way to understanding not only how children develop regulation but also the role of the environment (social and physical) in supporting that development. While cortisol has become a popular measure of arousal, it is only one component of the physiobiology of arousal. It is important to develop a more holistic understanding of arousal.

Our study aimed to evaluate both cortisol and alpha-amylase responses in preschool-aged children in response to both an unusually challenging task as well as to normal early childhood activities. We have used these to develop a model linking activation of the HPA and SAM systems to children’s cognitive performance, including the mediating impact of daily activities.

Introduction

Learning new things is challenging. In these moments, children are functioning in the upper limits of their acquired capability: in Vygotskian terms, children are functioning in their zone of proximal development (ZPD). Acting in the ZPD is cognitively loading and stress-provoking (Sajaniemi et al., in press). Thus, the ability to function optimally in this state of increased stress has fundamental effects on the development of learning abilities. At the same time, we know that chronic and/or extremely high levels of stress are detrimental to learning (Gunnar & Quevedo, 2008; Marshall & Kenney, 2009). Effective learning occurs when children are able to regulate stress to avoid chronic and/or extreme arousal and, at the same time, adapt to moderate arousal levels.

Children learn the skills to regulate their arousal in the years before starting school (Graziano, Reavis, Keane & Calkins, 2007) and poor emotional regulation skills impair children’s ability to think (Blair, 2002). Blair cites neuropsychological research identifying increased activation in specific parts of the pre-frontal cortex associated with high levels of arousal which is found to interfere with high level cognitive functioning. Such associations are experience-dependent and chronic activation promotes ‘... use-dependent connectivity that is detrimental to attention and executive cognitive processes’ (Blair, 2002, p. 117).

Such activation is mediated by two interrelated brain-body systems: the sympathetic-adrenomedullary (SAM) and the hypothalamic-pituitary-adrenocortical (HPA) systems (Bales & Carter, 2009; Marshall & Kenney, 2009). The SAM system is a part of the sympathetic autonomic nervous system and its activation leads to release of adrenaline from adrenal glands. Increases in circulating adrenaline orchestrate flight/flight responses. Adrenalin facilitates the availability of energy to the body and prepares the organism for various activities, including learning. The HPA system’s role is to help contain, or shut down sympathetic activation by producing glucocorticoids (GC), cortisol in humans.
Adrenaline does not cross the blood–brain barrier to a significant degree whereas the brain is the major target of cortisol (Gunnar & Quevedo, 2007). Inability to regulate stress responses harms brain development in specific areas including the hippocampus and prefrontal cortex, all fundamentally important in learning, memory and executive functions (Gunnar & Vazquez, 2006).

There has been a growing interest in children’s stress responses to cognitive and emotional challenges (Dickerson & Kemeny, 2004; Dozier et al., 2006; Kestler & Lewis, 2008; Steptoe, van Jaarsveld, Semmier, Plomin, & Wardle, 2009). Examination of the stress-related HPA-axis is long established through non-invasive measurements of salivary cortisol (Kirschbaum & Hellhammer, 1994). Both elevations and suppressions of diurnal cortisol levels are known to indicate dysfunctions in stress regulative abilities (Gunnar & Vazquez, 2001; Luby, Belden & Spitznagel, 2006). Either high cortisol levels or blunted cortisol activity have been associated with behavioural extremes and developmental disorders (Ellenbogen & Hodgins, 2009; Segerstrom & Miller, 2004; Smider et al., 2002; Young & Breslau, 2004). Further, cortisol reactivity during everyday challenges is suggested to indicate functionality of the stress regulatory system (Gordis, Granger, Susman, & Trickett, 2006, 2008; Luby et al., 2006). According to previous studies, cortisol responses to cognitive and emotional challenges are related to attention, effort and executive functions (Shin & Lee, 2007). However, findings have been inconsistent, showing both decreased and increased cortisol reactivity in response to various stressors (Luby et al., 2006).

Recently, a small number of studies have focused on the other major component of the stress system, the SAM system. Activation of the SAM system can be evaluated non-invasively by saliva alpha-amylase concentration (Granger et al., 2006). The HPA axis and SAM axis are connected at multiple neural levels, and these two systems should demonstrate some degree of symmetry (Young, Abelson & Cameron, 2005), although HPA and SAM show different timing in response to challenges: rates of activation and recovery are faster for alpha-amylase than for cortisol (Granger et al., 2006; Spinrad et al., 2009). Optimal functioning of the stress regulative system occurs when HPA and SAM responses are balanced (Bauer, Quas & Boyce, 2002). Concurrent activation or deactivation is the most adaptive and activation asymmetries are maladaptive. For example Gordis, Granger, Susman and Trickett (2008) found that young people (9–14 years) who had experienced maltreatment were more likely to have asynchronous activation of HPA and SAM systems compared to a comparison group of young people. Studies combining both HPA and SAM measures are rare, yet multi-system approaches (Bauer et al., 2002) offer ‘... significant potential to extend our understanding of the role that early experiences play in shaping individual differences in stress related psychobiology’ (Davis & Granger, 2009, p. 3), particularly as there is some evidence that SAM reactivity may moderate the link between cortisol reactivity and children’s behaviour (Spinrad et al., 2009).

Individual differences in HPA and SAM reactivity are related not only to experiences of chronic stress but also to the availability of attachment figures (Davis & Granger, 2009). Attachment figures function to initially offer regulation of children’s arousal levels (Schore & Schore, 2008; Sims & Hutchins, in press). Young children who experience this external regulation learn to self-regulate their arousal through the interactions they have with these attachment figures (Braungart-Rieker, Hill-Soderfund & Karrass, 2010; Graziano et al., 2007). Thus secure attachments, built through nurturing, reciprocal, and sensitive caregiving (Sims & Hutchins, in press), function to reduce the cortisol peak in stressful situations (Gunnar, 2006) and, in the long term, shape the physiology of the stress regulatory system and improve self-regulation across the life span (Flinn, 2009).

This is recognised in many early childhood service systems (for example child care, preschool, kindergarten programs) around the world, and secure attachment is often positioned as a key quality indicator of these services (Sims, 2007; Sims, Guilfoyle, & Parry, 2006, 2008). For example, a range of researchers have identified the importance of early childhood educators engaging with children’s interests and responding to their attempts to communicate (Connor, Son, Hindman, & Morrison, 2005; Kugelmass & Ross-Bernstein, 2000; Mitchell, 2002; Sims & Hutchins, in press; van Ijzendoorn, Tavecchio, Stams, Verhoeven & Reiling, 1998; Zaslow & Tout, 2002), and this research is translated into practical performance indicators in quality assurance systems (such as those presented in the Australian quality assurance process; National Child Care Accreditation Council, 2005). However, it may be that adults find it more difficult to respond contingently to children whose regulatory systems are non-synchronous (i.e. they do not show a synchronous HPA and SAM response to stimuli), particularly if the behaviours exhibited by the children do not clearly indicate their physiological arousal. For example, Spinrad et al. (2009) suggest that children with low levels of arousal may withdraw from situations (perhaps because they are easily overwhelmed by multiple stimuli?) whereas children with higher reactivity thresholds (i.e. children who appear on the surface to be well-regulated) may be more likely to behave aggressively in order to seek sensation. Thus adults working with children giving these conflicting signals may prompt the withdrawn child to join activities when, in fact, maintaining homeostatic physiological arousal levels might better be served by supporting the child’s withdrawal. If this is indeed the case, these children may experience difficulty in learning self-regulation, as the
The NEPSY scale is 0.81. Pencil tasks children experience daily. The reliability of NEPSY tasks resembled the preschool paper-and-pencil tasks, as these are seen as normal early childhood activities, and we have reported on the cortisol data elsewhere (Sajaniemi et al., in press). The purpose of this paper is to add the alpha-amylase responses to the previously reported cortisol data, and use these to develop a model linking activation of the HPA and SAM systems to children's cognitive performance, including the mediating impact of daily activities.

Methodology

Participants

The study sample included 84 children (40 girls, 44 boys) attending separate preschool groups in five childcare centres in metropolitan Helsinki. The childcare centres served predominantly middle-class white families; the average annual family income was categorised as medium or high in 86 per cent of the cases. Mean age of the children was six years, six months (range = 6;6–7;1). The children were without any major developmental disabilities or chronic illnesses.

In Finland, children attend preschool in the year before they start school. Many of the activities undertaken throughout the day are pencil-and-paper tasks, as these are seen as preparation for school. Groups sizes ranged from 18 to 22 children and the groups were run by a teacher who was required to have a university Bachelor degree in early childhood pedagogy. Attendance at preschool is the norm in Finland, with an attendance rate of 96 per cent.

Measures

Cognitive ability

The cognitive tasks were chosen from the Developmental Neuropsychological Assessment (NEPSY-II) (Korkman, Kirk & Kemp, 2008). The subtests relating to design coping, visual attention for faces, visual fluency and visual-motor precision were used in this study. NEPSY provides an overall standardised score with a mean of 10 for each of the domains. These tasks were selected because they could be administered in group situations and because they challenged children’s attentive, executive and self-regulative skills. In addition, these NEPSY tasks resembled the preschool paper-and-pencil tasks children experience daily. The reliability of the NEPSY scale is 0.81.

To assess children’s ability to orient toward cognitive demands and to follow instruction in challenging tasks, as well as their language abilities, we used the Boehm Test of Basic Concepts (Boehm, 1993). The test measures the concepts that most frequently occur in children’s language. The tests effectively identify the concepts children already know and those they need to learn to be successful in school. The test has 47 items and a maximum score of 47. The validity of the test is known to be good (reliability varies from 0.55 to 0.87); it is widely used and easy to administer in group situations.

Play behaviour

Children’s play behaviour was assessed using the Preschool Play Behaviour Scale (PPBS) (Coplan & Rubin, 1998). The PPBS is a widely used evaluation method in early educational settings to identify social immaturity, impulsiveness and risk for externalising behaviour. It consists of 18 items on a five-degree Likert scale, with low scores indicating rarely observed behaviours. The PPBS is designed to evaluate the multiple forms of young children’s behaviours during free-play sessions. The reliability (Cronbach Alpha) is 0.75. In the PPBS, solitary-passive behaviour is identified as the quiescent exploration of objects and constructive activity while playing alone. Reticent behaviour consists of prolonged looking at the playmate without accompanying play, the child being essentially unoccupied. Solitary-active behaviour is characterised by repeated sensory motor actions with or without objects and by solitary dramatising in the presence of the social group. In addition, the PPBS has items for social play (group play, sociodramatic play and peer conversation) and rough play (rough-and-tumble play).

Cortisol and alpha-amylase reactivity samples

The baseline cortisol and alpha-amylase were measured when children arrived at their preschool, approximately one hour after awakening. The second saliva sample was collected subsequent to watching the video and completing the cognitive assessment, approximately 40 minutes after the first sample (post-test 1). The third sample was collected 20 minutes after the second sample (post-test 2), after the children had been singing, listening to music or playing freely. Trained educators collected all the saliva samples. Reactivity was defined as notable if the values in post-test 1 sample were at least 10 per cent above the pre-test values.

The sampling procedures were simple and easy for most of the children. The children mouthed 2-inch cotton wads until they were wet. The cotton wads were placed in Salivette tubes (Sarstedt, Nümbrecht) according to written instructions, and stored in a refrigerator until they could be mailed to the laboratory responsible for saliva cortisol and alpha-amylase measurements. In the laboratory the saliva was separated from the cotton wad by centrifugation.
(1000 G, 5 min.) and stored at –20°C until the analyses were undertaken.

**Procedure**

Students of special education assessed children's cognitive abilities in day-care settings in November 2008. Preschool teachers assessed play behaviour during several days in January 2009 in the normal preschool setting. Saliva and alpha-amylase were collected following a standard protocol for all children on one morning in February 2009 as follows:

- Baseline cortisol and alpha-amylase were measured when children arrived at their preschool.
- The children first watched a movie with an experimenter who was unfamiliar to the children. The movie was a Momin-movie which is known to be emotionally appealing and exciting for average preschool-aged children (Korhonen, 2008).
- After this the children went to another room where the experimenter undertook the Boehm and NEPSY-II.
- Cortisol and alpha-amylase were again taken (post-test 1).
- The children were sent back to their classroom where, for each group, the teacher chose an activity perceived to be relaxing. Two of the groups sang together (n = 38), two groups listened to music (n = 28), and in one group the children played freely (n = 20). All the episodes through the protocol were videotaped.
- Cortisol and alpha-amylase were taken after 20 minutes of the relaxing activity (post-test 2).

**Analysis**

The salivary cortisol levels were analysed using a commercially available luminescence immunoassay for the quantitative determination of cortisol in human saliva (Cortisol Saliva LIA, IBL Immuno-Biological Laboratories, Hamburg, Germany). The assay is based on the competition principle and the microtiter plate separation. Briefly, an unknown amount of cortisol present in the sample and a fixed amount of enzyme-labelled cortisol compete for the binding sites of the antibodies coated onto the wells. After three hours of incubation the wells are washed to stop the competition reaction. Once the luminescence substrate solution is added, the relative luminescence units (RLUs) can be read after 10 minutes and within 40 minutes; the concentration of cortisol is inversely proportional to the luminescence measured. Measuring range of the method is 0.43–110 nmol/l. The Coefficient of Variation of intra- and inter-assay of the method is 5 per cent and 8 per cent respectively.

The salivary Alpha-Amylase activity was analysed with a Salivary Alpha-Amylase Assay kit (Salimetrics). The kit is specifically designed and validated for the kinetic measurement of salivary alpha-amylase activity. The method utilises a chromogenic substrate linked with maltotriose. The enzymatic action of alpha-amylase on this substrate yields 2-chloro-p-nitrophenol which can be measured at 405 nm. The amount of alpha-amylase reactivity present in the sample is directly proportional to the increase in absorbance at 405 nm. The Coefficient of Variation of Intra-assay is 2.5–7.2 per cent and inter-assay is 3.6–5.8 per cent, depending on concentration.

All the statistical analyses were conducted with SPPS for Windows 17.0. To determine whether there were changes and symmetry in children's salivary cortisol and alpha-amylase levels across the three saliva collection points, General Linear Modelling (GLM) was performed. For detecting possible relations of cortisol and alpha-amylase to cognitive performance and play behaviour, analysis of variance (ANOVA) was conducted. Probability levels of 0.05 were considered to be statistically significant.

**Results**

Our results indicate that the study children were low-risk, typically developing preschool-aged children. We found that children's performance in Boehm test and in NEPSY tasks of design coping, visual attention for faces, visual fluency and visuomotor precision were age-appropriate. In play behaviour, the highest scores were in social play and the lowest in solitary dramatising play. We checked for gender differences but found none. The mean scores in NEPSY, Boehm test of basic concepts and Preschool Play Behaviour Scale are presented in Table 1.

**Table 1. Children's scores in BOEHM, NEPSY and Preschool Play Behaviour Scale**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOEHM</strong></td>
<td>43.59</td>
<td>2.81</td>
<td>35</td>
<td>47</td>
</tr>
<tr>
<td>design coping</td>
<td>8.8</td>
<td>2.91</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>visual attention</td>
<td>8.95</td>
<td>3.09</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>visual fluency</td>
<td>9.91</td>
<td>3.19</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>visuomotor precision</td>
<td>12.79</td>
<td>4.36</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td><strong>NEPSY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reticent behaviour</td>
<td>2.43</td>
<td>0.75</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>solitary-active</td>
<td>2.59</td>
<td>0.77</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>solitary-dramatising</td>
<td>1.99</td>
<td>0.81</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>social play</td>
<td>4.27</td>
<td>0.63</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>rough-and-tumble</td>
<td>2.7</td>
<td>1.05</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>
Children’s cortisol and alpha-amylase values are presented in Table 2. We further divided the children’s responses into three groups based on the activity in which they participated after undertaking the formal assessments. There were no significant between-group differences in cortisol values (Figure 1). However, differences between groups were significant in all measurement points for alpha-amylase. Pre-test values were highest in the free-play group ($p < 0.04$), post-test 1 and post-test 2 values were highest in the free-play group ($p < 0.02$, $p < 0.04$, respectively) (Figure 2). Cortisol changes between the three time points significantly decreased in the free-play group ($p < 0.02$) and music-listening group ($p < 0.01$). The singing group showed a different cortisol pattern, with increasing values after the recovery session. However, the value changes were not significant (Figure 1). There were no significant differences between time points for alpha-amylase values (Figure 2). These demonstrate that children from the different groups had different baseline levels of cortisol and alpha-amylase. These baseline differences indicate that children in the different groups are bringing different experiences into their early education settings. Because they start from different points, we were less interested in comparing the absolute differences in their cortisol and alpha-amylase levels, but rather the changes between the different time points.

In all three groups children demonstrated a decline in cortisol after viewing the video and undertaking the cognitive assessment. However, the alpha-amylase values indicate that only one group showed a decline at this point. This suggested to us that there must be a number of children who had an asynchronous pattern of reactivity and we explored this further below.

<table>
<thead>
<tr>
<th>Cortisol values</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>baseline (ug/dl)</td>
<td>85</td>
<td>0.33</td>
<td>0.4</td>
</tr>
<tr>
<td>Post-test 1 (ug/dl)</td>
<td>84</td>
<td>0.26</td>
<td>0.39</td>
</tr>
<tr>
<td>Post-test 2 (ug/dl)</td>
<td>85</td>
<td>0.25</td>
<td>0.33</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alpha-amylase values</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>baseline (U/ml)</td>
<td>85</td>
<td>49.1</td>
<td>33.9</td>
</tr>
<tr>
<td>Post-test 1 (U/ml)</td>
<td>84</td>
<td>48.7</td>
<td>29.26</td>
</tr>
<tr>
<td>Post-test 2 (U/ml)</td>
<td>85</td>
<td>47.8</td>
<td>30.58</td>
</tr>
</tbody>
</table>

A lack of cortisol reactivity to challenging tasks is often seen as a cause for concern (for example Shin & Lee, 2007 found a blunted cortisol response to challenging tasks is often associated with poor cognitive performance). Children in our study did not show an elevation in cortisol or alpha-amylase following the cognitive assessments. Reduced cortisol and alpha-amylase levels across all three measurement points were in congruence with the diurnal cortisol pattern which is expected to decrease across the day (Gunnar & Vazquez, 2006). The absence of a cortisol response could be interpreted as a result of the stress hypo-responsive period of the HPA-axis some researchers have observed amongst children of the same ages when responding to laboratory stress (Gunnar & Fisher, 2006; Maldonado, Trianes, Cortes, Moreno & Escobar, 2009). However, we prefer to believe that children did not experience the task as challenging. This is supported by our finding that children’s level of cognitive performance was at expected age-level, both in NEPSY and Boehm tasks, indicating that the tasks were neither too difficult nor too easy for them. We had chosen the NEPSY because of its format, and its similarity to the pencil-and-paper-activities with which the children were familiar. This choice appears to have succeeded in being perceived as non-stressful.
After the cognitive assessment, we asked teachers in each group to select a task the children would be likely to perceive as relaxing. We had left this to the teachers to choose, working on the assumption that they would best understand the needs of the children with whom they worked. Children who played freely and listened to music after the cognitive assessment showed a decline in both cortisol and alpha-amylase (a decline from post-test 1 to post-test 2). However, children who sang showed an increase in both cortisol and alpha-amylase between post-test 1 and post-test 2. This indicates that children found singing more arousing than either listening to music or free play.

Reactivity in singing sessions may be linked to the fact that the adults’ role was more prominent than during any other activities, including in the cognitive assessment. Our preliminary analysis of the video recordings shows the teachers singing together with children. This engagement of the teachers with the children might have promoted children’s participation and excitement. Based on our preliminary video-analysis, these moments appeared to be more emotional than those we observed in the music-listening or free-play groups. It seemed that teachers and children were in emotional tune with each other, which could have elicited some reactivity in our children. It may also be that the listening and free-play activities offered children space to manage their arousal, whereas the singing engaged children in a more structured way that did not allow them the flexibility to disengage. Research by Steptoe, van Jaarsveld, Semmier, Plomin and Wardle (2009), demonstrating a decline in cortisol levels in children playing computer games, supports our suggestion that adult involvement in an activity might be more stimulating than playing alone.

Given we had reason to believe that some children’s cortisol and alpha-amylase reactions were not synchronous, we re-examined our data and identified those children with synchronous reactions (i.e. both cortisol and alpha-amylase followed the same pattern) and asynchronous reactions (cortisol and alpha-amylase changed in different directions). Only 19 per cent of the children (n = 16) demonstrated a symmetric increase in both cortisol and alpha-amylase values from pre-test to both post-test measurements. Looking at the change between pre-test and post-test 1 only, we see 43 per cent (n = 36) of children demonstrated a symmetric change. Symmetry of reactivity was not connected with performance in NEPSY tasks. However, children with symmetric reactivity across all cortisol and alpha-amylase measurement points had significantly higher scores in Boehm Test of Basic Concepts (F (1) 5.3, p < 0.05). Symmetry of reactivity was also connected to reticent play behaviour during free-play observations (F (1) 5.7, p < 0.05). No other significant connections were found.

We next examined the cortisol responses of synchronous and asynchronous children (see Figure 3). The cortisol values between groups across the three measurement points are significantly different (F (1) 4.6, p < 0.04).

![Figure 3: Cortisol levels for synchronous and asynchronous children](image)

We can see that children whose responses are synchronous (and who, we suggest, are likely to be better-regulated) show an increase in cortisol in response to the cognitive assessments followed by a decrease. Children who are asynchronous (and who, we suggest, are likely to be less well-regulated) show a decline in cortisol in response to the cognitive assessments and little change subsequently. In addition, all NEPSY scores tended to be higher in synchronous than in asynchronous children, although differences did not reach significance. Does the elevation of cortisol for the synchronous children suggest that these children were more likely to be engaged in the learning tasks, as evidenced by improved understanding of basic concepts needed in preschool activities? Conversely, were asynchronous children less engaged in the challenging assessment tasks, leading to a lower performance on the Boehm? Supporting this possible interpretation is the preliminary video analysis which indicates that synchronous children were more task-oriented than were asynchronous children. Alternatively, are the asynchronous children more stressed by the assessment experience and reacting with a suppressed HPA pattern? The increase in reticent behaviour in the synchronous children’s play may be a strategy used to regulate after experiencing the heightened arousal associated with the assessments. Unfortunately, numbers are too small to enable us to undertake an effective comparison of synchronous/asynchronous children’s cortisol in the three different activities (listening, singing and free play) post assessment.
Building the model

Combining the results of our study with the extant literature, we propose the following model (see Figure 4).

Figure 4 A preliminary model

Conclusions

Our study is one of the few using multiple measures of children’s stress reactivity, and, given that research in this area is in its infancy, we have raised more questions than we have answered. Certainly the combination of cortisol and alpha-amylase measures suggests that establishing physiological regulation is problematic for some children, and that the interaction of both the HPA and SAM systems has an impact on children’s cognitive development. The role of adults in supporting the development of regulation has been well-established (for example Rothbart, Posner, & Kieras, 2008; Thompson & Lagattuta, 2008) but we question the ability of adults to respond contingently to children who may be emitting conflicting signals. Given that the quality assurance processes for many early childhood programs around the world require the establishment of contingent responses to children (as a key component of establishing secure relationships), improving our understanding of regulation development can only support the evolution of quality early childhood services.

References


Equity of access: Requirements of Indigenous families and communities to ensure equitable access to government-approved childcare settings in Australia.

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Telethon Institute for Child Health Research

Sherry Saggers
Kate Frances
Curtin University

This article is concerned with the interplay between Indigenous children and their families’ equitable access to government-approved childcare services and their respective participation in such services. Specifically, it focuses on key factors that affect access and that serve as barriers to participation. The paper draws upon a national consultation funded by the Australian Government and conducted throughout 2005–2006 to respond to these concerns, and is situated within a substantial body of work which already provides a context for Indigenous children’s access to, and participation in, early childhood services. In recognition of the diverse circumstances and requirements of Indigenous families, the research methods included focus groups, community consultations, and interviews with other stakeholders in the childcare sector nationally. An analysis of national and international literature on the research theme was made. The research findings correspond with other studies in this area, highlighting that accessibility (availability of places and transport), affordability, acceptability, and appropriateness are indicators which measure how well—or not—a service is meeting the needs of Indigenous children, their families and communities in relation to child care. To ensure that all children have equitable access to the service best suited to their needs, the Commonwealth of Australia, together with all states and territories, must understand and incorporate these requirements in childcare service provision for all Indigenous children.

Introduction

The aim of promoting social justice and socially inclusive opportunities for all Australians is central to the principle of equitable access to service provision, and is invoked across a variety of disciplines and sectors (SCRGSP, 2008). The term ‘equity’ has a number of interpretations, and generally incorporates ‘horizontal’ and ‘vertical’ equity (SCRGSP, 2008). For the purposes of this paper, ‘horizontal equity’ refers to services which are equally accessible to everyone in the community with a similar level of need. At present, most of the childcare services in Australia exhibit this form of equity, regardless of ‘need’ (Bown, Fenech, Giugni & Millei, 2008; Elliott, 2006; SNAICC, 2009). ‘Vertical equity’, on the other hand, refers to services which account for the special needs of certain groups in the community and adjust delivery to suit these needs (SCRGSP, 2008). For Indigenous children and their families, exceptions to the horizontal form of equity do exist, in small measure, and include Multifunctional Aboriginal Children’s Services (MACS) and other Indigenous prior-to-school services (Kelly & Vnuk, 2003; Rogers, 2004). Access relates to the ease with which a service can be obtained, and is often measured by availability of places and affordability (Elliott, 2006; SCRGSP, 2008).
Equity in access is a principle usually implemented through policies and procedures that aim to improve both outcomes and participation of some members of the community who have difficulties accessing a standard service (SCRGSP, 2008). Reasons for these difficulties may include:

- language or literacy proficiency
- gender
- age
- physical or mental capacity
- race or ethnicity
- geographic location (Gallagher & Clifford, 2000; SCRGSP, 2008).

There is now widespread recognition that Indigenous people, in particular, experience significant barriers to accessing appropriate child care, with participation rates falling well behind those of the rest of the Australian community (ABS, 2008). The effect of this is felt across the spectrum of optimal outcomes for Indigenous children, including their care and protection, health and wellbeing, and transition to school (ACOSS, 2006; ARACY, 2008; Hutchins, Martin, Saggiets & Sims, 2007). As noted by COAG (2009), ‘early childhood care and education is not a repeatable process for a child’ (p. 5). Equity in access plays a central role in both the removal of barriers and the attraction of higher participation rates for Indigenous children (Bown et al., 2008; Pocock & Hill, 2007; Wannan, 2007).

To this end, the Australian Government, in partnership with all state and territory governments, is implementing a range of national reforms to the early childhood education and care sector in order to ensure that all Australian children receive equal access to such services (COAG, 2009). For example, the recently introduced National Quality Standard for Early Childhood Education and Care and School Age Care (COAG, 2009)—which refers to equity as ‘fair and just treatment of all individuals’ (p. 38)—has been developed in recognition of the importance of a ‘focus on the early years to ensure the wellbeing of [all] children throughout their lives ...’ (p. 2).

For Australia’s Indigenous children, COAG (2009) has determined targets that relate to early childhood development including:

- ensuring all Indigenous four-year-olds in remote communities have access to early childhood education (within five years)
- access for every child to a preschool program in the 12 months prior to full-time schooling by 2013.

The research we are reporting on here builds upon a substantial body of work which has examined factors affecting equity in access to childcare services for Indigenous children and their families, and include availability of places and transport, affordability, acceptability and appropriateness (Aboriginal Best Start Status Report, 2004; Fasoli & Moss, 2007; SNAICC, 2002; Walker, 2004). The following discussion reviews this body of work and reports the findings from consultations with Indigenous communities and service providers funded by the Australian Government in 2005. The purpose of the consultations was to ascertain indicators which measure how equitable—or not—childcare services are for Indigenous children and their families.

**Availability of child care**

Supply and demand is an important issue in the discussions about early childhood programs, with evidence of a shortage of childcare places (ACOSS, 2006; Pocock & Hill, 2007). There is, however, a lack of national evidence determining the extent to which available places are meeting existing demand, and an incomplete national picture of children’s participation in childcare programs (ABS, 2008; ACOSS, 2006; Elliott, 2006).

Nonetheless, data from the 2004 Child Care Census (ABS, 2008) shows that, in 2004, 651,044 children were accessing Australian Government-supported childcare services, with less than two per cent (11,971) being Indigenous children. Indigenous-specific services, such as MACS, had the highest proportions of Indigenous children (79%). One reason for the low participation of Indigenous children is the lack of specific services for them in most of the major Indigenous population centres throughout Australia (SNAICC, 2002). Where such services do exist, demand greatly outstrips supply (Aboriginal Best Start Report, 2004; SNAICC, 2002). The discrepancy between supply and demand affects both mainstream and Indigenous-specific services (Elliott, 2006; Fasoli & Moss, 2007). According to ACOSS, ‘parents, childcare operators, MPs and the media all cite access to child care as a major problem’ (ACOSS, 2006, p. 6). Furthermore, discrepancies in availability and quality of services, particularly in remote locations where significant numbers of Indigenous people reside, have also been identified as an issue (Report on the Review of Aboriginal Education in NSW, 2004).

**Transport**

Regardless of levels of availability of places within childcare services, transportation to and from such services is also identified as a barrier to Indigenous families accessing the service. These families are far less likely than others in Australia to have access to reliable private transport. There is a correspondingly higher participation rate associated with services which provide transport compared with those which do not (Aboriginal Best Start Status Report, 2004; SNAICC, 2002; Walker, 2004). Transport is also important for
excursions, which have been reported as essential in some communities in order to ensure the children are exposed to cultural experiences such as collecting bush tucker, fishing and hunting (SNAICC, 2002).

**Affordable child care**

Affordability has been identified as another constant problem for parents wishing to access childcare services (ACOSS, 2006; Walker, 2004). Access depends upon the capacity of parents/carers to pay for such services (Hill, Pocock & Elliot, 2007). Elliott (2006) notes how few free early childhood services of any type exist in Australia, with other research also highlighting how the costs of child care in this country are increasing much faster than inflation and, particularly for families on low or average incomes, affordability has been declining since the 1990s (Elliott, 2006; Hill, Pocock & Elliot, 2007). This situation led the Government to introduce the means-tested Child Care Benefit (CCB) in 2000 as a way of helping families to meet such costs (AIHW, 2006). Nonetheless, it has also been reported that Australia’s overall expenditure on early childhood services is lower than that of other OECD countries (OECD, 2006) and this, together with the substantially increasing costs in child care, wipes out the effect of the CCB (AIHW, 2006; Pocock & Hill, 2007).

Mainstream child care is prohibitively expensive for most Indigenous families (Aboriginal Best Start Status Report, 2004; SNAICC, 2002), especially for those living in rural and remote locations where the cost of living and housing is significantly higher than in most metropolitan areas (Penter, 2000). Other issues affecting affordability for many Indigenous families include high unemployment rates, low incomes, and lack of knowledge about subsidy entitlements (Report on the Review of Aboriginal Education in NSW, 2004).

**Acceptable child care**

Of equal importance to Indigenous children, their families and communities is the need for childcare services to be acceptable (SNAICC, 2009). The issue of acceptability relates to culturally safe environments for all involved—children, parents and extended family members—environments which have been reported as lacking in many mainstream childcare services (Fasoli et al., 2004; SNAICC, 2002; Priest, 2005). Culturally safe services are defined as those where individuals, families and communities feel comfortable in the knowledge that the service understands, respects and acknowledges their culture and background, and embeds this information in practices, standards, policies and attitudes (Bamblett & Lewis, 2007; Hutchins et al., 2007; SNAICC, 2005). Indigenous families’ reports of feeling culturally unsafe include racist and judgemental remarks, dismissive comments, and a general lack of sensitivity to their experiences (Bamblett & Lewis, 2007; Report on the Review of Aboriginal Education in NSW, 2004; Walker, 2004).

It is for these reasons that Indigenous families have a preference for Indigenous staff working within their childcare services (Bamblett & Lewis, 2007). It is well-documented, however, that there is a shortage of both Indigenous and non-Indigenous qualified childcare staff and early childhood educators, a situation that exists within both mainstream and Indigenous-specific services. Such deficiencies impact on both the quality and availability of services, creating, particularly for Indigenous families, barriers to accessing services (Report on the Review of Aboriginal Education in NSW, 2004; Walker, 2004).

**Appropriate child care**

The literature identifies a number of interrelated cultural values important to service provision (including but not limited to child care) for Indigenous peoples, including acknowledgement of history; the importance of community control of services; and the inclusion of parents and families in childcare programs (Fasoli et al., 2004; Priest, 2005; SNAICC, 2002). Child care for many Indigenous peoples is seen as ‘the focus for building community, maintaining language and supporting families and their children to grow’ (RPR Consulting, 2005, p. 3).

In 1997, the Multifunctional Aboriginal Children’s Services (MACS) were developed, and are the predominant model servicing the childcare needs of Indigenous children, their families and communities. MACS provide an example of culturally strong childcare programming, with services offering long day care, outside-school-hours care, transport to and from the service, provision of food, cultural activities, and family support programs (Indigenous Professional Support Unit, website).

**Methodology**

Ethics approval to undertake the research was granted by Edith Cowan University’s Human Research Ethics Committee. The research was conducted with attention to NH&MRC’s (2003) *Guidelines for ethical research in Aboriginal and Torres Strait Islander health research*. These guidelines require all researchers to conduct their work according to Indigenous priorities and processes, and with respect for Indigenous values at all stages of the project. Importantly, the broad research team included Indigenous and non-Indigenous peoples with many years’ experience of working with Indigenous communities.
The national sample consisted of Indigenous childcare providers \((n = 202)\), Indigenous community members \((n = 210)\), and state and territory government representatives \((n = 66)\). A minimum of one capital city consultation and one rural/remote consultation of service providers and community members was undertaken in each state and territory. Metropolitan consultations were held during the Secretariat for National Aboriginal and Islander Child Care’s (SNAICC) state conferences where possible. Rural/remote sites were nominated by SNAICC, the Australian Department of Families, Community Services and Indigenous Affairs (FaCSIA) and state and territory government representatives.

Qualitative data was obtained through focus group discussions and individual consultations, using semi-structured interview guides. Three guides were developed, each relevant to the respective participant groups. For community members, the guide was piloted with a reference group and modified to ensure the style and wording of questions, and the general context and purpose, was appropriate. The guide was then approved by Edith Cowan University’s Ethics Committee. The questions evolved, however, throughout the data collection phase to take into account local themes and needs. Where appropriate and consensual, focus group and interview discussions were audio-recorded and transcribed verbatim. Field notes and observations were also collected by interviewers when visiting communities and government, providing a further source of data.

Analysis of the data was done by all members of the research team and focused on designated topics. This data was coded by an independent analyst into thematic categories and then brought to team meetings, undergoing constant review. Written drafts were then combined and organised under the headings reported below.

Limitations of the study included time constraints and the limited sample. In addition, many participants raised their objections to the presence of FaCSIA staff at the consultations and, as a result, may have been more constrained in voicing their opinions. Overall, however, robust and exhaustive deliberations were generated by the issues of the study.

The consultations

Accessible child care

Lack of available childcare places was identified as one of the predominant barriers to accessing child care—‘not having any!’ being a frequent response. This shortage of places was reflected across all geographic locations. Where services did exist, many Indigenous childcare providers spoke of extensive waiting lists and having to turn families away:

We have only been open two weeks this year and we are full, now we are turning families away (Service provider, regional).

A lack of qualified staff is one of the factors impinging on the availability of child care, with services frequently required to close their doors until qualified staff can be found. Remote communities, in particular, suffer from this issue, sometimes closing several times per year for staff to complete training, take holidays and sick leave:

There is a million dollar centre on X that has been closed all year because they can’t get staff. The lights have been on since it has closed and the weeds are growing high They need to get the staff right before they build these centres (Community member, remote).

For metropolitan areas, a significant issue revolved around childcare centres training Indigenous staff only to have them leave upon gaining their qualifications because the centre was not able to offer them a trained staff position:

After you get qualified it is like who can afford you? (Service provider, metropolitan).

Centres can’t afford to pay staff they train once they become qualified (Government, metropolitan).

Transport

The lack of transport proved to be a key barrier to child care for Indigenous families. This was an issue across the country, and not simply confined to rural and remote areas. At one of the consultations participants talked about children leaving the centre if there was no transport. Staff from another centre talked about the importance of a larger bus:

If the children can’t get on the bus they have to walk home with the older children from school. They also have problems with having to share the bus (because of other community commitments). If they miss the breakfast bus they go without breakfast (Service provider, metropolitan).

According to one government representative:

The bus is the umbilical cord to the service, if it breaks down it’s really low (Government representative, metropolitan).

Where transport and a dedicated driver were available, the driver and his/her role were seen as essential components of the service: As one driver described himself:

I am the bus carer (Community consultation, metropolitan).

Having licensed drivers, not simply the lack of a vehicle, was also a problem for some communities:
We need a bus but we also need a staff member that is licensed to drive a bus and enough staff to go on the bus with the kids. Sometimes we borrow the bus to go to the library (Service provider, remote).

The general consensus among those service providers not having transport was that more children would access the service if they were picked up and dropped off, as many community members did not have access to private vehicles, or they were too expensive to operate:

We don’t have a bus so some people car pool and this is dangerous and illegal as there are not enough seat belts. Sometimes the cars break down and they can’t get the children to the crèche (Service provider, metropolitan).

In some remote communities the lack of transport was an issue owing to adverse weather conditions, despite distances between homes and the childcare centres being relatively short. As parents explained, the heat for many months of the year was scorching, often reaching 47°C. One parent commented:

If you have to walk from the office to here (childcare centre) in the middle of the day that is too far in the heat, specially for a little one (Community member, remote).

Transport is also important for excursions, which were seen as essential in some communities in order to ensure the children were exposed to cultural experiences:

… the boys go out in the bus and pick the wild plums. They love it (Service provider, rural).

Affordable child care

The affordability of child care for Indigenous families varied greatly across the country, depending upon the type of their community and the type of care available and/or accessed. Nevertheless, most service providers and community members identified the cost of formal child care as prohibitive to most Indigenous families, with mainstream services costing more than Indigenous-specific services:

[Mainstream] child care can cost $50–$100 per day per child (Government representative, metropolitan).

It is cheaper at Aboriginal services but it can still be a problem for families to pay this (Service provider, metropolitan).

There appears to be a range of fee structures in place for Indigenous child care. For example, parents in one Indigenous community told us they do not pay childcare fees—the fees are paid by the community council.

In other instances, childcare services only require the families to make a contribution towards the cost of food. However, even this can pose a difficulty or some:

Some mothers feel that the $20 per fortnight the crèche asks them to contribute for food is too much, although some are really fine about this. Even I chuck in $20 a fortnight, even though I don’t get to eat much (Service provider, remote).

Community members said that between $2 and $5 per day per child was a reasonable fee for child care. However, with the size of Indigenous families varying—the largest number of children we identified in one family was 15—the cost of child care becomes increasingly out of reach the more children there are. Even inexpensive child care—for example, $10 per day per child for a family of six children—is prohibitive for families on low incomes and with inadequate access to subsidy entitlements.

Management of subsidy

Confusion about childcare subsidies led to some families paying more fees than necessary. Confusion revolved around eligibility, accessibility and cost:

My daughter is doing the sums now; she has to see what she can afford. Before, parents only had to pay a percentage and not the full amount (Community member, metropolitan).

Completing the Centrelink requirements, or in some cases accessing the Centrelink officer, proved to be difficult for many of the participants:

Centrelink don’t know what they are doing. I spent half an hour on the phone, always on the phone to Centrelink, they keep doing things wrong. It is expensive to go into Centrelink, $8 on the ferry each way (Community member, remote).

Those families who accessed childcare subsidies freely often relied on the centre’s staff to assist them with the arrangements:

We take time to get the Centrepay forms with the client, but Centrelink charge the operator a fee to have this facility (Non-Indigenous service provider, regional).

Collection of fees

Collecting fees from Indigenous families was reported by some service providers as difficult. Falling behind in fee payments often resulted in non-payment notices, the child and family leaving the centre, and verbal abuse and threatened violence to staff attempting to collect fees:

If we have parents that owe money we tell them that the children cannot attend until the bill is paid. Some centres have a debt limit of $100 before you stop accessing services but this can be unfair where there is more than one child due to the rates of the accumulating date (Service provider, metropolitan).
I was threatened by parents for asking for fees
(Service provider, regional).

Different strategies were in place across the service providers to deal with the collection of fees, including: deduction from CDEP wages; assisting with the Centrepay service; allowing families to do voluntary work in the centre in lieu of fees; payment of fees in advance; providing positive reinforcement for bill payment; and having a culturally appropriate approach to collection of fees.

Acceptable child care

Indigenous families characterised acceptable child care in different ways but it was primarily having a choice in care options as well as a culturally safe service. The ‘one size fits all’ approach is not one that suits Indigenous families and communities:

Not all Aboriginal families are in need … we are not cloned (Community member, metropolitan).

The three main options for child care as described by Indigenous families include children being cared for by family members; children attending mainstream services; or children attending an Indigenous-specific service. The latter was the most popular option amongst our participants, although by no means the only one. Making use of family members for child care—not an option available to all families—involves issues of availability, cost, flexibility, trust and tradition:

People think grandparents are better because they don’t have to pay them (Service provider, remote).

A couple of our children used to be with their grandparents and speaking to them last week they are glad they are here. We had another parent who took their children out and the grandmother hit the roof ‘cause she couldn’t cope (Service provider, remote).

Some communities have no services. In these communities children are cared for informally (Service provider, remote).

Mainstream childcare services were a considered option for some Indigenous families. These reasons vary, ranging from non-identification as an Indigenous person to a desire for their children to experience mainstream culture. One grandmother sent her grandson to a mainstream service because she:

… wanted him to have a white experience (Service provider, regional).

One father, who moved from an Indigenous community to the city, said:

My kids they went to day care here with white kids. ‘Cause you have to learn how to be with others. That’s the world now (Community member, metropolitan).

Mainstream services, however, are not an option for many Indigenous families. For these families, acceptable child care is a place where they feel their children are culturally safe. For this reason, families feel comfortable and safe in Indigenous childcare centres where their family’s background is understood. Indigenous services operated by local people and which meet the needs of that specific community are clearly preferred, and more are needed:

The feel of the centre is important, for example, the look of the centre should be culturally appropriate, sleep times and the approach must be culturally appropriate, foods need to be appropriate, systems need to meet needs of Indigenous families (Government representative, metropolitan).

Indigenous child care services view the child holistically, as part of the family and community. All their needs are dealt with together (Service provider, metropolitan).

There was a strong sense among community members that both Indigenous-specific and mainstream childcare services should be staffed with Indigenous staff members. This criterion was seen as more essential than having staff with formal childcare qualifications, although families did want qualified staff caring for their children. Having Indigenous parents involved in caregiving roles and understanding how children are brought up was an important issue, as one father said:

My daughter is five, she has always got bruises, I don’t want someone sitting there going oh yeah blackfella beating up his kids, she always has bruises on her legs … I guess another Aboriginal parent can understand how hyperactive they can be … I always fear that because Aboriginal people have been a bit more strict with their kids (Community member, metropolitan).

White workers, they should not be teaching black stuff … that’s why mothers won’t attend (Community member, metropolitan).

Issues faced by Indigenous families need to be understood and dealt with by staff members. These issues can involve, for example, feuding between families and groups, which can affect the attendance of children at the childcare centre:

There is too much politics involved in community-managed services so they don’t work all that well, it can make it hard for staff and families with family feuds. Some families might be told that there are no spots for the children if they don’t want a particular family in the centre. They might tell other people in the community that a family can’t pay their fees (Community member, rural).
Appropriate child care

Indigenous families consider appropriate child care to be that which acknowledges their histories, cultures and languages in all aspects of the service. Appropriate child care requires programs and services to be culturally strong.

Culturally strong services and programs

Many parents were critical of services which did not acknowledge their Indigenous heritage:

There is a lack of programming for Koori kids. They don’t know how to run culturally appropriate programs—creating an environment where families feel welcome, use of the flag, recognition of culture in the centre—not willing and don’t know how (Community member, metropolitan).

This lack of acknowledgement included ignorance of Indigenous kinship systems and how they may influence the way families use services. One Aboriginal child, attending mainstream care, told his caregiver:

‘Mum X [his mother under the classificatory kinship system] is picking me up today.’ The caregiver said ‘She is not your Mum, she is your Aunty’. He said ‘No, she is my Mum X’. The caregiver continued to argue with the child and he became upset. The child does not want to return to the centre and the parents will not send him back there (Service provider, regional).

Incorporating Indigenous culture into the childcare program in a meaningful manner is very important to Indigenous people:

There's a survival instinct when kids are very small—they have to have all of the hunting and fishing and learning. The child care should be a place to see the continuance of that sort of learning, of childcare stuff, to allow them to keep moving on (Service provider, metropolitan).

Do culturally inclusive activities in kindy, Aboriginal stories on mat using puppets, show the flag and talk about it, use the didgeridoo and Aboriginal music (Community member, regional).

Knowledge of the role of child care

The importance of development in the early years, the role child care can play in this development, and the broader role child care can play in family support, is not always understood in some Indigenous families and communities. Some communities were reported as seeing child care as merely a babysitting service:

The family and community are unaware of and do not value the contribution good child care can make to the child’s development and wellbeing (Government representative, metropolitan).

There was confusion for some parents around the reasons for accessing child care, with them thinking, for example, that this care is available only to working parents. This reflects a general lack of accessible information to Indigenous families:

People are not confident to approach us; they think they need to be working to get their kids in here (Service provider, metropolitan).

In addition, many Indigenous parents of young children today did not have positive early childhood experiences themselves. While the parents want their children to be educated, these negative experiences come to the fore as soon as issues arise for their children within the childcare environment, the result being that they may remove the child from the service:

Children’s services need to build trust with families. The parents of today did not have great early childhood experiences, so when something goes wrong they don’t send children anymore (Government representative, metropolitan).

Shame was also cited as a reason for Indigenous families choosing to not send their child to child care, feeling that they and their family will be judged by others both in the community and in the childcare centre for attending the service:

It’s shame hey. They scared to come (Community member, remote).

Well, she is not working, why can’t she look after her own kid? (Community member, remote).

For some, extended family members themselves were not comfortable with the children going to child care, seeing it as the family’s responsibility to bring up the children:

I looked after my children and grandchildren, I can’t do it now ‘cause I am too old. My great-grandchildren go to child care. I don’t think it is right because they need loving. How can you love all those children? I don’t think it is right to send them to child care. Children need loving up (Community member, remote).

Discussion

This research does not stand alone as an attempt to emphasise some of the barriers to Indigenous children’s participation in government-approved childcare settings across Australia. Rather, it contributes towards a larger body of research which calls for the realisation of equity in access for Indigenous children and their families in these settings (Aboriginal Best Start Status Report, 2004; Fasoli & Moss, 2007; SNAICC, 2002; Walker, 2004). Improvements in the wellbeing of Indigenous children, families and communities require
that Commonwealth, state and territory governments pay attention to the research findings that result from Indigenous peoples’ participation in such studies. In this and similar studies, the issues of accessibility (availability of places and transport), affordability, acceptability and appropriateness have been reported as significant barriers to access and participation and must be addressed in current and future Indigenous early childhood development.

Where services for Indigenous children do exist, the lack of available places and transport are significant barriers to their access to both mainstream and Indigenous-specific services (ACOSS, 2006; SNAICC, 2002; Walker, 2004). Many of these existing services also claim long waiting lists, and both the literature and the consultations highlight that many more children could be placed if those services were expanded (Pocock & Hill, 2007). On the other hand, the establishment of services in many communities with significant Indigenous populations—typically rural and remote areas—is limited owing to the lack of trained staff and proper acknowledgement of the comparatively high costs associated with living in such areas, and high costs of child care (SNAICC, 2002).

Affordability of child care is a complex issue, particularly as it relates to Indigenous families, and involves the issues of both absolute and relative poverty, knowledge of and access to existing childcare subsidies, and the capacity of large households to meet the costs of child care where other demands on income are prioritised. These factors, whether existing in isolation or combined, make accessing child care—particularly mainstream services—very difficult, even impossible, for some families (ACOSS, 2006; Report on the Review of Aboriginal Education in NSW, 2004; SNAICC, 2002). While the consultations highlighted that very few of the participants use mainstream services—most preferring Indigenous-specific services for a number of reasons—those that did spoke of their struggles to pay their high fees. This was also an issue within Indigenous-specific services, with attempts made by many of those services to assist parents/carers with dealing with this problem. It was also clear, however, that many Indigenous families do not take advantage of the Child Care Benefit owing to, for example, being unaware of their eligibility, poor literacy skills, and/or insufficient assistance from government officials charged with its administration.

The interrelated issues of culturally safe and culturally appropriate child care are central to the choices that Indigenous families make about service provision (Fasoli et al., 2004; SNAICC, 2002; Priest, 2005; SNAICC, 2009). Many mainstream services have been reported as being either unaware of the special needs of Indigenous families; openly racist in their comments about Indigenous people; and/or judgemental of their styles of parenting (Bamblett & Lewis, 2007; Fasoli et al., 2004; Hutchins et al., 2007). Experiences such as these leave families feeling unsafe, with feelings of shame when confronted with such treatment (Report on the Review of Aboriginal Education in NSW, 2004).

While some of the issues experienced by Indigenous children and families are similar to those experienced by the mainstream population, the socio-historic context in which the Indigenous population is positioned further exacerbates these barriers (Bamblett & Lewis, 2007; Hutchins et al., 2007). The benefits of equity in access to childcare services for children are far-reaching, not only in the goal of providing for ‘fair and just treatment of all individuals’ (COAG, 2009, p. 38), but also in the enhanced outcomes of their participation in such services: their care and protection, their health and wellbeing, and their transition to school (ACOSS, 2006; ARACY, 2008; Hutchins et al., 2007; SNAICC, 2009).

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References


Background

Initially, a small-scale pilot study was undertaken to explore ways to research children’s perspectives on what being outdoors meant to them (Greenfield, 2004). This pilot study aimed to explore what a group of six four-year-old children in full-day child care thought about being outdoors, what they liked to do outside and what else they would like to have outside. The children shared their feelings and views about their outdoor playground through the medium of photography and discussions using the photos they had taken. The study was stepping into unknown territory by using new research tools that empowered the child within the process.

The voice of children was just beginning to be heard in academic research at the turn of the century (Brooker, 2001; Robbins, 2002). The 2004 study, where children were each given a disposable camera to photograph their favourite places outside, affirmed that ‘handing the camera over to the child’ provided a very appropriate means of discovering what was important to the child, as Clark (2005) and Einarsdottir (2005) had found. More detailed reflection on ways to listen to children’s views at that time can be found in Greenfield (2006). Two weaknesses of the 2004 study were overlooking the importance of observing children as they played outside and seeking the views of the children’s teachers and their families. The child is part of a wider context, not just a child with isolated views and behaviour unconnected to anything else. Additional research tools were sought that allowed further investigation of children’s perspectives in a meaningful, uncontrived way.

The Mosaic Approach

The next research project was a much larger qualitative study on children’s, teachers’ and parents’ perspectives on the outdoors, using multiple data-collecting tools such as touring, photography, observations, drawing, and photo elicitation. It was exciting to discover that on the other side of the world Peter Moss and Alison Clark were exploring similar research tools (Clark & Moss, 2001, 2005). The Mosaic Approach developed by Moss and Clark affirmed the use of multiple methods to research children’s perceptions and views. Children’s perspectives are much better understood if the researcher spends time in the setting with the participant children. This time outdoors, in the children’s world, requires the researcher to use all their senses to truly listen to the children, in order to capture the many ways they have of communicating.
The Mosaic Approach relies on children being given the time and opportunity to express themselves in different ways. This acknowledges the ‘Hundred languages’ (Malaguzzi, 1996) that children may use to explore and represent their experiences, and includes giving the child space to take the lead in the research. As Langstead (1994, cited in Clark & Moss, 2005, p. 83) describes, it is about re-establishing children as ‘experts in their own lives’. The Mosaic Approach, as its name suggests, is about piecing together multiple types of data to help understand children’s views.

It became the framework for the second study (Greenfield, 2007a), a much larger qualitative, semi-participatory case study. This was conducted one day a week over 14 weeks, with 14 children aged between two years-nine months and four years-nine months, in one early childhood centre. The purpose was to explore young children’s views on their outdoor experiences as well as the perspectives of their parents, teachers and the centre owner. The research questions were:

- What are children’s perspectives of their experiences in the outdoor setting of their early childhood centre?
- What are children’s views on the role of the teacher outside?
- What are teachers’, parents’ and the centre owner’s perspectives on outdoor experiences for children and their provision at the centre?

The investigation was undertaken using a variety of the data-collecting tools (see Table 1) adapted from those used in the Mosaic Approach by Clark and Moss (2001; 2005).

The Mosaic Approach is a way of researching that is participatory, reflexive, adaptable and focused on children’s lived experience. It occurs in the setting where the children are, is embedded in practice, and provides a valid framework for listening to children (Clark & Moss, 2001; Greenfield, 2007a, 2007b). The Mosaic Approach has three stages. Stage one is the gathering of the data using multiple research tools; the second stage is the piecing together of the information for discussion, interpretation and reflection with participants; and the third stage is where findings are used for decision making and action. The Mosaic Approach informed all stages of the investigation of children’s, teachers’ and parents’ views on being in the centre’s outdoor environment. This reflection focuses on stages one and two.

**Underpinning principles**

In order to use the Mosaic Approach in research, it is vital to understand the three main principles that are considered to underpin the approach and are at the forefront of all research undertaken with children (Greenfield, 2006). The first principle is the belief that children have ideas, feelings and opinions worth listening to (Dahler-up, Moss, & Pence, 1999). Research with young children must be situated in the belief that children seek to understand and make sense of their world. It was hoped that the children could offer information which, in combination with other evidence, would enable the researcher to see how they perceived their centre’s outdoor environment. From this stance I positioned myself, not as the expert, but as the ‘authentic novice’, a term used by Clark and Moss (2005) to describe the researcher who is genuinely seeking the child’s perspective. ‘Handing over of the camera to children was a significant aspect of building trust and helped diminish the power difference between the researcher and children. Children can become research partners if given the time and the tools to be involved’ (Fasoli, 2003). One way this was accomplished was by giving each child their own camera, whereas all other studies to date, such as Clark and Moss (2001), Cremin and Slatter (2004) and Docket and Perry (2003), had children all sharing one camera.

| Table 1. Research tools used adapted from the Mosaic Approach |
|------------------|----------------------------------------------------------|
| **Research tools** | **Comments** |
| Observation | Qualitative participant observation, narrative accounts, photographic observations and time-sampling participation charts (both scheduled and spontaneous) |
| Child conferencing/conversations | Semi-structured interviews conducted one on one or in small groups, as well as conversations children initiated |
| Photography and photo novella | Digital (researcher and children) and disposable cameras (children) used to photograph important people, places, events and things |
| Drawing | Collaborative drawings of what children like outside |
| Focus groups | Semi-formal discussion with parents and teachers |
| Interview | Semi-formal with centre owner |
| Photo-elicitation | Looking at pre-selected pictures of familiar and different outdoor places and equipment |
| Journals | Parents, teacher and researcher kept during data collection |
| Touring | Tours of the outdoor setting led by children |
| Book-making | Children selecting photos and creating their own pages |
| Documentation | Centre brochure and website |
| Audio-recording | All conversations, interviews, focus groups recorded |
The second principle is that establishing and maintaining positive professional relationships with everyone in the research setting is crucial. This principle, when kept at the forefront, ensures the researcher is always mindful that being in the children’s environment is a privilege. Research, especially in early childhood centres, must always have a benefit for the children and the teachers. This starts from negotiating entry to the early childhood settings right through to the end of the project and beyond, including the publication and presentation of findings. This involves ensuring that photographs used in the research, and those made available for public scrutiny, will do no harm.

The third principle is that, throughout the data-collection phase, the research procedures should not be too tightly constrained. Appropriate and flexible activities for eliciting the children’s views were used in order to enhance the validity of the findings, as well as to avoid stress on participants. This required a continual reconsideration of what strategies were needed to enable the children to remain in control of the photography, their drawing, their participation in the other research activities, and when and where they talked to the researcher. This can entail respecting and acknowledging that small children like to engage in conversations about all manner of things, which are often not related to what you, the adult, wants to talk about (Robbins, 2002). Respecting a child’s choice not to participate at a particular point is vital and signals to the child that you were sincere about them talking with you on their terms. The ability to reflect on strategies between each visit to the centre and to be responsive to what was important for the children at the time was imperative (Hatch, 1990).

**Discussion on research tools**

Data from the planned observations (running records, time-sampling) was useful for discovering the outdoor areas and equipment used at specific times and by whom. This data provided a general picture of the usage of the setting. The findings highlighted the fallibility of equating usage with preference if only children’s observations are being used to gather data. For example, a grass space in the middle of the outdoor area had the highest usage, but the actual equipment on it was not used as much as the large, moveable climbing equipment, and none of the children identified the middle grass space as a favourite (Greenfield, 2007a).

Targeted time-sequenced photographic observations of all the participant children, using the digital camera, captured a few minutes of their engagement with a particular piece of equipment or area. These photographs were formed into a photographic essay (Banks, 2001; Pink, 2001; Prosser & Schwartz, 1998). This provided useful data for inductive analysis (Edwards, 2005) and supported and enriched the written observations (Kervin, Vaille, Herrington, & Okely, 2006). These photographs provided evidence of the stages of an action or an experience. The photographic essays, when placed alongside the transcripts’ comments, contributed to ongoing understanding of a child or group of children (Banks, 2001; Prosser & Schwartz, 1998).

Child interviewing requires a great degree of sensitivity, so natural conversations and open-ended interviews (semi-structured/child conferencing with the children were used. Patton (2002) calls them ‘conversational interviews’. These are most appropriate for young children, allowing the researcher to ask the key questions when the opportunity arises and to be flexible and responsive (Gillham, 2000) to whatever is happening at the time and to whatever the child may want to talk about. Sometimes conversations were held with just one child, sometimes several children, and talking with children in small groups added richness to the data collected. Other studies have also found that small-group interviews revealed consensus views and facilitated richer responses (Gillham, 2000; Wiltz & Klein, 2001).

The framework for child conferencing used by Clark and Moss (2001; 2005), and an essential aspect of using the Mosaic Approach, provided the basis for the semi-structured interviews/child conferencing conversation. After some initial refining the following statements and questions were used:

- Tell me about the places outside you like the best.
- Tell me about the parts of the outdoors you do not like.
- Why do you like to go outside?
- Tell me about your most favourite place outside.
- What would you like to see changed or added to the outdoor space?
- Tell me about what teachers do outside.
- What do you think teachers should do outside?

Multiple copies of the framework questions (one for each child) stayed on a clipboard that was available nearby at all times. This enabled the recording of a child’s answers to the questions when the child chose to engage in dialogue with the researcher. The child conferencing framework allowed flexibility to revisit the questions and their responses in an informal way when at the centre. During conversations with the children, the rephrasing of the framework questions was sometimes required, as was having conversations about all manner of things, and responding to their requests and questions.

Photographs taken by the participants and researcher were used in three ways: (1) as ‘aides memoires’ in the course of fieldwork; (2) as sources of data in their own right; and (3) as prompts for discussion by research.
participants (Altrichter, Posch, & Somekh, 1993; Kervin et al., 2006), all of which added to the richness of the written observations, the descriptions developed, discovering the children’s perspectives on outdoor settings and authenticating the findings.

Photo-elicitation as a method of interviewing worked much more effectively than expected, as found by Clark and Moss (2005), Warming (2005) and Wiltz and Klein (2001). Using assorted pre-selected pictures of equipment and outdoor play settings proved to be a non-threatening way of opening up conversations and gave an insight to how the children felt about outdoor experiences not provided within the centre setting or that the researcher had not been around to observe. Each picture was numbered and recorded on a master sheet. As children indicated whether they or not they thought they liked to play with that particular piece of equipment or in that natural outdoor space, it was noted. This master sheet also stayed permanently on the clipboard. All the children made clear choices as to what they liked/disliked that stayed true during subsequent sessions. What had not been anticipated was that looking at the assorted pictures would be such a social event, a time when the children sought each other’s opinions.

Some of the most satisfying moments in the study were those when the children took complete control of the data collection and the researcher became very much a participant, under their direction—‘record this’, ‘photograph that’, ‘write this’, ‘do that’. Most memorable were the times when two of the boys took over the role as ‘interviewer’ of the other children: ‘Do you like this?’, ‘Who likes this …?’ ‘Who loves that …?’. On occasion this went on for 30 minutes. They proved to be effective interviewers of each other, and this is a research tool worth exploring further.

Photo Novella is about handing the camera over to the child. Each child having their own disposable camera to use seemed to be an empowering learning experience for all children and validated the decision to not restrict them to only a few frames, as seems to be the trend in many studies (such as Clark & Moss, 2001; Dockett & Perry, 2003). Empowering children in this way also means the researcher does not have control of what is photographed; the children are providing the data. The children were excited and proud to have their own camera. This seemed to give them a sense of real importance, and even more so when they got to use the researcher’s digital camera. The cameras at the centre were for teachers’ use only at that time. Photo Novella proved to be a highly effective research tool in providing another avenue for children to communicate their perspectives besides the spoken word.

Through the children’s photographs it was discovered how much notice they take of the natural world. The natural elements of the outdoor environment were the most photographed. This finding is consistent with other studies where children have taken photos of the important places and people in their early childhood centres (Clark, 2005; Einarsdottir, 2005; Greenfield, 2006). Not only did the children’s photographs offer unrivalled information in understanding the children’s perceptions (Brooker, 2001), Photo Novella proved to be an enjoyable experience and one that has subsequently led to children discovering a new interest and area of expertise. This project empowered the children to see themselves as competent in taking photographs. As the birthdays of several of the participant children occurred at this time, it was good to see that grandparents and parents gave cameras as gifts to these children.

Talking with children about their photographs was spread over many weeks, as they finished using their film on different days. This allowed time to be spent with individual children or naturally forming small pairs/groups looking at their pictures together and talking about them. Several parents had commented that their children talked a lot about their photographs at home. Children showed their photographs and talked about them with other children and teachers. Surprisingly, though, looking at their own photos with others did not generate as much discussion as had been anticipated. This was disappointing in some ways, but at the time there was a tension between wanting children to talk about their photos and respecting their responses such as short answers, nods, smiles and grins. In asking them to photograph the things and places they liked outside, they had indeed done as asked; it was a matter of trust that their photos were of the places, spaces and people they valued most. Certainly this assumption has been validated by the findings from the other data sources and findings from similar studies, such as those of Clark and Moss (2005) and Einarsdottir (2005). However, in hindsight, the strategy Hart (1979) used of asking the children to order their photos from most favourite to least, may well have been a more effective strategy to promote discussion.

Collaborative drawings added a valuable piece to the mosaic of finding out children’s perceptions of the outdoor setting that would otherwise have been overlooked. In particular, the inclusion of natural elements in their drawings became highly significant, especially when analysed in combination with the audio-taping of their conversations while drawing. Other researchers, such as Clark (2005) and Dockett and Perry (2003), have also found there is more to gain from listening to young children’s talk during the drawing process rather than afterwards.

Touring or ‘walking interviews’ have been used successfully in several of the studies mentioned (see Clark & Moss, 2001; 2005; Dockett & Perry, 2003) and this method was particularly useful with the younger
children. As we walked, assistance could be given with winding on the film in the disposable cameras, which was quite hard to do for some of the youngest participants, while talking about what was capturing their interest and about other things. The physical nature of walking was in line with what other researchers had found, that children like to go to the places they are talking about (Clark & Moss, 2001; 2005; Dockett & Perry, 2003).

Audio-recording was an exceptionally valuable research tool in relation to its complementary use with other tools. The children appeared very comfortable with the tape recorder and either ignored it or specifically asked to be interviewed so their voices could be played back. The audio-recorder became just another expected item like the camera and research journal.

Making books has a long tradition in early childhood education practice in New Zealand, and is becoming recognised as a useful tool when researching with young children (Clark & Moss, 2005; Dockett & Perry, 2003). This tool was not part of the original research design but, as the study was drawing to a close, its use seemed an appropriate way of further listening to children and signifying that the time spent together was nearly over. Disengaging should be considered as important an aspect of the research design as any other (Berg, 2004; Bryman, 2004). Book-making provided a tangible way of disengaging from that phase of the study.

The most noticeable aspect of the book-making was that the children were so excited to see so many photos of themselves, photos that had been taken by other children or the researcher. As they created their individual pages of the book it became apparent that having pictures of themselves on their own page was very meaningful. The younger children had seemed a little disappointed that they could not find themselves in their own photos. The youngest participant asked, when looking at his photos, ‘Where is Hamish?’ By the provision of many copies of photographs the researcher and other children had taken, the younger ones were able to include photographs of themselves on their pages. The book became a wonderful way for the children to see themselves engaging in the outdoor setting, doing what was most important to them, ‘playing’. Each child received a photocopy of the finished book and the centre was given the master copy.

Focus groups provided an informal way of interviewing the parents and teachers (Bryman, 2004). The views of the significant adults in the children’s lives contributed to the understanding of the children’s behaviour in the outdoor setting and of the connections between home and centre. The parent focus groups also provided opportunity for the parents to hear each other’s view about the outdoors, discovering much in common. All the participant parents perceived the outdoor environment of the early childhood centre and the wider outdoors as having a highly important role in the holistic development of children.

**Journal-keeping**

Keeping a reflective research journal proved worthwhile and is viewed as vital in qualitative participatory research (Altrichter et al., 1993; Gillham, 2000). A book with a purple cover, with glittery green and pink butterflies, was chosen for our journal so it would be appealing to children. Right from the first day the children were attracted to the book and commented on it, asking what it was for. This provided a good vehicle for explaining what the research was about, as well as for self-reflection on the research over time. It was where things that needed to be done were recorded, questions to ask and notations about new ideas. It became the place where the small drawings by some of the children were stored, and it was useful in the data analysis and write-up phase.

The parent journal provided lots of insightful data, especially for those children who did not talk very much while at the centre, yet told their parents about what they liked to do outside when at the centre. The parent journal also provided a greater understanding of the sorts of outdoor activities the family engaged in. It was especially useful for those parents who could not attend the focus group meetings. A semi-formal interview was used when talking with the centre owner about her views on the role and value of the outdoors for young children.

**Reflection on processes**

**Multiple roles of the researcher**

The first role of the researcher was to participate by staying sufficiently detached in order to observe and analyse but needing to build trusting relationships with children, teachers and parents (Merriam, 1988, 1998). For example, it was explained to the children that it was fine if they did not want to talk at a particular time. Several children on occasion said they were busy right now and would look at the pictures or talk later, and their choice was always respected. Parker (1984), cited in Browning and Hatch (1995), warns against using adult status to coerce children to participate or respond, as the way the interviews are structured could have powerful effects on children’s responses.

Second, Gold’s (1958) classification of ‘observer as participant’ (Bryman, 2004) also fitted the researcher’s role and aligned with the Mosaic Approach. Spending a minimum of three hours one afternoon a week for 12 weeks allowed the researcher to be available to the children and become ‘part of the furniture’, so to speak. ‘Observer as participant’ also allowed for observation of the natural play and behaviour of the children outside. Third, as time went on, the researcher took on an increasingly active role while maintaining
distance. This involved trying to be helpful to the staff rather than a hindrance; for example, helping to pack away the outdoor equipment at the end of the day. This role of the participant researcher is described as active membership within the setting (Merriam, 1988).

The fourth role included being a ‘reactive participant’ (Corsaro & Miller, 1992) when approached by non-participant children. This required responding to the children, listening to their views, letting them take a photo with the digital camera but not recording their views or retaining their photos. It also meant directly intervening in a situation only if there was physical danger, but engaging in small tasks at children’s requests, such as holding a toy for a child or taking off a sweater.

The Mosaic Approach is not the easiest or simplest way to research. Having multiple roles along with multiple data-collection tools adds to the complexity of the task. It meant a far greater time commitment in order to be in the centre with the children regularly and resulted in a vast amount of data to analyse. However, by using the Mosaic Approach, the triangulation and integrity of the findings were exceptionally high.

**Trustworthiness and situated validity**

The notion of trustworthiness or validity stems from ensuring that the perceptions of the participants rather than those of the researcher take precedence (Siraj-Blatchford & Siraj-Blatchford, 2001). Combining visual media with participant observations enabled an in-depth exploration of what ‘being outside’ meant to the participants and provides triangulation. This in turn led to being able to assess and justify the extent to which the children shared a particular attitude or opinion.

The use of visual documentation made the competence and the feelings of the children more visible, trustworthy and transparent, in ways that are sometimes more powerful than the written word (Warming, 2005). Further, the Mosaic Approach provided a platform that gave greater visibility to the children’s voices (Clark & Moss, 2005), and provided ‘situated validity’ (Denzin & Lincoln, 2003). The reporting of the findings must privilege the participants’ voices.

**Flexibility and inclusion**

The entire process was one of critical inquiry as the researcher dealt with whatever each day in the centre brought forth and whatever the study revealed. The initial idea of working with just 12 participants, in small groups of three or four children at a time, was discarded fairly quickly. This was after finding out that there were other children very keen to participate and also discovering that all the children aged over two years shared the same outdoor space and had free access to this space most times during the day. This situation required engagement in some way with all the children who approached the researcher and showed an interest in what was happening. Inclusion of non-participant children called upon all my skills as a teacher and parent but was non-negotiable given the principles that underpinned the study.

Inclusion is justified through the following example of child X, who became intensely interested when the children started to use the disposable cameras. He was offered the digital camera to use, as was successful with other non-participant children on several occasions, but he kept looking for and asking where his camera was, referring to the disposable cameras. The teachers were asked if they were agreeable for a disposable camera being purchased for him to use solely for his own benefit, not for research purposes. Agreement was given, influenced by the fact that he was often excluded by the other children outside, and the teachers and researcher felt that having his own camera may support and foster his inclusion within the larger group. The research journal entry for November 2nd reads:

*Child X approached me as soon as he spotted me, asking, as usual, if I had a camera for him, and I was so delighted that I had I bought a camera for him – he was absolutely rapt – huge smile, showing it to all the other children, and went off taking his pictures. He used up all the film and brought it back to me. I explained that I had to get the film developed and would bring his photos in an album next week.*

He carried the album around, proudly showing his photos to everyone. Upon returning to the centre two months after the completion of the project child X ran up, a big smile on his face, and wrapped his arms around the researcher’s legs. A heart-stopping moment in knowing that the decision to include him (yet not include technically), had been the right one.

**Disengaging: Bringing closure**

Disengaging was something that needed serious consideration. It is very disappointing that ways to bring long-term field work to a close, for both researcher and the participants, have been under-described and under-discussed in the research literature. There is a need to bring closure to the fieldwork stage of the project for all involved, particularly when young children are participants and responsive, reciprocal relationships have been established and maintained over time. Berg (2004) points out that exiting the field setting ‘involves two distinct operations: first, the physical removal of the researchers from the research setting and, second, emotional disengagement for the relationships developed during the field experience’ (p. 187). So creating a book with the children about our time...
together not only helped bring closure, but also became part of the data collected. The book was given to the centre, but one of the children said she would not be able to look at it because she was entering school, so she and every participant child got a photocopy of the original. Giving the books to each child was an exceptionally meaningful and precious moment and felt like the fieldwork stage was well and truly over.

Analysis phase

The Mosaic Approach in the analysis phase meant that it was an holistic one that combined the study of the individuals and groups with the study of the outdoor environment itself (both spaces and equipment), and which together formed a large study of the whole (Patton, 2002). Using inductive analysis which involved discovering patterns, themes and categories within the data and creating multiple mosaics, the findings emerged (Bryman, 2004; Patton, 2002), thereby creating a summary mosaic of preferences. These summary mosaics emerged for each child, from (1) all data gathered from children and (2) all data sources (researcher observation, parents and teachers). The Mosaic Approach supported qualitative data analysis, requiring an interpretative process that began with data collection and continued until the conclusion of the research. It was a process of trying to blend together and ‘make sense of the various images, sounds, and understandings’ (Denzin & Lincoln, 2003, p. 6).

Conclusion

On reflection it is apparent how important the more intuitive aspects of participant observation are. There is no argument that participation and listening are extremely complex and problematic concepts; and enabling children to describe what being outside meant to them, in their own way, in their own time, using so many different tools, was a demanding and challenging task as noted by Pramling Samuelsson (2004).

When working with young children, researchers need to be mindful of the reality that conversations about other things will occur. Children are often more open and trusting when the adult is honest with them. That honesty applies to the researcher explaining to the children why the research is being done and informing them that the time spent with them is coming to an end.

Challenges arose, but what was important was facing them in a flexible, adaptive way.

This paper has highlighted the importance of using a diverse range of research tools, as advocated in the Mosaic Approach. Of particular value was using Photo Novella and photo elicitation, as a means of gaining children’s perspectives. The use of non-verbal research tools such as photography, drawing, touring and observation proved immensely valuable, especially for the more reticent children. Providing children with several ways to share their views enabled the more taciturn children to register their interest (Carr, Jones, & Lee, 2006; Gollop, 2000).

The Mosaic Approach provides an effective, flexible and authentic methodology. By adapting and adding to the methods used by Clark and Moss (2001; 2005), the researcher was able to further explore other research tools that were empowering for participants and provided various ways for them to share their views. The use of multiple tools resulted in data which significantly increased the trustworthiness and authenticity of the research findings.

References


An exploratory investigation on the influence of practical experience towards shaping future early childhood teachers’ practice in the arts

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**ACCORDING TO THE NATIONAL** Education and the Arts Statement (Ministerial Council for Education, Early Childhood Development and Youth Affairs, 2007), all children and young people should have a high-quality arts education. The statement also supports the notion that arts experience can be the first meaningful point of engagement in the education system for students. To achieve quality arts education, teachers require a high level of skill and training (Andrews, 2004). This suggests teachers require significant training to help develop a strong sense of perceived capability towards teaching in the area of arts education.

This study explores the beliefs of early childhood teachers in their first three years of teaching. Focusing on self-efficacy beliefs, this study used Bandura’s (1997) model of self-regulated learning as a base from which to consider sources of an early childhood teacher’s sense of agency related to teaching the arts. Findings suggest teachers develop beliefs about arts education during practical experience that shape attitudes towards teaching arts in the early years. These findings have important messages for improving arts education.

**Introduction**

Early childhood teachers gain skills for teaching the arts in teacher education.

Without sufficient teacher training in music and the arts, teachers can develop negative perceptions about their own confidence and competence (Bartel, Cameron, Wiggins & Wiggins, 2004). The teaching of the arts is also influenced by life experience, personal experience and perceptions of confidence (Robinson, 2001).

Recent national inquiries suggest the standard of arts teaching within Australia is inadequate (DEST, 2005; DEST, 2008). In 2005, the National Review of School Music Education (DEST, 2005) raised a number of questions in relation to the training generalist teachers receive in music. The review highlighted a decline in the number of hours given for generalist primary pre-service education courses (Pascoe et al., 2005), suggesting pre-service teachers did not have adequate time to enhance their teaching skills in music. Similar findings were made in First We See: The National Review of Visual Education, highlighting the decline of visual art education in teacher training (DEST, 2008). Both reviews highlight the absence of status and support for music and visual arts in most teacher education programs for primary educators, calling for improvement in pre-service teacher training and ongoing professional learning. Further investigation of beliefs towards teaching the arts is therefore necessary in teacher education and during professional development.

In this paper, we focus on the factors that affect quality arts education through the lens of self-efficacy. We examine how self-efficacy information is likely to influence the arts education practices of beginning teachers. In particular, we look at the influence of supervising teachers.

**Theoretical connections**

Self-efficacy is defined as ‘beliefs in one’s capabilities to organise and execute the courses of action required to produce given attainments’ (Bandura, 1997, p. 3). The construct of teacher self-efficacy is grounded within self-efficacy theory, emphasising that people can exercise influence over what they do (Bandura, 2006). A teacher’s beliefs about the arts will therefore determine the quality of arts education in the classroom. Self-efficacy develops over time and through personal and vicarious
experiences (Bandura, 1997). Beliefs are created through decisions influencing actions, attitudes, emotions and thoughts. Thus, self-efficacy acts as a motivational construct, determining the actual amount of effort an individual will bring to the task of teaching as they assess their ability to perform the task successfully (Tschannen-Moran and Woolfolk Hoy, 2001).

Teacher self-efficacy has been related to greater commitment to teaching (Coladarci, 1992), greater levels of planning and organisation (Allinder, 1994), decreased teacher burnout (Brouwers & Tomic, 2003), a wider variety of teaching material with the desire to search for a new teaching formulae, and the use of innovative teaching methods (Ghaith & Yaghi, 1997; Wertheim & Leyser, 2002). Woolfolk Hoy (in Shaughnessy, 2004) suggests that, if teachers seek to help students increase their academic and self-regulatory self-efficacy, they should first attend to the sources underlying their own teacher beliefs.

Teacher self-efficacy beliefs are influenced by four sources, including (1) mastery experiences; (2) vicarious experience (modelling); (3) verbal persuasion; and (4) emotional arousal (Bandura, 1997). These may happen simultaneously or in isolation. Mastery is considered the strongest source (Bandura, 1997; Tschannen-Moran & Woolfolk Hoy, 2001). When an experience (or performance) is perceived as successful, self-efficacy is raised. When the performance is perceived a failure, self-efficacy beliefs are lowered. The level of emotional arousal (either excitement or anxiety), adds to the feelings of mastering a task. Vicarious experiences are associated with the modelling of a task. If the observer can identify the skills with the modeller, teacher self-efficacy can be enhanced. The final source, verbal persuasion, consists of discussions around the task being performed. The potency of verbal persuasion depends on the credibility, trustworthiness and expertise of the persuader (Bandura, 1997).

Within arts education, research has explored the influence of specific knowledge and skills to teacher self-efficacy. Previous research by Temmerman (1997) and Bartel and Cameron (2002) has shown that a perceived lack of competency to teach the knowledge and skills required in music was a significant internal factor affecting teachers’ perceptions of their musical ability. Furthermore, in a comparison between one New Zealand and one Canadian generalist teacher, self-efficacy towards music, levels of competency and self-efficacy clearly influenced curriculum (Bartel et al., 2004), with few teachers able to show an understanding of students’ musical thinking. These two teachers were also unable to make judgements ‘about the value or importance of the consequences of an action for the arts’ (Bartel et al., 2004, p. 88). These results suggest teacher self-efficacy strongly influences the ways arts education is taught in classrooms.

Focus of study
This study focuses on the following two questions:
1. What sources of arts education self-efficacy information do beginning teachers receive during practical experience?
2. How are these sources of self-efficacy information likely to influence their own arts education practices?

The participants
For purposes of this study, beginning teachers (defined as teachers in the first three years of their career since graduating from a teacher education institution) working in early childhood education from both private and public schools in Queensland, Australia were invited to complete a questionnaire on teacher self-efficacy in relation to arts education. Ultimately, 21 out of 60 questionnaires were returned from participants, a response rate of 35 per cent.

Participants answered a ‘call for participants email’ sent though the Beginning Teachers Association to all early childhood beginning teachers. They were current members of this organisation.

Participants were assured that the survey was anonymous. They were sent an online survey that could be completed outside of school hours.

Research methods
The survey consisted of 10 open questions designed to elicit descriptions of beginning teachers’ experiences with arts education, as part of the professional experience component of their teacher education program. During this time, the then pre-service teachers were supervised by a teacher with at least three years’ experience.

Results were analysed using content analysis, ‘a research technique for making replicable and valid inferences from texts to the context of their use’ (Krippendorff, 2004, p.18). An adapted version of Cavana, Delahaye and Sekaran’s (2003, p.171) 15 stages of content analysis was used as a guide to identify key themes and meanings. Coding for ‘manifest content’ (Wallen & Fraenkel, 2001) was used, acknowledging what was directly written in the online survey.

Results of the content analysis
In general, the participants described negative experiences that had occurred during the professional experience component of their pre-service teacher education program. Overall, these experiences were shaped by either supervising teacher practices (a form of modelling), or supervising teacher feedback (verbal persuasion). The
participants also talked about the tensions they saw between the arts and other subjects, showing links to vicarious experience and emotional arousal (contextual influences). Tensions were shown by supervising teachers, with the curriculum being overcrowded and a greater focus placed on the teaching of literacy and numeracy. This appeared to create negative teacher self-efficacy beliefs for teachers about the arts in school.

Three main categories emerged from the content analysis:

1. supervising teacher practice (vicarious experience),
2. supervising teacher feedback (verbal persuasion), and
3. the profile of arts as a subject experienced by the participant (vicarious experience).

Each category is discussed below.

**Supervising teacher practice**

The first category supported the proposed vicarious experience as a source of efficacy (Bandura, 1997). Vicarious experiences (also known as modelling) allowed participants to personally experience arts education teaching practices. Experiences described by participants showed a clear lack of mastery experience in supervising teachers. This suggests that supervising teachers did not model suitable arts education practice.

One beginning early childhood teacher described a negative experience with a supervising teacher in a kindergarten. She felt disheartened that arts practices were not being modelled within this particular early childhood education setting:

*I never saw it used on any teaching prac.* (Beginning Teacher, C).

*Many of my prac teachers did not do the arts* (Beginning Teacher, J).

These findings suggest the participants did not experience positive modelling during teacher practical experience that would lead to positive teacher self-efficacy for the arts. Without adequate opportunities for positive vicarious experiences, pre-service teachers may need to draw on other sources of efficacy to develop perceived capabilities towards teaching the arts.

**Supervising teacher feedback**

Some beginning early childhood teachers described hearing negative comments (negative verbal persuasion) from their supervising teacher regarding the teaching of arts education. The participants who described these experiences felt that the supervising teacher did not value the arts, which influenced the beginning teachers’ values in relation to the teaching of the arts in early childhood classrooms.

One beginning teacher described a negative experience with a Year 1/2 classroom teacher:

*On my first prac at a public state school I was involved in art groups that consisted of all of things that I had avoided in my work in early childhood centres. Stencilled outlines of horses that children had to collage over, bubble blowing painting... where was the freedom of expression in that? When doing a maths lesson in subtraction for a Year 1 and 2 composite class I sang 10 green bottles with the class. The children sang along happily but my supervising teacher told me to keep the noise down so as not to disturb the children next door* (Beginning Teacher, F).

Another beginning early childhood teacher also described the negativity from a supervising teacher when she tried to teach the arts to students:

*My teacher thought the arts weren’t as important. When I started teaching them, I got in trouble* (Beginning Teacher, I).

Verbal persuasion appeared to influence the self-efficacy of the participants during their practical experience. The verbal feedback given by supervising teachers appeared to shape current understandings about the arts in the early years classroom.

**The profile of arts as a subject**

Typically, early childhood educators do not have formal training in the arts (Eisner, 1988; Eisner & Day, 2004) in pre-service education programs, but are encouraged to ‘integrate’ arts into the core curricular areas. Beginning early childhood teachers wrote about the place of arts in

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the curriculum while on their professional experience. These teachers suggested that this lack of exposure to the arts as part of the curriculum impacted upon their current beliefs and may potentially have an impact on their future practice.

One participant suggested that some teachers de-intellectualised the arts, making it a ‘fun’ subject:

*Many teachers allow students to develop this ‘bludge’ mentality by not valuing the arts themselves. It is a difficult battle to reform students’ opinions* (Beginning Teacher, L).

One beginning teacher also wrote about poor teacher training leading to inadequate teaching of the arts in schools. Subsequently, she suggested generalist teachers teach only certain subject areas:

*I don’t think teachers that have been around a long time see the benefit of it or have the training or ability to implement it. They just teach reading, writing and maths* (Beginning Teacher, M).

The portrayal of the arts would lead the supervising teacher to model the teaching of the arts with certain characteristics. The pre-service teacher would see this negative modelling and may also start to develop negative beliefs about the arts.

### Summary

What is clear from comments from the 21 participants is that there is a negative arts profile in some early childhood classrooms in Queensland, Australia. These experiences were based on professional experience in classrooms under the guidance of supervising teachers during pre-service teacher education programs. It is unclear to what extent these negative experiences have shaped the participants’ current teaching practice as beginning early childhood teachers. While some of the participants suggested it influenced their teaching of the arts as a beginning teacher, without observation of the teacher it is hard to provide an empirical recount. What is known is that participants remembered the negativity towards the arts while on practical experience.

### Final thoughts

The previous results provide an interesting starting point for analysis in the investigation of beginning early childhood teachers’ beliefs on their pre-service teacher education. It appears that supervising teacher practices, supervising teacher feedback, and the profile of the arts as a subject contribute to a teacher’s self-efficacy. The previous discussion, which focuses on beginning early childhood teachers’ perceptions of their arts education experiences in their pre-service teacher training, provides an insight into sources of self-efficacy information about the teaching of arts education.

Without positive experiences created through Bandura’s (1997) proposed sources of efficacy (mastery experience, vicarious experience, verbal persuasion and emotional arousal), beginning early childhood teachers may feel they have little capability when teaching the arts in their own classroom. In the long term, these experiences may contribute to lower teacher self-efficacy for the arts, creating a cyclical problem of failure for arts education in early childhood.

From this study, a major concern of teacher-educators appears to be helping pre-service teachers understand the importance of arts education in the early years and to critique experiences while on practical experience. Based on the data collected, it appears participants remember the negative events with arts education. This could suggest that, since these events were remembered, they are held as possible sources of efficacy for the beginning teacher.

From this research, two issues are raised: (1) teacher education and (2) professional development. First, how do universities control how supervising teachers demonstrate quality arts education practices? If supervising teachers’ self-efficacy for the arts is low, how can they be equipped to model and critique suitable arts practice in the classroom? Their lack of teaching in the arts will then affect the beginning teacher they are supervising, possibly creating a continual cycle of failure. As Bandura (1997) suggests, giving teachers a sense of efficacy is critical if they are going to even attempt the task.

The second issue raised is ensuring professional development opportunities in arts education for early childhood teachers. To improve teacher self-efficacy for the arts in early childhood greater support is needed in the form of professional development for early childhood teachers working in schools and early childhood centres. Through ongoing professional development, these teachers can begin to value the arts in the decisions about implementing curriculum.

In conclusion, current practices in arts education courses within early childhood teacher education must be reviewed if teachers are expected to learn skills they can use in the classroom. Closer links must be made with supervising teachers. This study has also raised questions about future research for arts education in the early years. For example, what are the current influences on teacher self-efficacy for early childhood teachers in schools? Can professional development and community involvement help improve arts education in schools? Can a generalist teacher have strong teacher self-efficacy for all key learning areas? Such research would provide teacher-educators, schools and policy-makers with evidence of crucial periods where beginning early childhood teachers require greater support. This would allow teacher self-efficacy for arts education to be supported throughout the beginning phase of teaching.
References


Exploring and evaluating levels of reflection in pre-service early childhood teachers

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THE PURPOSE OF THIS STUDY is to add to the current literature that focuses on approaches to assessing and evaluating reflection. It adds to this literature by developing and trialling a method of assessing reflection occurring in student teachers’ reflective tasks. The reflective tasks were taken from a Self-Assessment Manual (SAM) developed specifically for early childhood practitioners and student teachers, and piloted with six early childhood student teachers. Through the application of an adapted version of the Boud, Keogh & Walker (1985) framework (Sim, 2006), six levels of reflection processes learners might experience were identified and responses aligned to these stages. Initial results show this model was able to provide an effective framework for objectively evaluating student teachers’ levels of reflection, enabling a defined level of analysis for the assessor. What is also noted is the correlation between the type of reflection task and the reflection level demonstrated in the student teacher responses. Introducing the student teachers to the framework so they can self-assess, in order to deepen their understanding of their own reflection levels, is the next step of the project.

Introduction

The benefits of reflection as a practice for teachers has been well-documented (Artzt & Armour-Thomas, 2002; Margolis, 2002; Mayes, 2001; Moore, 2002; Rock & Levin, 2002; Swain, 1998), along with the understanding that the ability to systematically and deliberately use reflection as a learning tool in professional practice requires conscientious development over time in pre-service and post-service courses (as cited in Atkins, 2005). Requiring student teachers to take part in activities that involve some form of reflection is an accepted practice in teacher training courses; however, Plack, Driscoll, Blissett, McKenna & Plack (2005) remind us that “While reflection is generally accepted as a critical component of learning from experience and essential to professional education, limited research has been conducted to address the issue of how to assess reflection’ (p. 210). This is something many teacher educators grapple with when having to mark or grade reflective tasks. Student teachers are asked to reflect on their experiences but then there is often no sure way of evaluating these reflections, owing to the subjective and personal nature of these reflective tasks. This study attempts to address this dilemma by applying a model able to identify and categorise the level/s of reflection students are engaging in. It is hoped that this framework, once tested by the student teachers themselves, will provide them with a greater insight into their own reflection processes, ultimately enabling them to strive for a higher level of critical reflection. With assessment driving much of the learning process, there needs to be a sound way of assessing reflection to remove the problems often related to the notion of assessing reflective tasks for both educators and students (Sim, 2006).

While there appears to be many definitions of reflection in the literature, Atkins and Murphy (1993) maintain that there are elements which are essential to the reflective process; an awareness of uncomfortable feelings and thoughts which is followed by a critical analysis of both the feelings and the experience. It is deemed that, through this analytical process, a change in practice occurs. The critically reflective teacher provides space
for ‘new possibilities to be explored and realised’ (Moss & Petrie, 2002, p. 145). In our experience, simply completing specific reflection tasks does not in itself ensure that reflection takes place, as often the reflection is more of a description about an experience devoid of the critical process of analysis.

Schön (1983; 1987), Mezirow (1990), Brookfield (1995), Barnett (1995) and Fisher (2003) identified characteristics afforded to critical reflection, such as the ability to articulate a contextual awareness of one’s own position through identifying the impact of one’s own influences and background. To be able to identify one’s own values, beliefs and assumptions, consider other perspectives or alternative ways of viewing the world: being able to identify what perspectives are missing from one's account; identify how one’s own views can have a particular bias that privileges one view over another; perceive contradictions and inconsistencies in one’s own account of events; and imagine other possibilities (i.e. a capacity to envision alternatives, Fisher, 2003, p. 317) have all been noted as important characteristics to add the critical component to reflection. These characteristics are often not clearly identifiable in student teachers’ work and, as such, a judgement about the criticality of their reflection is problematic. The very act of assessment dictates setting of criteria, which, according to Boud, is inappropriate, as ‘effective reflective practice needs to be unboundaried’ (as cited in Bolton, 2001, p. 83). There is a mismatch between reflection and assessment, since the nature of reflection requires one to question pre-suppositions and uncertainties and yet the very same reflective task is often being assessed for understanding of subject matter (Boud & Walker, 1998). Hence, education researchers question the value of assessment of reflection while others caution that the very process of creating assessment criteria will stifle the spontaneity of reflection (Beveridge, 1997; Sumison & Fleet, 1996).

**Rationale for our study**

In order to produce reflective practitioners, we feel a need to have some type of measure to assess a student’s capacity to reflect, which will also allow for feedback on learning to students, educators and organisations (Plack et al., 2005; Bournier, 2003). Once a successful measure is developed and tested, student teachers could be made aware that there are different levels to the reflective process and how their progress in reflective thinking fits within the levels. Working in this way, we believe, will help them develop a better understanding of the process. By making the process explicit, it is hoped they will begin to internalise the process which will transfer in time to their everyday practice as a teacher. As Fisher (2003, p. 314), referring to the work of Fay (1987), states ‘human beings, through critical self-reflection, can come to see the true nature of their existence and act to change their situation, based on this understanding’. Before this is possible a suitable measure must be established.

**Developing a reflective evaluation framework**

There are studies which have drawn on both qualitative and quantitative methods in an attempt to evaluate proficiency in the reflection process, with varying rates of success. Like Bournier (2003), initially we saw one way of progressing the idea of developing a framework to apply in the assessment of the reflection of our students as separating content and process, which would allow for assessment of the reflective process without judging the subjective nature of the reflection. Studies which appear more successful draw on the work of Boud et al. (1985), who defined stages in the reflective processes, and Mezirow (1990), who developed a theoretical framework around the components of the reflective process. A study by Wong, Kember and Chung (1995) combined these two concepts while another study (Plack et al., 2005) added a time dimension (reflection in action, reflection on action, reflection for action), drawing from the work of Schön. However, a study by Williams, Sundelin and Foster-Seargeant (2000) chose to exclude Mezirow’s categories, saying they ‘preferred to focus on the process of reflection rather than on what they suggest to be categorization of the different types of reflection’ (Plack et al., 2005, p. 205).

We decided that, for our study, we would use levels of reflection, and chose an adaptation by Sim (2006) of the framework of Boud et al. (1985) which had been used successfully with health care professionals undertaking further training. Boud et al. (1985) proposed a generic framework of reflection that describes six levels of reflection processes learners might experience. The categories relate to the stage of reflection and returning to experience, attending to feelings, association, integration, validation and appropriation. These are hierarchic in nature: returning to experience, a basic recounting to appropriation where knowledge is internalised and leads to changes in behaviour, the learner’s affective state and perspectives. Following is a brief description of each level.

**Level 1: Returning to experience**

This is an essential step of recounting past experiences so that subsequent reflections are based on actual recollection of events. This usually entails describing events and activities, and while not considered reflection as such, it is a precursor to reflection.
Level 2: Attending to feelings

This level recognises the importance of feelings in facilitating or obstructing the learning experience since ‘utilising our positive feelings is particularly important as they can provide us with the impetus to persist in what might be very challenging situations’ (Boud et al., 1985, p. 29). Allowing learners to articulate their feelings helps them understand their emotions in the learning context, an important characteristic of self-directed learners (Patterson, Crooks & Lunyk-child, 2002). Student reflections would demonstrate awareness of their feelings at the beginning of the reflective experience and recognition that these feelings can either assist or hinder the learning process.

Level 3: Association

This refers to relating new knowledge to pre-existing understanding, feelings or attitudes, and involves the consideration of multiple perspectives. Reflections at this level show how perhaps exchanges at discussion forums, etc. have forced the student to consider multiple perspectives by reconciling new ideas with existing workplace knowledge.

Level 4: Integration

This involves synthesising old and new knowledge, resulting in the formation of new insight. Reflections show that, as a result of the knowledge the student has acquired or been made more aware of, came the ‘new’ insight.

Level 5: Validation

Testing and verifying the proposed synthesis for (internal) consistency are characteristics of this level. Reflections reveal how the students, instead of simply using motherhood statements, deliberately conceptualise ways to incorporate a new concept.

Level 6: Appropriation

This calls for using the knowledge together with one’s own. Reflections show how the student is using the process of reflection in her awareness and daily approach towards work, leading to outcomes ranging from changes in behaviour, changes in the learner’s affective state and changes in perspectives (perspective transformation or transformative learning—Brookfield, 2000; Mezirow, 1990). It involves ‘becoming critically aware of how and why our presuppositions have come to constrain the way we perceive, understand and feel about our world’ (Mezirow, 1990, p. 14). It requires a major shift in one’s basic assumption and a consequent change in perspective and personal paradigm. Changes in behaviour could be viewed as Action outcomes, changes in the learner’s affective state as Affective outcomes and changes in beliefs as Perspective outcomes.

Action outcomes involve a new way of doing things, development of new skills, commitment to action and or readiness for application. This would be seen in the student’s readiness to apply her newly acquired reflective skills to action.

Affective outcomes involve a change in attitude or emotional state. It involves a ‘positive attitude towards learning in a particular area, greater confidence or assertiveness, or a changed set of priorities’ (Boud et al., 1985, p. 34). The student’s changed attitude to wanting to find out more about a certain aspect of practice, along with her increased motivation towards learning, would be evidence of this.

Perspective outcomes involve changes in perspectives and beliefs and values. This is characterised by the student changing her perspective on reflection.

It must be noted, however, that these levels do not necessarily occur in sequence, neither do learners need to experience each level of the reflective process. In fact, validation and appropriation, which form the higher levels of the reflection process, could also be viewed as a form of reflective outcomes.

Another factor to consider is that assessment tasks, unless thoughtfully designed, may not make it easy to identify subtle shifts in student teachers’ transmission of knowledge or how this impacts on their practice. This highlights the importance of designing the reflective tasks and the questions that will guide this task.

Methodology

This research project applied Sim’s (2006) adapted version of Boud et al.’s. (1985) model of assessing reflection to the work of pre-service early childhood student teachers. The reflective evaluation framework was piloted with a group of six early childhood student teachers, who undertook reflective tasks taken from a Self-Assessment Manual (SAM) (Raban et al., 2007). This manual, specifically designed to guide early childhood practitioners and student teachers in the reflection process, provides the opportunity to think through and record past and present training and professional experiences, and plan for future professional growth and development. The student teachers, through guided reflection, undertake a series of tasks encouraging the documenting of past experiences, reflection on beliefs and values in relation to teaching and learning, mapping current practice across theoretical perspectives, and setting challenges for the future. The tasks are designed to capture thinking around practical experiences, influences on development and knowledge acquisition, and feelings towards both the reflective process and their own
journey as a developing professional. At three points in the manual the student teachers share their task reflections with each other in small group forums. The SAM is divided into four sections as follows:

**Section 1: Past experience**

This section asks participants to recount motivations for choosing a career path in early childhood, the mentors and role models who have guided their development to the current point, previous work experience in the field, and previous experience that might add to their skills as an early childhood practitioner.

**Section 2: Present experiences**

In this section questions relate to the practical experiences each participant has undertaken during training in early childhood settings, the positive aspects of the combined experience in these settings (What have they been able to achieve? What have they learned?), knowledge of professional organisations that could support their own work/development in the field, and professional learning outside of their own study. Finally, each participant is asked to consider the qualities, dispositions and behaviours they believe to be needed for their future career in the field. Within this section there is an ‘Individual Reflection’ task asking for the identification of significant influences on their emerging profile as an early childhood practitioner, particular areas of professional learning that are becoming significant to them and areas thought to be a growing strength or specialisation.

**Section 3: Beliefs and values**

Stem statements to be completed by the participant around their philosophy are located in this section, leading to the articulation of personal philosophies/approaches to teaching and learning. The accompanying ‘Individual Reflection’ task asks for a summary of these completed stem statements, guiding the participant in the recognition of the most significant beliefs and values impacting on their practice. Also in this section is the task ‘Developing a Practitioner Profile’, which enables participants to map their current practice to theoretical perspectives to produce a matrix which is then reflected on to see how well this fits with personal beliefs, values and understandings.

**Section 4: Future experiences**

This section concentrates on the consideration of further study possibilities, and the identification of skills/knowledge for further development.

The six student teachers who took part in this study were part of the larger cohort undertaking a Bachelor of Early Childhood Education degree in Victoria in 2007. All written responses, as captured by the Self-Assessment Manual, became the data set after the completion and assessment of the unit, along with a post-evaluation survey of the process.

To analyse the data, Henri’s (Herrington & Oliver, 1999) thematic unit of analysis was adopted owing to its flexibility in coding data. Henri’s thematic unit refers to counting each ‘unit of meaning’ by extracting the meaning from the text without the constraint of word, sentence or paragraph limitation (Herrington & Oliver, 1999). Therefore, the length of the unit of meaning is dependent on the participants’ writing style, allowing for flexibility when coding. As the data involved participants’ learning and reflections, explicit statements were the norm, with subtle meanings a rarity. Thus the issues of increased subjectivity and low coding reliability associated with coding for more subtle themes posed less of a problem in this study (Rourke, Anderson, Garrison & Archer, 2001).

Some educational researchers maintain that using the highest level of reflection outcomes give ‘over-estimated reflective scores’, and propose instead the use of the mean reflective score of each participant as a more accurate measure (Hawkes & Romiszowski, 2001, p. 292). However, as the reflection coding recorded the student teachers sharing their learning at each stage of the topic, rather than a record of the continuum of their reflective processes, it would be inappropriate to obtain the mean reflective score from these reflection responses. In addition, the researchers were interested in finding out if particular reflective activities embedded in SAM attracted a higher level of reflective response. The results therefore give an indication of the level of reflective process experienced by each student teacher and the extent of the reflection outcomes. Thus, although this approach does not indicate the mean reflective scores of each student teacher, relying on the frequency count of the reflective process was an appropriate and adequate methodology for this study.

The adapted Boud et al. model served to inform and guide the researchers regarding the criteria for analysing and assigning the data into the reflection levels; however, coder stability and inter-rater reliability were important aspects needing to be developed before coding could begin. For reliable analysis both researchers needed to form a consensus on the criteria for each level of reflection in the model. Time was devoted to developing inter-rater reliability where the extent to which both coders, each coding the same content, came to the same decisions. To ensure inter-rater reliability, both researchers independently coded the six sets of SAM data. Attention was focused on the correct application of concept and definition of reflective process rather than on the agreement of starting and ending of the code. This is because the latter is often arbitrary and thus not a good measure of reliability (Gibbs, 2002).
This process to ensure coder stability (Rourke et al., 2001) took time, as one researcher was familiar with the Self-Assessment Manual and early childhood content delivered within the unit and course, while the other researcher was more experienced with applying the model to health-care professionals.

**Findings**

Based on the reflective evaluation framework, all student teachers demonstrated some level of reflective process, except integration and, in terms of outcomes of reflection, perspective change. The following Table 1 shows each participant in relation to the levels of reflection attained.

In terms of the first level of reflection (Returning to experience), all participants showed evidence of this in their responses. For the second level (Attending to feelings) most of the student teachers were coded as expressing their emotions in their SAM workbook. Examples included:

> I have found this style of reflective thinking very worthwhile as I am really enjoying learning more about philosophy, having done my previous training in only one philosophy (Montessori) (Participant 4).

> One member of the group spoke of her despondency with the industry but we all shared that if everyone banded together to achieve a system that could enhance the children’s learning despite the system and maybe in spite of it, then we have brought good to the industry (Participant 5).

Three of the student teachers (50%) were coded as demonstrating validation, while three showed association and appropriation. This suggests these student teachers were able to relate their pre-existing experiences and knowledge to their newly acquired knowledge (association), testing the validity of new concepts (validation) and incorporating the process of reflection in their awareness and daily approaches towards teaching practices (appropriation) as the following excerpts illustrate:

> The ability to be open to dialogue and change is the foundation upon which all professional development is constructed (Association from Participant 1).

> Furthermore this high score under the ecological system correlates with my view that because our lives are constantly changing for instance when we move house, settle in a new job, have a baby or travel, this impacts on the relationships within the family, childcare environment and beyond. These impacts need to be recognised and utilised to add meaning to the program the child experiences and to link it to family. The ecological approach is one which is strongly influenced by a layering of relationships and networks (Validation from Participant 1).

> The impact that these beliefs will have on my future as an early childhood professional are that I need to produce a program that will facilitate each child’s learning, it will need to be open-ended and cater for each child’s way of learning (Appropriation from Participant 6).

According to Wong et al. (1995), it is common for more learners to show evidence of association (lower level of reflection), with relatively fewer learners demonstrating

<table>
<thead>
<tr>
<th>Level of reflective process</th>
<th>Code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total</th>
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<tbody>
<tr>
<td>Returning to experience</td>
<td>0A</td>
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<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Attending to feelings</td>
<td>1</td>
<td></td>
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<tr>
<td>Negative feelings</td>
<td>1B</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
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<td>3</td>
<td></td>
</tr>
<tr>
<td>Association</td>
<td>2</td>
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<td>1</td>
<td></td>
<td>1</td>
<td>3</td>
<td></td>
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<tr>
<td>Integration</td>
<td>3</td>
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<td>-</td>
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<tr>
<td>Outcomes of reflection</td>
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<tr>
<td>Action</td>
<td>6A</td>
<td>1</td>
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<td></td>
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<td>1</td>
<td></td>
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<tr>
<td>Affective (emotions)</td>
<td>6B</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
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<td>6C</td>
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<td>5</td>
<td>4</td>
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higher levels of the reflective process. However, the fact that not all participants demonstrated the validation and appropriation levels does not necessarily indicate their inability to reflect at these levels. It may be simply that the student teacher participants here did not articulate that aspect of reflection during their SAM activities. Another possible explanation is that some participants (for instance Participant 5) were able to achieve reflection outcomes without the need to experience each reflection level (Boud et al., 1985).

Not all student teachers were coded to demonstrate reflection outcomes. Only two of the six participants showed affective outcomes while four were coded to demonstrate action outcomes (see Table 1). An example of affective reflection outcome is illustrated in the following comment:

*I will try to adopt a willingness to adapt, to be flexible to change and be more reflective and to participate in regular self assessment* (Participant 1).

Action outcomes refer to the participants’ explicit views about their commitment to action, readiness to apply their new knowledge and skills, or simply indicating development of new skills, as illustrated by the following comments:

*If I was to run a centre, I would like to develop a program centred around family grouping which I believe is a more true to life manner of organising rooms and settings, a layering of children, toddlers and adults all interacting, supporting and assisting each other in learning and cooperation* (Participant 1).
*I will make a difference and I will. I will humble myself to keep gaining knowledge to take out and share in the community and spread the word around my colleagues in the industry* (Participant 5).

When considering the SAM tasks and the levels of reflection elicited by the various tasks, no clear pattern is discernable (See Table 2). However, many of the SAM tasks begin by asking participants to recount experiences before moving into reflective questions about these experiences, and, as such, the student teachers are guided to return to their experiences, hence the fact that all student teachers showed Level 1 reflection. It is also interesting to note that Sections 2 and 4 provided the most Level 5 reflections, but this was not the case for all participants; and for one student teacher, only one section of SAM provided reflections that could be coded—Section 2.

Individuals reflect at different levels and the disparity of frequency of reflections between different sections is indicative of the differing levels of reflections by individuals. In addition, one possible reason for not all students displaying reflection outcomes could be because this cohort of student teachers is only in the early stages of their undergraduate program, has entered the course with varying levels of experience, and is still in the early stages of reflective learning.

<table>
<thead>
<tr>
<th>SAM tasks</th>
<th>Participants</th>
</tr>
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<tbody>
<tr>
<td>Section 1: Past experiences</td>
<td>Level 1</td>
</tr>
<tr>
<td>Section 2: Present experiences</td>
<td>Level 1 Level 2 (x 2) Level 6: Action Level 6: Affective</td>
</tr>
<tr>
<td>Section 3: Beliefs &amp; values</td>
<td>Level 5 Level 6: Action Level 5 Level 6: Action Level 6: Affective</td>
</tr>
<tr>
<td>Section 4: Future experiences</td>
<td>Level 3 Level 6: Action Level 6: Affective</td>
</tr>
</tbody>
</table>

| Level 1: Returning to experience | Level 2: Attending to feelings |
| Level 3: Association            | Level 4: Integration          |
| Level 5: Validation             | Level 6: Appropriation = Outcomes: A) Action B) Affective C) Perspectives |

In Table 2, the coding of student responses to SAM tasks—applying levels of reflection is illustrated.
Discussion

Structured reflective process

It is important to ensure that reflection does not occur in a ‘vacuum’, rather that students are guided through the process of reflecting within their context of learning. Thus, as part of the student teacher development, SAM provided a structured process of guided reflection, leading the students through the process of reflecting on their past and present experiences, beliefs, values and practices, and relating and reflecting on their future aspirations of professional growth. The learning and reflection process was further enhanced with reflection occurring both at an individual and group level. Each of these guided activities provided opportunities for students to go through the reflective process as described by Boud et al. (1985): returning to experience, association, integration, validation, appropriation, and outcomes of reflection including action, affective and change of perspective at their own pace and stage.

Reflection evaluation framework

What has become apparent is the ability of the evaluation framework to provide a structure for the assessment of reflective writing. The flexibility of the framework to the individual responses of the student teachers demonstrates that it can pinpoint the depth of reflection the student is applying to their work. This is useful when faced with the difficult task of assessing reflection tasks: it clearly shows the reflection levels applied by the student and constructive feedback relating to the differing levels of reflection and what they entail. If introduced to the student, the evaluation framework will provide a structured process by showing students how they can move between the different levels of reflection and what might be considered within each level. By creating an awareness of where students are reflecting within this framework, they could be assisted in their ability to self-evaluate, thereby facilitating subsequent reflective opportunities to reflect at a higher level. Thus, information obtained from the evaluation framework can be used to empower learners in their future reflective experiences.

Implications and recommendations

A number of conditions need to be in place to ensure that the proposed combined model of structured reflective process and evaluation framework succeeds.

First, reflection has its risks. Challenging or questioning one’s own practice puts the practitioner in a vulnerable position (Ghaye & Lillyman, 2000; Hillier, 2002). This is especially true when the issues discussed are political, social or ethical, subjecting participating practitioners to a higher level of personal or professional risk (Bolton, 2001). The self-evaluation process may also lead to a range of negative emotions such as frustration, despair, fear or disgust. Another outcome of reflection may be confrontation in the workplace. Public expression of one’s reflections may result in disagreement at the workplace and may lead to awkward situations for some (Ghaye & Lillyman, 2000). Hence, it is important that reflection be effectively facilitated and conducted in a safe, supportive and structured learning environment (Bolton, 2001; Boud et al., 1985; FitzGerald & Chapman, 2000; Hawkes & Romiszowski, 2001).

Second, the reflective activities must be authentic, contextualised and meaningful in order to encourage student engagement (Herrington & Bunker, 2002). Third, there must be protected ‘thinking time’ so as to ensure sufficient time is set aside for students to reflect instead of performing a cursory reflection. Fourth, educators should also employ multiple reflective techniques to facilitate the development of reflection. By using a variety of reflective techniques, it is more likely that students will fully engage in the reflection process (Nolan, 2008).

Last but not least, activities should be designed so as to encourage individual and collaborative reflection. Individual and collective reflections can provide the necessary encouragement and new perspectives, allowing practitioners to understand their own assumptions and validation of presuppositions of their work practices (Bolton, 2001; Mezirow, 1990).

There are recommendations for future studies. First, owing to the small number of participants in this study, there is a need for the study to be replicated with a larger cohort of student teachers to see if results are similar. Second, a similar study could be conducted with other professions, such as healthcare professionals who are also required to be reflective practitioners, to ascertain if the combination of carefully crafted tasks does facilitate higher levels of reflections in students.

Conclusion

A structured reflective guide that is contextualised can be used to guide practitioners in their reflection process, thereby facilitating the development of practitioners’ reflective practice (Bulman, 2000; Burnard, 1991; Cranton, 1996; Ghaye & Ghaye, 1998; Mezirow, 1981). When used in conjunction with a reflective evaluation framework, the level of reflection can be assessed. It is hoped this framework will prove useful for educators who have the task of assessing reflection, and that, once the evaluation framework is introduced to student teachers, they will also find it a useful tool to consider when completing reflection tasks. Assessing the levels and quality of reflection is an achievable task.
The study is now ready to progress to the next stage, which will involve introducing the evaluation framework to student teachers to establish whether or not informing learners of the levels of reflection will indeed result in enhancing their reflective skills. If successful, this proposed model of developing and enhancing learners’ reflective process will have significant implications on how educators assist learners in their journey towards becoming reflective practitioners. For now, we view the reflective framework as enabling a defined level of analysis of reflective tasks for assessors of student teachers work.

References


Financial implications for parents working full time and caring for a child with chronic illness

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Margaret Vickers
Lesley Wilkes
University of Western Sydney

Belinda Barton
The Children’s Hospital at Westmead

THE COST OF CARING FOR a child with a chronic illness is a serious concern for parents. Unfortunately, there is limited knowledge about the financial challenges facing full-time working parents who also care for a child with chronic illness. This paper shares some findings from a large mixed-methods study situated in Australia, and presents data from both qualitative interviews and a national survey which explored the challenges and support needs of such parents.

The findings reveal that parents are not benefiting financially from full-time employment, as one would normally expect. We argue that this is because many are employed in low-paid jobs in direct response to their need for flexibility to undertake their caring responsibilities. As well, while taking lower-paid employment, these parents faced high-cost specialised care for their child. Further, owing to their often unique support arrangements, many of the existing support entitlements available in Australia are not available to them. Full-time working parents who care for a child with chronic illness struggle financially to care for themselves and their child. They are in need of more specific financial support from government to help them balance their dual roles.

Introduction

Over the past 20 years, advances in medical management and technology have resulted in an increasing number of children living with a chronic illness (Isaacs & Sewell, 2003). Chronic illness is defined for the purposes of this study as a significant illness or disability which may be physical, emotional or cognitive and which continues for at least six months, requiring medical intervention to treat acute episodes and/or ongoing problems (George, Vickers, Wilkes & Barton, 2006; 2008a; 2008b; Vickers, 2005a, 2005b; 2006; Vickers & Parris, 2005; Vickers & Parris & Bailey, 2004). Examples of childhood chronic illnesses might include (but are not limited to) asthma, cancer, diabetes and cystic fibrosis. Estimates indicate that approximately 31 per cent of children under the age of 18 years have one or more chronic illnesses (Melnyk, Feinstein, Moldenhauer & Small, 2001). In Australia, there are almost 300,000 children aged between 0 and 14 years (7.5%) with a disabling chronic illness, with most being cared for at home (AIHW, 2002).

This study focused on the challenges presented to the carer of a child with significant chronic illness who is also working full time, rather than any medicalised definition of the child’s condition, or the child’s experiences (George et al., 2006; 2008a; 2008b; Vickers, 2005a; 2005b; Vickers & Parris, 2005; Vickers et al., 2004). The increase in the number of children with chronic illness has highlighted the extra caring responsibilities of these parents and the possible potential difficulties. Research has shown that parents who care for children with a chronic illness experience greater emotional and psychological distress than do parents of healthy children (Meleski, 2002; Isaacs & Sewell, 2003). Recent reports from Australia (Cummins et al., 2007; Edwards, Higgins, Gray, Zmijewski & Kingston, 2008) indicate that carers (of adults or children) have significantly more mental health issues and higher rates of depression than does the general population. This has been attributed to the high levels of stress these parents experience when dealing with the various
issues encountered in their caring role (Ievers & Drotar, 1996). Specific concerns include the unpredictability of the child’s illness (Melnyk et al., 2001), complications and frequent hospitalisation of the child (Fisher, 2001), time limitations (Hedov, Anneren & Wikblad, 2002), and strain on personal relationships (Sen & Yurtsever, 2007).

We present here another issue of particular concern for parents of children with chronic illness: the costs associated with providing their child with ongoing care. Expensive health care, coupled with costly lifestyle modifications, special equipment and specialised child care can mean an additional burden for families (Emerson, 2003; Mutlu, Demir, Karen & Livanelioglu, 2003). A national study in the United States of America showed that, compared with healthy children, the health-care cost of children with special needs was three times higher (Newacheck, 2005). And, as we will further highlight, while the associated costs of caring for a child with chronic illness are higher, it is also far more difficult to maintain full-time work for a parent who is also caring for a child with chronic illness because of the parent’s need for flexibility to accommodate that child’s needs.

Recent demographic trends also demonstrate further impacts on those with caring responsibilities. The rise in single-parent families (Bianchi, 2000), the increase in women employed outside the home (ABS, 2004a), and the rise of dual-earning families (Lewis, Kagan & Heaton, 2000) have all contributed to the increase in the number of working parents caring for a child with a chronic illness. The few studies that have tackled this area have identified numerous added challenges confronting these parents: the need to locate appropriate child care (Einam & Cuskelly, 2002; Vickers, 2006); the requirement to attend their child’s medical appointments while also meeting job responsibilities (Newacheck et al., 1998); and the difficulties of accessing support services tailored to the needs of working parents (Einam & Cuskelly, 2002).

Working and caring for a child with a chronic illness is extremely difficult. However, despite the difficulties, many of these parents need to continue to work, and many maintain full-time employment. While we were unable to locate statistics specifically about parents who were working full time and caring for a child with chronic illness in Australia, we confirm that, according to the Australian Bureau of Statistics (ABS), in 2003 there were almost 2.6 million such carers in Australia, half of whom were in paid employment (ABS, 2003; 2004b). Further, another Australian study showed that, out of 547 parents who cared for a child with chronic asthma, 85 per cent of fathers and 45 per cent of mothers were in full-time employment (Mihrshahi et al., 2002).

For parents who are working full time and caring for a child with chronic illness, the stressors involved in balancing work and caring duties are intense. The main limitations of existing Australian studies in this area have been: a lack of focus on parents who are working full time (Einam & Cuskelly, 2002; Leiter, Krauss, Anderson & Wells, 2004); reductionist studies that focus only on specific chronic illnesses such as Down syndrome and asthma rather than chronic illness more generally (Hedov et al., 2002; Smith, Hatcher & Wertheimer, 2002); the lack of generalisable findings because of the work being qualitative and exploratory in nature (Vickers, 2006); and the limited number of studies conducted in Australia (Cuskelly et al., 1998; Einam & Cuskelly, 2002; Vickers, 2006). Of those studies conducted in Australia, only Vickers (2006) specifically focused on parents who were working full time, undertaking a phenomenological exploration of the lives of nine full-time working mothers who were also caring for children with chronic illness. These findings vivified the overload, disconnection, grief and lack of social support these women experienced, as well as confirming their need to continue to work even while facing significant challenges (Vickers, 2006).

The lack of research into working parents of children with chronic illness in Australia can also be attributed to some assumptions evident in the literature. It is assumed that parents of children with chronic illness do not work, and certainly do not work full time. Mothers, in particular, are assumed to stay at home to care for their child (Vickers, 2006). It is also assumed that the support needs of working parents are similar to those of non-working or part-time working parents of children with chronic illness. Assumptions such as these are evident in the fact that so few studies have explored the interplay between full-time working and caring for a child with a chronic illness. Many that have investigated this area have investigated part-time working parents only (see Shearn, 1998; Einam & Cuskelly, 2002). We claim it is reasonable to assume that the challenges associated with working and caring for a child with a chronic illness would be greater for parents working full time than for those working part time, especially as many of the issues of concern revolve around time constraints.

As the number of children being diagnosed with a chronic illness continues to rise in Australia, especially as this coincides with an increasing number of dual-earning families, it is important to investigate the needs of these working parents more comprehensively in order to challenge existing assumptions and identify various areas of need. The focus of this paper is on the financial challenges these parents encounter. We suggest that financial challenges are especially significant for full-time working parents as they grapple with the impact their caring responsibilities have on their working lives. These parents’ caring responsibilities limit the work roles they could maintain, which, in turn, limit the level of income they could command. And it is with this considerably less income and job security that they then face the additional costs of caring for a child with chronic illness.
Method

A mixed-methods approach was adopted for this study. Mixed-methods research effectively combines quantitative and qualitative research techniques, methods and approaches (Creswell, 2003; Greene, Caracelli & Graham, 1989; Johnson & Onwuegbuzie, 2004, p. 17; Patton, 2002; Tashakkori & Teddlie, 1998) enabling both qualitative and quantitative data to be gathered and examined in a single study (Rocco, Bliss, Gallagher & Perez-Prado, 2003). This paper reflects the successful use of a mixed-methods approach, including both analysed qualitative interview data and quantitative findings to support our argument.

Design

This study involved three phases. Phase 1 involved qualitative, in-depth, semi-structured interviews exploring the experiences of parents working full time and caring for a child with a chronic illness. Qualitative methods have been recommended for use when exploring support needs for individuals as their needs and constraints can be easily assessed (Williams, Barclay & Schmeid, 2004). Phase 2 involved the development of a questionnaire focused on the support needs of these parents, based on the findings from Phase 1. Phase 3 involved the identified issues being tested and confirmed by piloting the questionnaire through a national survey. Presented here are the qualitative and quantitative findings from both the in-depth interviews and the pilot study, especially as they related to the theme of financial concerns.

Selection criteria of the study

For inclusion in this study, parents had to be working full time or equivalent; taking care of a child, defined as 18 years or younger, with a chronic illness; live in a capital city or metropolitan area of Australia; and be fluent in the English language. The term ‘full time or equivalent’ was used to include parents who were self-employed, or undertaking multiple part-time/casual roles or full-time study, or were in the full-time permanent paid labour force. Metropolitan areas were chosen for this study because this is where more than two-thirds of Australian children live (ABS, 2003). In addition, other studies have shown the support needs of people living in rural and remote areas of Australia to be different from those in metropolitan areas (Wilkes, White, Mohan & Beale, 2006). Compared to families in metropolitan areas, rural families require more support in dealing with challenges such as lack of transport, lengthy travel to health-care services, limited information on services available, and associated accommodation needs (Wilkes et al., 2006).

Phase 1: Qualitative interviews

Recruitment: Purposive sampling was used to select parents for participation in this phase (Creswell, 2003). Parents were recruited through a modified chain referral technique (Vickers, 2006; Watters & Biernacki, 1989) that made use of informal referrals to the study investigators and word-of-mouth; contact via chronic illness support organisations; local newsletter and magazine advertising; and advertising flyers being distributed and displayed at a large children’s hospital in Sydney.

Sample

Nine females and three males were recruited for the qualitative interviews. Their ages ranged from 30 to 50 years with an average age of 42. All parents worked full time (or equivalent) with 11 having partners who also worked full time. Parents were employed in various types of jobs, such teaching, administration and information technology. Two interview respondents had to care for another adult as well. The children in this study were aged from three to 18 years and had diverse chronic illnesses such as cerebral palsy, muscular dystrophy and spina bifida.

Data collection: Twelve in-depth, semi-structured interviews were conducted at locations convenient for participants; in most cases in their homes. Each interview was audio-taped and lasted for approximately 90 minutes, and all interviews were conducted by the same interviewer. Before the interviews, signed informed consent was obtained and brief demographic details about the child and the parents were collected. During the interviews, parents were asked about their experience of working full time while caring for a child with chronic illness, with special attention to the identification of areas where support was required. The interviews were conversational in nature, the flow of which was governed by the participant. They were guided by, but not restricted to, the following focus areas: caring responsibilities; getting carers; financial implications; family and partner relationships; dealing with professionals; work life; current employment conditions; grief; sources of information; and practical needs. These focus areas were formulated after reviewing relevant literature, including results from an earlier exploratory study (Vickers, 2006), and as a result of discussions by the research team. Interviews were conducted until a point of information redundancy was reached (Lee, Mitchell & Sablynski, 1999), that is, until the interviews no longer provided any new insights into the experiences of these parents.

Data analysis: All interviews were transcribed verbatim and analysed using qualitative content analysis (Sandelowski, 2000). The transcripts were read line-by-line in order to identify recurring patterns

Selected references

Barclay & Schmeid, 2004. Phase 2 involved the development of a questionnaire focused on the support needs of these parents, based on the findings from Phase 1. Phase 3 involved the identified issues being tested and confirmed by piloting the questionnaire through a national survey. Presented here are the qualitative and quantitative findings from both the in-depth interviews and the pilot study, especially as they related to the theme of financial concerns.

Selection criteria of the study

For inclusion in this study, parents had to be working full time or equivalent; taking care of a child, defined as 18 years or younger, with a chronic illness; live in a capital city or metropolitan area of Australia; and be fluent in the English language. The term ‘full time or equivalent’ was used to include parents who were self-employed, or undertaking multiple part-time/casual roles or full-time study, or were in the full-time permanent paid labour force. Metropolitan areas were chosen for this study because this is where more than two-thirds of Australian children live (ABS, 2003). In addition, other studies have shown the support needs of people living in rural and remote areas of Australia to be different from those in metropolitan areas (Wilkes, White, Mohan & Beale, 2006). Compared to families in metropolitan areas, rural families require more support in dealing with challenges such as lack of transport, lengthy travel to health-care services, limited information on services available, and associated accommodation needs (Wilkes et al., 2006).

Phase 1: Qualitative interviews

Recruitment: Purposive sampling was used to select parents for participation in this phase (Creswell, 2003). Parents were recruited through a modified chain referral technique (Vickers, 2006; Watters & Biernacki, 1989) that made use of informal referrals to the study investigators and word-of-mouth; contact via chronic illness support organisations; local newsletter and magazine advertising; and advertising flyers being distributed and displayed at a large children’s hospital in Sydney.

Sample

Nine females and three males were recruited for the qualitative interviews. Their ages ranged from 30 to 50 years with an average age of 42. All parents worked full time (or equivalent) with 11 having partners who also worked full time. Parents were employed in various types of jobs, such teaching, administration and information technology. Two interview respondents had to care for another adult as well. The children in this study were aged from three to 18 years and had diverse chronic illnesses such as cerebral palsy, muscular dystrophy and spina bifida.

Data collection: Twelve in-depth, semi-structured interviews were conducted at locations convenient for participants; in most cases in their homes. Each interview was audio-taped and lasted for approximately 90 minutes, and all interviews were conducted by the same interviewer. Before the interviews, signed informed consent was obtained and brief demographic details about the child and the parents were collected. During the interviews, parents were asked about their experience of working full time while caring for a child with chronic illness, with special attention to the identification of areas where support was required. The interviews were conversational in nature, the flow of which was governed by the participant. They were guided by, but not restricted to, the following focus areas: caring responsibilities; getting carers; financial implications; family and partner relationships; dealing with professionals; work life; current employment conditions; grief; sources of information; and practical needs. These focus areas were formulated after reviewing relevant literature, including results from an earlier exploratory study (Vickers, 2006), and as a result of discussions by the research team. Interviews were conducted until a point of information redundancy was reached (Lee, Mitchell & Sablynski, 1999), that is, until the interviews no longer provided any new insights into the experiences of these parents.

Data analysis: All interviews were transcribed verbatim and analysed using qualitative content analysis (Sandelowski, 2000). The transcripts were read line-by-line in order to identify recurring patterns
pertaining to the impact and support needs of these parents. These patterns were then coded using QSR NUD*IST VIVO software (NUD*IST Vivo, 2003) and arranged into categories (Braun & Clarke, 2006). Each of the transcripts was explored and statements relating to the codes identified were extracted and then organised into the various coding categories. Sub-categories were also identified by combining and cataloguing related patterns, thus adding meaning and depth to the main category. Quotes from the analysed data (together with pseudonyms replacing parents’ real names), were used to illustrate each coding category and sub-category. The categories were discussed with the research team in order to verify that the data was appropriately clustered, and that the categories made sense and fitted the data. This process added to the rigour of the analysis (Lee et al., 1999).

**Phase 2: Development of the questionnaire**

The questionnaire was developed from the findings of Phase 1 (Qualitative interviews), as well as the existing literature on caring for children with chronic illness. It was pre-tested for clarity and readability (Foddy, 1993) and then distributed to an expert panel to establish its content validity. The panel consisted of experts in the field of academic research, questionnaire development, family support, paediatric medicine and children's education. The questionnaire consisted of 38 questions (closed, open-ended and Likert scale questions) that addressed the support needs of parents in different aspects of their lives.

**Phase 3: Pilot study**

**Recruitment:** Purposive sampling was utilised to select participants for the pilot study (Srivastava, Shenoy & Sharma, 2002). They were recruited as for Phase 1. Interested parents then contacted the study investigators and survey packages containing an information sheet, the questionnaire and a reply-paid envelope were sent to them, either directly, or via the various organisations that supported the study.

**Data collection:** Altogether, 6310 questionnaires were distributed. Parental consent was assumed upon return of the completed questionnaires to the research team.

**Sample:** Only 579 completed questionnaires were returned during the pilot study, giving a response rate of 9.2 per cent. A possible reason for this low response may have been that working parents of children with chronic illness are extremely busy trying to balance their dual roles and may not have had the time (or the energy) to complete a questionnaire. It is also possible that the support organisations through which most of the questionnaires were distributed may not have had accurate contact details for the parents targeted. Of the 579 questionnaires, 341 satisfied the selection criteria of the study and the remaining 238 participants were excluded from data analysis. Of the 341 respondents, 271 (79.5%) were females and 70 (20.5%) were males. The majority of these were in the 35–54 age group (82.7%). Most of the respondents were working professionals (47.2%) and associate professionals (30.7%), indicating that the respondents’ occupations were skewed towards more skilled employment. Close to 40 per cent of the respondents (39.6%, n = 131) from the pilot study were from low- or middle-income families having a combined household income of between $40,000 and $80,000 per annum. Most respondents (81.8%, n = 279) were living with a spouse/partner who, in most cases (78%), was also working full time.

The children reported in this study consisted of 54 per cent (n = 204) males and 46 per cent (n = 174) females. These children had diverse chronic illnesses, the most common being ‘intellectual/developmental disorders’ (42.3%, n = 161) such as Down syndrome, and ‘systemic disorders’ (29.7%, n = 111) such as diabetes. Most of the children went to school or special school (45.8%, n = 173), while others attended integrated child care (20.6%, n = 78) or were cared for by friends/relatives (28.8%, n = 109) while their parents worked.

**Data analysis:** Initially, all returned questionnaires that satisfied the study inclusion criteria were assigned a code number for identification. Next, all data from the questionnaires was entered into SPSS (Statistical Package for Social Sciences Version 14.0, 2005) for analysis. Once all the data was screened for errors and missing values, descriptive analysis was done on the demographic data, and on all the closed questions and Likert scale questions in the remaining three sections of the questionnaire. Qualitative responses from all the open-ended questions were extracted and entered into Nvivo version 2.0 (Qualitative Solutions and Research Pty. Ltd, 2003) computer software. Content analysis was also done on the qualitative survey data and quotes were selected to help illustrate the categories. Following qualitative analysis, the questionnaire was subjected to specific statistical tests. The findings of this validation process have not been included in this paper.

**Ethics**

Ethical approval to conduct the study was granted by the human ethics research committees from both the University of Western Sydney and a large children’s hospital in Sydney.
Findings

Content analysis of the qualitative data from the interviews and pilot study revealed several categories highlighting the challenges and support needs these parents faced: issues with carers; impact on relationships; money; caring responsibilities; the workplace; dealing with health professionals; and information needs. In this paper, the category ‘money’ is examined, using both qualitative and quantitative data, to vivify the financial issues reported by respondents. Table 1 illustrates the qualitative findings relating to the ‘money’. No gender-related differences in these parents’ responses were noted.

Table 1. Qualitative findings for coding category ‘Money’

<table>
<thead>
<tr>
<th>Money</th>
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</thead>
<tbody>
<tr>
<td>• Additional expenses</td>
<td></td>
</tr>
<tr>
<td>• Constraints of policies</td>
<td></td>
</tr>
<tr>
<td>• Impact on employment</td>
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</tbody>
</table>

Money

The financial burden of caring for a child with a chronic illness was reported to be a serious concern and source of stress for many participants. The factors that contributed to their financial hardship included: additional expenses incurred; the constraints of policies to access entitlements; and the negative impact on employment.

Additional expenses

All 12 interview respondents identified various additional expenses they incurred while caring for their child with a chronic illness. They included: carers’ housing; equipment; private health insurance; treatment; and parking costs. Of these, the cost of professional carers was identified as one of the main expenses parents found difficult to manage. Services such as child care were reportedly extremely expensive, with most centres charging almost double their usual rate in the case of children with a chronic illness or disability, making their use prohibitive for some respondents:

The cost of getting a kid into care is probably expensive, really, really expensive (Rose).

That [child-care fees] could vary from 1½ times to 2 times of the normal child-care fees … depending on what type of requirement. So, I could definitely not afford that (David).

Even respite care was not affordable for many parents. Susan highlighted this, referring to one occasion when she had to arrange for professional care for her son overnight. Even with a portion covered as emergency respite care, the cost was extremely high:

I went out on this weekend to a work function, which was a social function. And John [Susan’s partner] and I stayed out overnight, because it was at North Sydney. I got through Emergency Respite for probably about 5–6 hours of it, but the rest of it, I had to fund myself because they won’t pay for overnight packages. So … I am going to have a bill that is about $600.00, paying someone to care for Dan [Susan’s son] overnight (Susan).

Constraints of policies

Nine of the interview respondents highlighted how their families were constrained by existing policies to access various carer entitlements. David described how his son, who had cerebral palsy, had to be constantly cared for by Vanessa (David’s wife). Yet, despite being a full-time carer, Vanessa was never able to access any extra carer entitlements such as the Carer Payment, because existing policies were very strict and rather arbitrary. The office allocating the Carer’s Payment did not consider Vanessa to be a full-time carer of her son because he didn’t require specialised equipment for feeding, even though Vanessa needed to stay with him all the time. David’s frustration was evident:

When we went there [to the hospital], they said that she should be getting the Carer’s Payment also. When she went for a claim, they [government office] said there is a criteria for this type of children. They said that children have to be totally supported and then it is ‘full time’ [care], I don’t understand what is meant by ‘full time’ because what they say is, if the children have been given food or other things through a tube or something, they consider that as full time. But as I explained, somebody has to be there at home to take care of him. I don’t know, what is the categorisation of full time? (David).

Jason and Michelle recounted similarly stressful experiences with bureaucracy. They found it extremely upsetting that their entitlements had to be constantly reviewed every three months, even though their child’s condition was terminal and would never improve:

Well, we have had integration funding [funding provided to assist children with disabilities at school] for many years now. But every three months we have to be interviewed by the case manager and then they put up the funding. We might not get it. There is always that threat, that you might not get it (Michelle).

Our situation hasn’t changed, it is worse. So, if anything, we need more caring, because his [their son’s] condition, like he is deteriorating. So he gets worse, he doesn’t get any better. But this, every three months … we get this anxiety that we are going to have to get this funding [integration funding] taken away from us (Jason).
Parents felt the policies involving entitlements were impractical and rarely took into consideration their relevant family circumstances. As David said:

People [government administrators] who are sitting there, they just follow the book. They don’t have practical knowledge about this type of commitment. They don’t have a clear or good knowledge about what parents of this type of children will be facing (David).

The constraints of the policies regarding entitlements were further highlighted in the pilot study, with more than 75 per cent of survey respondents also stressing the need to ‘make access to various government payments easier’ (75.7%, (n = 252) and ‘make government policies for accessing support payments more flexible’ (79.5%, (n = 264) (see Table 2).

Impact on employment

All 12 interview respondents highlighted the negative impact of their caring responsibilities on their employment. Difficulties were reported in finding appropriate and affordable carers, and this forced most parents to rearrange their work hours, requiring them to work weekends, only during school hours or shorter days to enable them to be available to care for their child. The stress experienced was exacerbated for parents of children with severe chronic illness because of the shortage of well-trained carers, and the unwillingness of many schools and daycare centres to accept these children. For parents in such situations, providing constant supervision to their child, as well as maintaining their employment, meant working inconvenient and inappropriate hours. Molly reported sacrificing her sleep and working night shifts while her husband cared for their son:

I used to start work at midnight and I would finish at 8.00 in the morning. His father would be at home while I was working ... I would go to bed at 7 o’clock at night and put the kids to bed and I would sleep from 7 to 11 and I would function on three hours sleep a day (Molly).

For five of the interview respondents, their caring responsibilities had a profound effect on their work life and resulted in job loss. Rearranging working hours was not a viable option for Susan, who was caring for her child with a developmental disability. She was unable to cope with the pressure of working odd hours. She had to leave her job after struggling on for six months without sufficient sleep:

I worked a job that I started work at 4.00 am in the morning and I finished at 1.00 pm in the afternoon. So I was home, or Alan [her partner] was home with Dan [her son]. But, the problem with it was, that I just … wouldn’t get enough sleep. You know, working really strange hours, it becomes hard work after six months of it (Susan).

Nine of the interviewed respondents also highlighted the negative impact that caring for a child with chronic illness had on their careers. The need for flexible jobs limited their job prospects and, for many parents, was a source of stress and anxiety. For Vicky, who had a child with renal failure, finding a flexible job, especially in the information technology (IT) industry, was extremely difficult. This resulted in her taking any jobs available, even if that meant lower wages and unsatisfactory conditions:

You know, just casual, just simple work, low paid … it was just work any odd job. I couldn’t look for anything that had a proper career in it (Vicky).

Having a child with chronic illness was also reported to have a considerable impact on the career pathways of interviewed respondents. Michelle, who had a managerial role before her son was diagnosed with a life-limiting disease, had to sacrifice her career goals in order to continue working and caring for her child:

Well, my career has suffered. I suppose it is the sacrifices that I have made … I have changed from what I was originally doing and what I wanted. The

<table>
<thead>
<tr>
<th>LIKERT SCALE ITEMS (n = 341)</th>
<th>AGREE</th>
<th>NEUTRAL</th>
<th>DISAGREE</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making government policies for accessing support payments more flexible</td>
<td>264 (79.5%)</td>
<td>42 (12.7%)</td>
<td>6 (1.8%)</td>
<td>20 (6.0%)</td>
</tr>
<tr>
<td>Making access to various government payments easier</td>
<td>252 (75.7%)</td>
<td>50 (15.0%)</td>
<td>13 (3.9%)</td>
<td>18 (5.4%)</td>
</tr>
</tbody>
</table>

NB: There was variance in missing cases across the items.
career path that I planned for myself, that I wanted to do, has done a nose dive ... So yeah ... I have had to find an area that would accommodate my family needs (Michelle).

Jason recalled how he deliberately avoided career changes, such as seeking promotions, as they would have jeopardised his precarious work–family balance. Such decisions, although necessary at the time, were still stressful and unfortunate from his point of view, especially when he had several years of experience that warranted potential promotion:

I made a conscious decision to not go on and not to seek promotion, to look after him [his son]. I probably made the wrong decision, but that is the decision I made because I wanted to be in the position where I could come at the drop of a hat, you know. Because it has been five or six years; I would have got promoted easily if I hadn’t made that decision (Jason).

Another area of concern for parents was the availability of leave entitlements. Parents who could take paid leave often utilised it to either care for their child whenever the chronic illness deteriorated, or to attend the numerous medical appointments and tests the child needed. This resulted in interviewed respondents reporting using up their paid leave prematurely. As Reina recalls, ‘I don’t have much annual leave. I’ve had to use annual leave for clinic appointments and those kinds of things.’

The impact on employment was reinforced by the results of the pilot study. More than two-thirds of the respondents also confirmed the negative effects of their caring responsibilities on ‘working hours’ (72.2%, n = 229), ‘job opportunities’ (68%, n = 222), ‘career advancement’ (67.4%, n = 217), and ‘time/leave from work’ (73.4%, n = 234) (See Table 3).

Discussion

This study has provided vital information about the financial situation of full-time working parents of children with chronic illness in Australia. Although we already knew that caring for a child with a chronic illness can be a huge financial burden (Floyd & Gallagher, 1997; Gunn & Berry, 1987; Leonard, Brust & Sapienza, 1992), both the qualitative and quantitative findings from this study highlight that, even when parents were in full-time employment, the financial costs of caring for a child with a chronic illness was a serious concern, and that their caring responsibilities had a significant impact on both their ongoing employment and career opportunities.

The majority of parents who participated in the qualitative interviews and the pilot study identified numerous additional expenses incurred while caring for their child. The most frequently mentioned was the cost of carers. The issue of accessing affordable carers is a notable problem in Australia, even for parents of healthy children. Numerous reports have underlined the substantial increase in childcare costs that have occurred over the past couple of years (Taskforce on Care Costs, 2005; Work ‘n’ Care, 2007a). Recent reports indicate that these costs have increased by an alarming 65 per cent in the past five years (Work ‘n’ Care, 2007a). The findings from this study indicate that, for working parents of children with chronic illness, the situation is even more challenging. All parents who participated in the in-depth interviews confirmed the high costs involved in accessing specialised carers, reporting that many childcare centres charged almost double the normal childcare rates to care for their child. This was purportedly due to the need for daycare centres to hire more staff to meet the needs of that child and provide constant supervision (Llewellyn & Fante, 1999). Similar concerns about the cost of carers were also reflected in the quantitative findings of the pilot study. Close to two-thirds of respondents reported the need for more affordable childcare fees. These findings underscore how difficult it is for parents of a child with a chronic illness to gain access to carers on a regular basis. Not only is the need to get carer assistance very high for working parents, it is difficult for them to locate

Table 3. Survey responses on the effect of being a carer on employment

<table>
<thead>
<tr>
<th>LIKERT SCALE ITEMS (n = 341)</th>
<th>NEGATIVE EFFECT</th>
<th>NEUTRAL</th>
<th>POSITIVE EFFECT</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working hours</td>
<td>229 (72.2%)</td>
<td>56 (17.7%)</td>
<td>18 (5.7%)</td>
<td>14 (4.4%)</td>
</tr>
<tr>
<td>Job opportunities</td>
<td>222 (68.5%)</td>
<td>69 (21.3%)</td>
<td>12 (3.7%)</td>
<td>21 (6.5%)</td>
</tr>
<tr>
<td>Career advancement</td>
<td>217 (67.4%)</td>
<td>77 (23.9%)</td>
<td>8 (2.5%)</td>
<td>20 (6.2%)</td>
</tr>
<tr>
<td>Time/leave from work</td>
<td>234 (73.4%)</td>
<td>51 (16.0%)</td>
<td>22 (6.9%)</td>
<td>12 (3.8%)</td>
</tr>
</tbody>
</table>

NB: There was variance in missing cases across the items.
and access suitable carers because of their children’s special needs. In addition, the specialist child care that is available is very expensive.

Apart from the high costs these parents are personally bearing, it is apparent that any government entitlements that are available are not meeting their needs. The majority of participants in both the interviews and the pilot study found the policies and eligibility criteria for various entitlements both unsuitable and impractical. One particular entitlement mentioned was the Carer Payment. This payment is an additional income support payment of around $475 paid every fortnight to families who are caring for a child with a profound disability or medical condition (Centrelink, 2009). However, the payment is income- and assets-tested. In addition, parents are required to have their child’s medical practitioner complete a medical report which is reviewed by Centrelink to determine if the child meets the legislated definition of ‘a profoundly disabled child’ (Work ‘n Care, 2007b). This latter eligibility criterion was reported by interview respondents to be restrictive and inflexible, preventing them from accessing much-needed financial assistance. Similar concerns have been reported in the media, with reports indicating that up to two-thirds of Carer Payment applications are rejected because the child fails to satisfy the criteria (Work ‘n Care, 2007b; Today Tonight, 2007).

The 50 per cent childcare rebate recently introduced in Australia is a further example of an existing government support that is not benefiting these parents. This rebate purported to allow families to reclaim 50 per cent of their out-of-pocket expenses incurred for childcare services at the end of each financial year (FAO, 2009). However, the childcare rebate is available only to parents who utilise ‘approved carers’, that is childcare services which have been approved to receive childcare payments on behalf of families (FAO, 2007). This rebate does not apply to payments made to ‘registered carers’ such as nannies, relatives or friends, who may be registered as carers with Centrelink and who are frequently recruited as carers of children with chronic illness by their working parents. The payment of these carers is ineligible for rebate under this scheme.

This poses a particular problem for parents who work full time and who require specialist childcare services. Because of the limited availability, and high cost, of ‘approved carers’ such as those found in specialised childcare centres, these parents are highly likely to make use of alternative carers such as friends and relatives. Indeed, close to 30 per cent of the respondents in the pilot study reported using friends and relatives to care for their child while they were at work, thus making them ineligible to receive the rebate. One of our key findings is that, despite government financial assistance apparently being available, many of these working parents found themselves unable to benefit from it because of inflexible and ill-considered eligibility criteria. Such a situation reflects a lack of responsiveness by government that needs to be addressed.

Another reason for these parents facing financial difficulties is the limitations they encounter with their employment. As confirmed by other studies (for example, Einam & Cuskelly, 2002; Shearn, 1998; Smith et al., 2002b), respondents in this study often reported having to rearrange their working hours, sacrifice their careers, and choose jobs that allowed them to balance their dual roles of caring and working. This limited their future job prospects as well as their income levels. The pilot study confirmed that almost half of all the families responding were low- and middle-income earners with an annual household income of less than $80,000, well below the average annual household income of Australians, which is $93,400 (HIA, 2007). This is significant, especially when considering that both parents were working full time in more than two-thirds of these families, and that more than 80 per cent of them had also reported being well-educated professionals, associate professionals and managers. Similar results were confirmed in another Australian study where carers (of adults and children) also engaged in full-time employment were found to have a $7200 deficit in household income compared with the national population (Cummins et al., 2007).

The findings of this study strongly suggest that financial assistance was identified by full-time working parents of children with chronic illness as an important area of need. Many such parents are working in low-paid jobs. Their financial challenges are exacerbated by their need to frequently take leave to care for their child, and to pay higher rates for specialist childcare services. That many of these parents had a low income is ironic; on one hand, their caring responsibilities required them to work; on the other hand, these same caring responsibilities made it extremely difficult for them to maintain well-paid work.

Conclusion

This study shows that the financial cost of caring for a child with a chronic illness is a serious concern for parents who are also working full time. These parents have to meet the very high cost of utilising specialist carers, often on a regular basis, alongside having insufficient access to financial support and an ongoing need to maintain full-time work in low-paid (but more flexible) jobs. Further, many of the existing policies for accessing financial assistance are inflexible and unsuitable for many. All these financial challenges highlight the need for the government to explore further avenues of improving financial support for these parents. Possible government response strategies could include conducting a review of current entitlements and assessing the adequacy of these carer payments; reviewing the policies and eligibility criteria of
existing entitlements as well as evaluating benefits and accessibility; and assessing the feasibility of changing the registration provisions for carers who may not currently be recognised for rebate provisions, such as certain childcare centres and family members and friends. The government should also explore the potential of providing additional carer payments specifically to parents who are working full time and caring for a child with a chronic illness, as well as offering subsidies to childcare centres to enable them to improve education and training of current staff, and to increase the number of early childhood staff in childcare facilities that can care for children with significant chronic illness. This, in turn, could enable centres to offer more placements for such children, potentially reducing the associated carer costs incurred by their parents.

It is essential that early childhood professionals be aware of the financial challenges facing full-time working parents when determining strategies to assist in the ongoing care of their children. Without adequate financial support, it is inevitable that these parents and their families will suffer, especially their children with chronic illness.

Acknowledgement

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