



LET'S COUNT LITERATURE REVIEW

Forming part of the *Let's Count*
Revision 2020-2021



CONTENTS

1. Summary of this document	3	6. Findings from the evaluations of <i>Let's Count</i>	24
2. Scope of the literature review	4	6.1 Recommendations from the evaluation of the initial pilot of <i>Let's Count</i> in 2010-2011	24
3. Early childhood education and pedagogy	5	6.2 Recommendations from the longitudinal evaluation of <i>Let's Count</i> in 2013-2014	25
3.1 Effective early years pedagogy	5	6.3 Recommendations from the <i>Let's Count</i> Online evaluation in 2018	26
3.2 EYLF practices: An overview	8	6.4 Recommendations from the <i>Let's Count</i> Community Professionals pilot evaluation in 2019	27
3.3 Culturally responsive pedagogies	9	7. Australian government policy on early childhood mathematics education	28
4. Mathematics education in the years before school	11	7.1 Evaluation of early learning and schools initiatives in the national innovation and science agenda	28
4.1 Strengths-based approaches	11	8. Links with the Learning Outcomes from <i>Belonging, Being & Becoming: The Australian Early Years Learning Framework</i>	30
4.2 Positive student identity	12	8.1 Learning Outcome 1: Children have a strong sense of identity	30
4.3 High-expectations relationships	13	8.2 Learning Outcome 2: Children are connected with and contribute to their world	30
4.4 Play	15	8.3 Learning Outcome 3: Children have a strong sense of wellbeing	30
4.5 Mathematics and culture	16	8.4 Learning Outcome 4: Children are confident and involved learners	31
4.6 What mathematics is appropriate for preschool children?	16	8.5 Learning Outcome 5: Children are effective communicators	31
5. Family engagement in children's mathematics learning	18	9. Recommendations Arising from the Literature Review	32
5.1 What is family engagement in children's education?	18	10. References for Literature Review	33
5.2 Is family engagement important in young children's learning?	19	Appendices	47
5.3 Family engagement in young children's mathematics learning	20	Appendix 1: What is <i>Let's Count</i> ?	48
		Appendix 2: Elements of The Stronger Smarter Approach™	50
		Appendix 3: Overview Of <i>Belonging, Being & Becoming: The Early Years Learning Framework For Australia</i>	64



1. SUMMARY OF THIS DOCUMENT

The Ian Potter Foundation and Equity Trustees – James Raymond Hartley Charitable Trust supported The Smith Family to revise the *Let's Count* program during 2020–2022. One goal of the revision was to ensure *Let's Count* reflects the latest research and incorporates First Nations Knowledges, making them inherent in the program design and appropriate for participants of all cultural backgrounds.

An early step in achieving this goal was The Smith Family's commissioning of Peridot Education Pty Ltd and the Stronger Smarter Institute to develop a comprehensive and exhaustive literature review.

The literature review synthesised and reported on the latest research in:

- early years mathematics learning
- family and community engagement in early years mathematics learning
- policy directions in science, technology, engineering, and mathematics (STEM)
- Aboriginal and Torres Strait Islander perspectives on the above issues.

The Strong Smarter Institute also reviewed current *Let's Count* content. The results of that review, and other internal and external reviews of the program, and this literature review formed the basis of recommendations that have and will continue to guide future plans, content, and modes of operation for *Let's Count*.

This literature review is organised into sections:

- Early childhood education and pedagogy
- Mathematics education in the years before school
- Family engagement in children's mathematics learning
- Findings from the evaluations of *Let's Count*
- Australian Government policy on early childhood mathematics education
- Links with the Learning Outcomes in *Belonging, Being & Becoming: The Early Years Learning Framework for Australia*
- Recommendations arising from the Literature Review.



Our goal – to ensure *Let's Count* reflects Aboriginal and Torres Strait Islander knowledge and the latest pedagogical research, and that it is appropriate for educators, children, and families from all cultural backgrounds.



The literature review and subsequent recommendations arising from it have also been informed by three foundational pieces produced by Peridot Education and the Stronger Smarter Institute, that are included as appendices.

Recommended reference for this document:

Peridot Education Pty Ltd, Stronger Smarter Institute Inc, & The Smith Family (2022). *Let's Count Literature Review 2022*. <https://www.thesmithfamily.com.au/programs/numeracy/lets-count/literature-review>



2. SCOPE OF THE LITERATURE REVIEW

The literature review was designed to answer the question: In what ways can *Let's Count* be improved to assist early childhood educators and families to facilitate the mathematics learning of three- to five-year-olds?

The *Let's Count* program was initially developed in 2010. This literature review considers research published since then, as well as seminal literature in mathematics and early learning. Initial searches were conducted in the areas of:

- early childhood education and pedagogy
- mathematics education in the years before school
- family engagement in children's mathematics learning
- early childhood mathematics programs
- Australian Government policy on early childhood mathematics education.

These search parameters were used to name some sections of this report. However, findings from searching for 'early childhood mathematics programs' have been incorporated into other sections.

This review includes sections that link findings from previous reviews of *Let's Count* and with the Learning Outcomes from *Belonging, Being & Becoming: The Early Years Learning Framework for Australia*. It concludes with recommendations for the revision of *Let's Count*.

From April 2020 to June 2020, databases available through the Charles Sturt University Library, including ProQuest, EBSCOhost (Education), Taylor & Francis, Elsevier and ERIC, were searched using the terms: young children OR early childhood AND mathematics learning OR numeracy OR spatial reasoning OR geometry OR number OR counting OR subitising OR data sense OR argumentation OR working mathematically OR technology AND mathematics OR measurement. For each of these combinations of terms, AND Indigenous OR Torres Strait OR First Nations OR Aboriginal was also added. To cover the general areas of family engagement, searches were conducted

using the terms: early childhood educator AND Families AND engagement OR cooperation OR collaboration OR partnership OR mathematics OR co-design. Another search was conducted using just the terms culturally AND responsive AND engagement. The policy area was covered through a web search for Australian Government policies in mathematics and STEM and a database search with the terms: Australian government AND STEM OR mathematics; State/Territory governments AND STEM OR mathematics; NGO OR The Smith Family OR Little Scientists AND STEM OR mathematics. The policy searches were restricted to 2015 to the present. Other articles were identified from bibliographies and other sources known to Peridot Education Pty Ltd or the Stronger Smarter Institute.

Only refereed research articles appearing in journals, book chapters or conference publications, or reports of evaluations of *Let's Count* were considered for inclusion in the analysis. We excluded articles that focused on a different age range, were written before 2010, or where mathematics was a minor aspect of the research. This resulted in more than 350 articles being read and reviewed in full.

This literature review conforms with many of the features of a systematic literature review, as we have:

- undertaken comprehensive and documented search approaches
- used inclusion and exclusion criteria
- assessed the quality of the reported research
- carefully applied selection processes
- synthesised existing evidence.

However, these features have not been applied rigorously. Hence, the claim is to a 'comprehensive and exhaustive', rather than a 'systematic', literature review (MacDonald & Murphy, 2019; Williams, Berthelsen, Viviani & Nicholson, 2018).



Only refereed research articles appearing in journals, book chapters or conference publications or reports of evaluations of *Let's Count* were considered for inclusion in the analysis.



3. EARLY CHILDHOOD EDUCATION AND PEDAGOGY

At their heart, effective early years pedagogies are relational. This is reflected in the principles and practices outlined in *Belonging, Being & Becoming: The Early Years Learning Framework for Australia* (EYLF) (DEEWR, 2009).

Relationships provide the context in which children grow, learn, and develop. It is within relationships that children form a sense of themselves, their identity, and their agency (Bowman, Donovan, & Burns, 2001; Colmer, Rutherford, & Murphy, 2011; O'Connor & McCartney, 2007; Shonkoff & Phillips, 2000).

In their extensive review, Shonkoff and Phillips (2000, pp. 264–265) note that children's learning and development is facilitated by relationships based on:

- reliable support that establishes children's feelings of confident security in the adult
- responsiveness that strengthens children's sense of agency and self-efficacy
- protection from harms that children fear and threats of which they may be unaware
- affection, which promotes young children's development of self-esteem
- opportunities to experience and resolve human conflict cooperatively
- support for the growth of new skills and capabilities that are within children's reach
- reciprocal interaction by which children learn the mutual give-and-take of positive sociability
- the experience of being respected by others and respecting them as human beings.

Secure, respectful, and reciprocal relationships between and among children, families, and educators are characterised by sensitivity and responsiveness (Beneke & Cheatham, 2016; Degotardi, Sweller, & Pearson, 2013), care for and about each other (Bronfenbrenner, 1986), trust (Flückiger, Diamond, & Jones, 2012; Roberts, 2017; Rouse & O'Brien, 2017; Swick, 2004), and respect (Cohrssen, Church, & Tayler, 2011; McNally & Slutsky, 2018). Within such relationships, children are supported to engage in relevant and appropriately challenging experiences, while at the same time receiving support from responsive adults.

Within the context of relationships, there is potential for collaboration and partnerships (Cooper & Hedges, 2014; Knight-McKenna & Hollingsworth, 2016; Rolfe & Armstrong, 2010), focus on high expectations and equity (Guilfoyle, Saggars, Sims, & Hutchins, 2010; Munns, Cole, & Sawyer, 2013; Saffigna, Church, & Tayler, 2011) and respect for diversity (Mitchell & Bateman, 2018; SNAICC 2019a; 2019b; Victorian Aboriginal Child Care Agency, 2008). All involved can value the funds of knowledge (Gonzalez, Moll, & Amanti, 2005; Moll, Soto-Santiago, & Schwartz, 2013; Sims, Ellis, & Knox, 2017) that the various participants contribute to interactions.

3.1 Effective early years pedagogy

The EYLF (DEEWR, 2009, p. 9) defines pedagogy as the professional work of the educator," especially those aspects that involve building and nurturing relationships, curriculum decision-making, teaching and learning". In elaborating this definition, the *Educators' Guide to the Early Years Learning Framework for Australia* (DEEWR, 2010, p. 15) notes that "pedagogy is made up of principles and practices, influenced by our knowledge, beliefs, values, attitudes and perceptions". This definition recognises the influence of each educator's personal and professional experiences on the approaches they take and the decisions they make as they interact with and support children and families. The professional judgement of educators draws on a range of theoretical backgrounds and perspectives to guide interactions with children, families, communities, other educators and professionals. Coupled with the EYLF principle of ongoing learning and reflective practice, this approach to pedagogy commits early childhood educators to "investigate why they act in the ways that they do" (DEEWR, 2009, p. 11) as they reflect, recognise, and consider their actions.

These positions are consistent with the perspective that "pedagogies make vital connections between teaching, learning, knowledge, society and politics" based on "a vision about society, people and knowledge" (Farquhar & White, 2014, p. 822). They also highlight the relational (de Lissoy, 2010) and instructional elements (Siraj-Blatchford et al., 2002; Stephen, 2010) of pedagogy. Reiterated across these views is that pedagogy extends well beyond 'instruction' to incorporate "all the actions and processes that educators use to translate philosophy and curriculum approaches into practice" (Arthur et al., 2018, p. 231).

Much of the current research around pedagogies in the early years draws on the Effective Provision of Pre-school Education (EPPE) Project (Sylva et al., 2010) conducted in the UK. This project and subsequent related investigations (Taggart et al., 2015) provide clear guidance that effective pedagogy in the early years incorporates a wide repertoire of practices that combine sensitivity to the experiences involved, the content being shared, children's own learning and development, social and cultural contexts, and children's existing expertise and interests (Siraj-Blatchford & Sylva, 2004).

3.1.1 PRACTICES

Holistic' pedagogies "recognise the connectedness of the mind, body and spirit" (DEEWR, 2009, p. 14). Educators who use holistic pedagogies attend not only to children's learning and development, but also focus on their overall wellbeing and spirituality. This is reflected in the EYLF, where children's academic outcomes are complemented by outcomes in the social, emotional, physical and spiritual domains.

While academic outcomes tend to be the focus of much discussion (Claessens & Garrett, 2014; Dockett & Perry, 2013; Petriwskyj, Thorpe, & Tayler, 2005; Taylor, 2011), and school readiness discourse abounds (Dockett, 2014; Dockett & Perry, 2009; Moyle, 2019; Rouse, Nicholas, & Garner, 2020), there is increasing recognition of the importance of pedagogies that value connections with the whole child (Nolan, Taket, & Stagnitti, 2014). This comes with recognition that children's learning and development occurs as an integrated process, rather than in discrete domains.

The connections between social and emotional development and learning are well-established (Immordino-Tang, Darling-Hammond, & Krone, 2018), as are the links between physical development and learning (Deans, 2016; Erikson, Hillman, & Kramer, 2015; McVittie, 2018). Increasingly, holistic pedagogies also emphasise the importance of connections with nature (Barrable, 2019; Campbell & Speldewinde, 2018; Chawla, 2015; Elliott & Young, 2015) and the centrality of spirituality in the lives of young children (Adams, Bull, & Maynes, 2016; Robinson, 2019).

Using the term 'everyday spirituality', Bone, Cullen, and Loveridge (2007, p. 344) highlight the importance of pedagogies that appreciate "aspects of daily life that are often taken for granted. Everyday spirituality recognises the extraordinary in the ordinary". The view that spirituality underpins everyday life is closely linked to concepts of wellbeing and belonging, and to culture, with spirituality framed as "a form of connectedness and a source of inspiration in daily life" (Bone, 2008, p. 354). The significance of spirituality is noted in the EYLF and also features strongly in Te Whāriki (Ministry of Education New Zealand, 2017), the New Zealand early childhood curriculum. Both documents build on the premise that spirituality develops within relationships (Toso, 2011) and contributes to young children's sense of self and wellbeing (Grajczonek, 2012), the meanings they construct in their everyday interactions (de Souza, 2016) and their sense of belonging (Robinson, 2019).

Effective pedagogies respond to "children's strengths, abilities and interests" (DEEWR, 2009, p. 14) and to "children's ideas and play" (DEEWR, 2009, p. 15). Responsiveness occurs within both child-initiated and adult-initiated experiences. While child-initiated and adult-initiated experiences in early childhood have been equated with play-based and transmission teaching, respectively, and then positioned as opposites (Fisher et al., 2010; Pramling-Samuelsson & Asplund Carlsson, 2008), this need not be so (Walsh, McGuinness, & Sproule, 2019). Indeed, the power of adult engagement with, and elaboration of, child-initiated play has been noted (Hakkarainen, Bredikyte, Jakkula, & Munter, 2013), as has the importance of responsiveness to children's ideas and

directions in adult-initiated experiences (Cohen, Raudenbush, & Ball, 2003; Graue, Whyte, & Delaney, 2014; Lobman, 2005).

The introduction of the EYLF was accompanied by increased focus on 'intentional teaching'. Intentional teaching is not to be equated with direct instruction. Rather, it refers to educators being "deliberate, purposeful and thoughtful in their decisions and actions" (DEEWR, 2009, p. 15). Intentional teaching can occur within both planned and spontaneous interactions (Graue, Whyte, & Karabon, 2015). It is based on sound professional knowledge, as well as deep understanding of children, their families and communities – their 'funds' of knowledge (Moll et al., 2013). Intentional teaching also involves displaying a willingness to harness these different knowledge bases as assets. Such an approach enables educators to build on children's knowledge, strengths and interests in ways that are relevant for each child (Graue et al., 2015; Pramling-Samuelsson & Pramling, 2014).

It can be challenging for educators to balance the perceived demands of intentional teaching with the traditional focus on play (Barblett, Knaus, & Barratt-Pugh, 2016; Ofsted, 2015). Central to achieving this balance is an understanding of multiple ways of promoting play-based learning and diverse approaches to intentional teaching.

Play-based pedagogies regard play as purposeful and affirm the importance of environmental resources and adult interactions (Arthur et al., 2021). Child-initiated and child-directed play, as well as adult-initiated and adult-supported play, can all contribute to children's development and learning. Some conceptualisations of play outline continua ranging from child choice (free play) through to guided play and learning through games and direct instruction (Pyle & Danniels, 2017), while also recognising the integration of these aspects in many play situations. Others outline a framework that encompasses open-ended play, modelled play and purposefully framed play (Edwards, 2017; Edwards & Cutter-Mackenzie, 2013). The latter model emphasises the equal value of each of these types of play and recognises that they often occur in combination. What is important in these discussions of play is the notion of balance (Hesterman & Targowska, 2020). It is important for children to have opportunities for child-initiated and directed play, but also important for educators to participate in children's play in ways that stretch and extend it. In other words, it is important for educators to adopt intentional (not necessarily directive) strategies to support and extend children's play. Further, this sense of balance needs to be felt by the children involved (Robertson et al., 2015).

Adult-child interactions during play afford opportunities for reflectivity and metacognition. In other words, these interactions can provide the prompts for both adults and children to talk about and share their thinking: "When adults help children make their thinking visible to themselves, children are likely to be more curious, more metacognitive and to develop thinking dispositions (tendencies that guide intellectual behaviour) as they find problems and try to solve them" (Salmon, 2016, p. 480).

By its very nature, play supports children's curiosity and inquiry as they explore situations, not by being limited to their existing understandings or knowledge, but through the notion of 'as if' (Pistorova & Slutsky, 2018). Exploring possibilities through play provides a context for challenging and extending what is known (Pramling-Samuelsson & Asplund Carlsson, 2008).

Children respond to challenge in many different ways. Much of children's learning emerges from challenge – be it physical (Sandseter, 2007), social (Ólafsdóttir, Danby, Einarsdóttir, & Theobald, 2017) or intellectual (Nikiforidou, 2017). When children's interests are the source of challenge (Hedges & Cooper, 2016; Neitzel, Alexander, & Johnson, 2016), and where adults provide appropriate scaffolding and support, children can be encouraged to consider different perspectives as they identify and seek to solve problems.

The EYLF describes 'learning environments' that support children's learning as "vibrant and flexible spaces that are responsive to the interests and abilities of each child" (DEEWR, 2009, p. 15). Interactions in and with physical spaces provide opportunities for children to connect with nature (Barrable, 2019; Lee & Bailie, 2019; Torquati & Ernst, 2013), public spaces (Hassinger-Das, Bustamante, Hirsh-Pasek & Golinkoff, 2018) and urban spaces (Real Play Coalition, 2020). The relative unpredictability of the outdoors, compared with indoor environments, provides opportunities for children and educators to engage in collaborative critical thinking and problem solving (Barrable, 2019). Public spaces also provide opportunities for play and for building connections with community spaces.

While they are important elements, learning environments consist of much more than physical resources. Just as important are the social, emotional, and intellectual environments created by the attitudes, dispositions, and modes of interaction of educators (Arthur et al., 2021). Welcoming and respectful environments encourage the participation of children, families, and communities.

Recognising that both physical and non-physical elements are significant within learning environments is compatible with the conceptualisation of place as more than a physical entity: each place has relational, contextual, and cultural dimensions (Massey, 2005). Places also shape those within them, just as people shape places (Greenwood, 2011).

Supportive learning environments provide a level of comfort for children. They also create spaces in which children and adults participate in rich conversations about their thinking, knowing that their ideas and opinions will be respected and that intellectual risk-taking will be encouraged through processes of inquiry. In this sense, the notion of intellectual risk involves "remaining open to possibilities" (Jones, 2012, p. 46). Pramling-Samuelsson and Asplund Carlsson (2008) describe such environments as providing a natural integration of play, inquiry and learning.

A key aim expressed in the EYLF is for educators to develop 'cultural competence'. Guidance for educators notes that this is an evolving concept (DEEWR, 2010, p. 21) that involves "being aware of one's own world view; developing positive attitudes towards cultural differences; gaining knowledge of cultural practices and world views; and developing skills for communication and interaction across cultures" (DEEWR, 2009, p. 16). Yet cultural

competence is a multifaceted concept that also moves beyond this description: cultural competence for Aboriginal and Torres Strait Islander peoples is "distinctly different from the broad idea of respecting all cultures" (DEEWR, 2010, p. 24). This is also the perspective of SNAICC (2020, p. 9), which argues that:

Culture is a fundamental aspect of Aboriginal and Torres Strait Islander learning and wellbeing. The importance of culture is not limited to the knowledge held by and practices of Indigenous Australians, but also the respect and recognition of that culture amongst the wider community. It is also important to understand that the word 'culture' refers to the diversity of the myriad Aboriginal and Torres Strait Islander nations and peoples, each with their own 'distinct cultural norms, law, language and identity'.

Cultural competence is a key element in considering the appropriateness and accessibility of educational environments and pedagogies (Cedric et al., 2014; Hunt, 2013; Milgate, 2016; Perso, 2012; SNAICC, 2019a, 2019b). While the term 'competence' is often associated with a specific set of skills (Bainbridge, McCalman, Clifford, & Tsey, 2015; Morris, 2010; Sinclair, 2020), recent explorations of cultural competence in early childhood education suggest an alternative that recognises the social construction of culture and the complexities of interactions within and across cultural contexts (Sinclair, 2019a, 2019b). This latter perspective acknowledges that teachers are unlikely to have the same depth of knowledge about the cultural assets of all children, families, and communities with whom they interact (Rigney, 2019a). Rather than relying on cultural competence frameworks, Sinclair (2019a, 2019b) attends to the importance of relationships that encourage critical reflexivity.

Sinclair (2019a, p. 7) draws on Martin's (2003) ways of knowing, ways of being and ways of doing to "deconstruct how we demonstrate cultural competence (Do), respectfully and rightfully be culturally competent (Being), through what we know about cultural competence (Knowing)". The framework of learning built from this considers how an individual can move from a position of "not knowing about cultural competence to a position of challenging reductive notions that suggest one can 'know' and be 'competent' in culture". This framework emphasises how people position themselves and how their participation in interactions provides a basis for questioning and growing in terms of cultural competence. It recognises the importance of an individual's reflexivity and growth as they engage with cultural competence and affirms that such interaction is a key element of effective engagement with children and families (SNAICC, 2020). Further, it positions cultural competence as an ongoing, evolving process that is underpinned by relationships that require educators to examine not only their knowledge and skills, but also their personal perspectives, understandings, and attitudes (Daniels-Mayes & Sinclair, 2014; Morris, 2010).

Focus on 'continuity of learning and transitions' recognises that "children bring family and community ways of being, belonging and becoming" to their experiences and interactions and "through building on these experiences educators help all children to feel secure, confident and included and to experience continuity in how to be and how to learn" (DEEWR, 2009, p. 16).

Recent explorations of children's learning have highlighted the importance of social and cultural contexts and "the social, historical and cultural dimension of everyday activities" (Fleer, Anning, & Cullen, 2004, p. 175). The terms 'sociocultural' and 'cultural-historical' theory (Arthur et al., 2021) position social interactions with more knowledgeable or experienced others as key drivers in children's learning and development. More knowledgeable others guide and support children as they engage in the zone of proximal development (ZPD), and the assistance of others enables children to complete tasks that are too difficult for them to achieve independently (Vygotsky, 1978). Strategies such as scaffolding (MacNaughton & Williams, 2009) and guided participation (Rogoff, 2003) create opportunities for temporary support as children build competence in a given area. Scaffolding involves adults providing "just enough but not too much support, matching the amount of support to the skill level the child displays, providing more support if the child falters and decreasing support just enough to challenge the child to move ahead" (Bowman et al., 2001, p. 220). Through interactions that target a child's ZPD, adults can promote challenge and complexity in children's interactions and understandings and support them as they move towards independent practice.

Guided participation (Rogoff, 2003) also assists children to master tasks they would be unable to complete on their own. Key to guided participation are the reciprocal interactions among children and more experienced others as they engage in culturally relevant experiences (Rogoff et al., 2017). Both scaffolding and guided participation involve patterns of interaction that start with:

- acknowledging social and cultural contexts, as well as the task being undertaken
- the strengths those involved bring to the situation
- some form of support provided by the more experienced participant
- the reduction of support as the child takes greater control of the situation
- elaboration or extension of the activity (Arthur, et al., 2021).

Both scaffolding and guided participation offer opportunities to complicate and extend children's play.

Supporting continuity of learning is not necessarily about pushing children to achieve more. Rather, it is about acknowledging the strengths children bring with them to the learning situation and providing a supportive environment that promotes collaborative exploration.

Promoting sustained shared thinking (Siraj-Blatchford, 2009; Siraj-Blatchford & Sylva, 2004) meets these criteria. Sustained shared thinking involves educators and children (or children together) working in an intellectual way to work through an issue, solve a problem or clarify understanding. It can be both child-initiated or adult-initiated. It is not a one-sided intervention, with the adult prompting all the interaction and providing all the guidance. Rather, it is a mutual interaction where both parties contribute to the

interaction and the thinking involved. Sustained shared thinking can only happen when there are responsive, trusting relationships between adults and children (Arthur et al., 2021).

Children make many transitions as they engage in educational contexts such as the home, community, and early childhood settings. Continuity of learning as children move between these settings is promoted when there is congruence – for example, when the language and practices across settings are compatible (Grace, Walsh, & Baird, 2018; Hartley et al., 2012; Mitchell, Bateman, Gerrity, & Myint, 2017).

Transitions from home to early childhood settings, as well as transitions to school, can be focal points for promoting continuity of learning (Dockett & Perry, 2014). Collaboration among all those involved in transitions – children, families, communities, educators and others – contribute to children feeling secure, capable and confident in new settings (Dockett & Perry, 2015; Educational Transitions and Change Research Group, 2011; Hohepa & McIntosh, 2017; Kaplun et al., 2017).

While continuity is an important element of transitions, so too is change (Boyle, Petriwskyj, & Greishaber, 2018; Dockett & Einarsdóttir, 2017). Supportive and responsive relationships can assist children as they manage transitions and build positive strategies to support future transitions (Dunlop, 2007).

When considering 'assessment for learning', the EYLF focuses on "gathering and analysing information as evidence about what children know, can do and understand" (DEEWR, 2009, p. 17). The starting point for any assessment is recognition of young children as competent learners; acknowledgement that the context of relationships will influence what is assessed, how it is to be assessed, and the ways in which the information generated can be built upon; and respect for children, families, and their funds of knowledge (Arthur et al., 2021). There are many approaches to informal assessment that can serve to make children's learning visible. These include multiple ways of observing and documenting children's experiences (Fleet, Patterson, & Robertson, 2017), creating and sharing learning stories (Carr & Lee, 2012; 2019), sharing photographs (McLachlan, 2018; Pyle & DeLuca, 2017), and participating in engaging conversations (Dockett, Einarsdóttir & Perry, 2019; Fleet & Harcourt, 2018; Weisberg, Zosh, Hirsh-Pasek, & Golinkoff, 2013). Making children's learning visible is a critical step in the processes of noticing and responding to their understandings, and to strengthening and extending these.

3.2 EYLF practices: An overview

Each practice noted in the EYLF has a strong research base and contributes to effective early years pedagogy. In particular, the EYLF emphasises collaboration, positive interactions, appropriate levels of challenge and support, as well as deep personal engagement in early childhood learning. It stresses that children's wellbeing and learning require sensitive, caring, and responsive engagement from those involved. Within the context of relationships, effective early years pedagogy:

- incorporates child-led, child-initiated, and adult-supported experiences

- builds on opportunities that are generated through the interests, curiosity, culture, and experiences of children and family members to promote meaningful and relevant learning experiences and outcomes
- uses both planned and incidental activities
- reflects high expectations based on knowledge of individual children and their strengths
- acknowledges children's rights, particularly their right to have input into their experiences, to be listened to, and to be treated as capable
- promotes play as a context for learning
- incorporates a diverse range of materials and resources.

These elements are consistent with the elements of culturally responsive pedagogies.

3.3 Culturally responsive pedagogies

The term 'culturally relevant teaching' was coined by Ladson-Billings (1994) to describe teaching that regards each child's background knowledge and experiences as educational assets. Culturally relevant teaching is centred around high expectations for each child, assisting children to develop cultural competence and critical cultural consciousness. A similar conceptual frame underpins references to 'culturally responsive teaching' (Gay 2018), 'culturally responsive pedagogy' (Villegas & Lucas, 2002a, 2002b) and 'culturally sustaining pedagogy' (Paris, 2012; Paris & Alim, 2017). Each approach recognises children as individuals who are connected to family, community, social, and cultural contexts, and commits to nurturing both a child's uniqueness and these connections, to support learning (Brown-Jeffy & Cooper, 2011). In other words, each approach regards the diversity of individuals as a strength and seeks to use this to create pathways for educational success for all (Souto-Manning et al., 2019). Each approach also promotes the classroom as a site for promoting social justice and social change (Aronson & Laughter, 2016). Villegas and Lucas (2002a, p. 25) summarise this by noting that the knowledge children bring with them

to learning contexts is "derived from personal and cultural experiences, [and] is central to their learning. To overlook this resource is to deny children access to the knowledge construction process".

The evolution of culturally responsive pedagogy in Australia draws on this work, particularly that of Ladson-Billings (1994) and Gay (2018). Morrison, Rigney, Hattam, and Diplock (2019, pp. 1–2) describe culturally responsive pedagogy as

those pedagogies that value, and mobilise as resources, the cultural repertoires and intelligences that students bring to the learning relationship. Such pedagogies are taken to be intrinsically dialogic and critically conscious, opening up generative and decolonising possibilities. This conceptualisation rests on the premise that all curriculum and pedagogy are culturally based.

While much discussion of culturally responsive pedagogy is situated around schools, Rigney (2019a) has outlined its relevance for early childhood education. He notes the current Australian context where "Aboriginal education outcomes are not improving and early childhood education in Australia has become super diverse and super-complex. Educators require innovative new pedagogies that give them confidence in educating for super-diversity". To achieve this confidence, Rigney outlines several elements of culturally responsive pedagogy relevant across early childhood contexts:

- high intellectual challenge
- strong connections to the life-worlds of children
- recognition of cultural difference as a positive asset
- critical engagement and activist orientation
- performance of learning and/or multimodal literacies.

In considering the ways in which these principles are enacted in early childhood education, Rigney (2019b; Rigney & Hattam, 2018) has explored alignment between culturally responsive pedagogies and the principles of Reggio Emilia (Edwards et al., 1998). Particular connections are noted between culturally



responsive pedagogy and the Reggio Emilia principles of the competent child, democracy, and listening; recognition of culture as an asset and the Reggio Emilia principles recognising the significance of the environment, space and time; and the concept of ‘performing learning’ with the Reggio Emilia principle of documenting learning and recognising the 100 languages of children.

The practical application of this alignment is reported by Sisson, Whittington, and Shin (2020, p. 123), who identify connections between the principles of Reggio Emilia, culturally responsive pedagogy, and Nunga Way learning processes:

threads stemming from the Nunga Way, such as those reflecting values about the natural world and cultural connections to the land, provided a cultural lens from which the Reggio Emilia perspective of the environment, as a teacher, could be contextualized. Similarly, connections were evident in the image of the child as strong and competent as reflected in the Reggio Emilia principle of learning as individual and group construction and the learning processes of the Nunga Way such as DIY, collaboration, celebration, and checking feelings. The strength of bringing these two cultural models together in dialogue was that they provoked deep thinking about the image of the child and the role of the teacher to shape participants, understandings, values, and enactments across the school.

While much of the literature and research base around culturally responsive pedagogy derives from studies of school and older children, there is an increasing awareness of the significance of culturally responsive pedagogy across early childhood education and its alignment with high-quality early childhood pedagogy – both in Australia (Fasoli & Wunungmurra, 2015; Martin, 2005, 2009, 2016; Sims & Tousere Tiko, 2016) and internationally (Bennett et al., 2018; Chu, 2014; Durden, Escalante, & Blitch, 2015; Nganga, 2015).

This research has emphasised the detrimental impacts of low educational expectations and deficit perspectives for all young children, but particularly for Aboriginal and Torres Strait Islander children (Buxton, 2017; Doucet, 2017; Gillanders, Iruka, Ritchie, & Cobb, 2012; Gillanders & Kantor, 2019; Maher & Buxton, 2015; Timmons, 2018). The principle of ‘High expectations and equity’ embodied in the EYLF (DEEWR, 2009) and the Stronger Smarter approach (Stronger Smarter Institute, 2017), reflects commitment to promoting high (yet appropriate) levels of intellectual challenge for all young children provided in supportive environments by educators enacting strengths-based approaches.

Positive educational outcomes for Aboriginal and Torres Strait Islander children require that learning experiences and opportunities be connected strongly to the children’s life-worlds. To achieve this, Martin (2009) advocates for early childhood education recognising and providing space for Aboriginal and Torres Strait Islander worldviews: that is, ways of seeing, knowing and being. The converse – where the lived experiences of everyday life for Aboriginal and Torres Strait Islander children conflicts with educational experiences – does not generate

opportunities for respecting, demonstrating, extending, or valuing children’s expertise (Nakata, 2007).

Connecting with children’s life-worlds is one way for teachers to disrupt power relationships (Tesar, 2014) and provoke reflection on taken-for-granted practices through the application of the EYLF principle of ‘ongoing learning and reflective practice’ (DEEWR, 2009). Connecting with children’s life-worlds is inherent in the EYLF (DEEWR, 2009, p. 13) principle of ‘respect for diversity’, which is based on “valuing and reflecting the practices, values and beliefs of individual families and communities. Educators honour the histories, cultures, languages, traditions, child rearing practices, and lifestyle choices of families”. A crucial element of this involves two other principles of the EYLF: ‘building secure, respectful and reciprocal relationships’ and ‘promoting genuine partnerships with Aboriginal and Torres Strait Islander families and communities’ (Grace & Trudgett, 2012; Harrison et al., 2017; Kearney et al., 2014; Miller, 2015).

Strengths-based practices unite the two EYLF principles of ‘high expectations’ and ‘equity with respect for diversity’. They also underpin culturally responsive pedagogy that emphasises recognising cultural difference as a positive asset. Strengths-based approaches (Perso, 2012) are central to building secure, respectful, and reciprocal relationships with Aboriginal and Torres Strait Islander parents and communities (Armstrong et al., 2012; Fogarty, Lovell, Langenberg, & Heron, 2018). Strengths-based approaches are also key to recognising cultural differences as positive assets (Lohar, Butera, & Kennedy, 2014; Newman, Arthur, Staples, & Woodrow, 2016).

Culturally responsive pedagogy is critically engaging and activist oriented. While the EYLF principle of ‘ongoing learning and reflective practice’ is part of this element, culturally responsive pedagogy calls for much more. The EYLF prioritises children’s rights as outlined in the *Convention on the Rights of the Child* (United Nations, 1989), to which Australia is a signatory. Further, Lee-Hammond and Jackson-Barrett (2019) argue that early childhood educators have responsibilities not only to advocate for children’s rights under this convention, but also under the Declaration on the Rights of Indigenous Peoples (United Nations, 2007) in order to progress the rights of children to education in their own language and culture.

The final element of culturally responsive pedagogy outlined by Rigney (2019a) in relation to early childhood education refers to ‘performing learning and/or multimodal literacies’. This links to calls across the broader educational community to make learning visible (Hattie, 2008). It is also compatible with the many ways of documenting young children’s experiences (Edwards et al., 1998; Fleet et al., 2017) and recognising the diversity of ways in which children engage in and demonstrate their learning (Fasoli et al., 2004; Yunkaporta & McGinty, 2009).

4. MATHEMATICS EDUCATION IN THE YEARS BEFORE SCHOOL

A great deal has been written recently about mathematics education in the years before children start school (see, for example, Benz et al., 2018; Downton et al., 2020; English & Mulligan, 2013; Kinnear, Lai & Muir, 2018; MacDonald & Murphy, 2019; Perry, MacDonald & Gervasoni, 2015; Phillipson, Sullivan & Gervasoni, 2017a). Little of this extensive corpus has specifically investigated the mathematics learning of Indigenous children before they start school (see, for example, Papic, 2015; Piantadosi, Jara-Ettinger, & Gibson, 2014; Warren & Miller, 2013).

There are a number of studies that do explore the mathematics learning of slightly older Indigenous children in the early years of school (see, for example, Anderson, Stütz, Cooper, & Nason, 2017; Gear, 2012; Grootenboer & Sullivan, 2013; Johansson, 2009; Jorgensen, 2011; Klenowski et al., 2010; Matthews, Watego, Cooper, & Baturo, 2005; Owens, 2015; Perry & Howard, 2008; Rigney, Garrett, Curry, & MacGill, 2019; Russell & Chernoff, 2013; Treacy, Frid, & Jacob, 2015; Warren, Thomas, & DeVries, 2011). We begin this section of the literature review by surveying this latter area and considering what conclusions may be pertinent to the prior-to-school years.

The Stronger Smarter Approach is built on four key elements:

- taking responsibility for change (professional accountability)
- taking a strengths-based approach
- embracing a positive Indigenous student identity
- building high-expectations relationships (Stronger Smarter Institute, 2017).

These elements are echoed, in various forms, in much of the available research literature on the learning of mathematics by both Indigenous and non-Indigenous children, and in the pedagogy section of this literature review.

4.1 Strengths-based approaches

It is well recognised that young Indigenous children know a great deal of mathematics when they start formal schooling. Indeed, “young Indigenous Australian students are capable and proficient users of mathematics” (MacDonald, Goff, Dockett, & Perry, 2016, p. 180). However, the mathematics knowledge

that these children have and use may not be recognised or valued by their teachers and peers in schools: “Australian Indigenous students enter school with intuitive knowledge about mathematics, and this knowledge may be different from the knowledge of non-Indigenous students” (Warren & Miller, 2013, p. 153). Treacy et al. (2015) illustrate this point by describing children’s low knowledge about counting in a remote Western Australian Aboriginal community where counting is used relatively infrequently by adults, and the disjunction that can occur when these children meet a counting-based mathematics curriculum in their first year of school. Despite their lack of knowledge about counting, many Aboriginal children in the study were able to use other methods to solve mathematical problems that would typically be solved by non-Aboriginal children through counting. So proficient in these methods were the children that their teachers and the researchers were, in some cases, unable to determine what the children had done to solve the problems. Other researchers see differences in the way certain types of mathematics are valued more than others as reasons why the strengths of young Indigenous children in the early years of school should be recognised and built upon (Maher & Buxton, 2015; Matthews et al., 2005; Papic, 2015). Returning to the example of counting, Jorgensen (2011, p. 317) characterises the lack of recognition of Indigenous children’s mathematical strengths as a systemic failure.

the ‘learning difficulties’ prescribed to many Indigenous students are not some inherent deficits but a difference in the habitus valued within the field. The unawareness of how numbers are a taken-for-granted form of knowledge in Western epistemology enables the exclusion of cultures that bring to school different ways of knowing; that is a different habitus, that is not valued. Knowing how to count becomes an ‘at oneness’ with the field and hence is not questioned and, as such, supports the knowledge structures of some fields while excluding others.

Taking a strengths-based approach to the mathematics learning of Indigenous children first requires that teachers in schools and early childhood educators in prior-to-school settings notice what mathematical knowledge and skills young children bring with them from homes and communities and build upon this. “Indigenous students bring their own cultural ontology (ways of being, knowing and doing) to the classroom” (Downton et al., 2020, p. 230) and these need to be respected, used, and developed.



Despite their lack of knowledge about counting, many Aboriginal children in the study were able to use other methods to solve mathematical problems that would typically be solved by non-Aboriginal children through counting.



The aim is to provide opportunities for children to develop curriculum mathematics, but the starting point is the strengths they already have: “if you want to teach, first find out what the learners know” (Sullivan & Grootenboer, 2010, p. 1).

Strengths-based approaches are advocated throughout *Belonging, Being & Becoming: The Early Years Learning Framework for Australia (EYLF)* as “educators are required to “build on children’s strengths, skills and knowledge to ensure their motivation and engagement in learning” (DEEWR, 2009, p. 14).

Strengths-based approaches are not new in Aboriginal and Torres Strait Islander early childhood education. Bobongie and Jackson (2019, p. 163) summarise:

for over 35 years Aboriginal educators have been arguing for a paradigm shift in the way Western pedagogy and epistemology dominates the way Aboriginal students are being educated and assessed. This changes the focus away from the deficit model to focus on differences in opportunity and ensuring high-quality teaching and high-quality curriculum opportunities for all.

While the benefits to children’s learning of starting with what the children already know are clear, strengths-based approaches do not deny that some children know more than others and know things in different ways; nor do they ignore challenges that are faced by learners. Rather, strengths-based approaches:

balance focus on strengths with principles of self-determination and social justice, reflecting ‘positive attitudes about people’s dignity, capacities, rights, uniqueness and commonalities’ (McCashen, 2005, p. v). The primary focus ... is working collaboratively for solutions, instead of dwelling on problems. (Hopps-Wallis, Fenton, & Dockett, 2016, p. 104)

The case for using strengths-based approaches in early childhood mathematics learning and teaching for all children has been made often (Cheeseman, 2019; Clements, Vinh, Lim, & Sarama, 2020; Dockett & Goff, 2013; Fenton, MacDonald, & McFarland, 2016; Fuson, Clements, & Sarama, 2015; Ginsburg, 2016; MacDonald & Murphy, 2019; Maher & Buxton, 2015). Researchers have noted that “young children have a spontaneous and sometimes explicit interest in mathematical ideas” (Cheeseman, 2019, p. 12) and “From an early age, [children] have organized ways of thinking about and dealing with mathematical issues; they do much more than simply memorize the counting words and names for shapes” (Ginsburg, 2016, p. 941). Fenton et al. (2016, p. 52) reinforce the place of strength-based approaches in early childhood mathematics by stating “that a Strengths Approach could be an effective framework used by early childhood educators to promote early mathematics learning in family contexts”. Strengths-based approaches have been a constant feature of the *Let’s Count* program since its inception (Gervasoni & Perry, 2016; Perry & Gervasoni, 2016; Perry, Gervasoni, Hampshire, & O’Neill, 2016). *Let’s Count* regards children, early childhood professionals, parents and other family members as ‘powerful mathematicians’.

So, there is mathematics all around young children, they are powerful mathematicians who learn through play, and the adults around them can support the children’s mathematics learning through noticing it, helping the children to play with it and, very importantly, provide the appropriate language to discuss the mathematics being learned. This is a very simple formula, and it is the basis for *Let’s Count: Notice, Explore and Talk About* (Perry & Gervasoni, 2016, p. 10).

4.2 Positive student identity

While introducing the concept of ‘culturally responsive pedagogies (CRP)’, Rigney et al. (2019, p. 4) reinforce and extend the earlier discussions around strengths-based approaches to learning and teaching. They argue that:

Teachers must see all children as competent, with funds of knowledge and capabilities brought from home to school. Pedagogical practices are needed that develop culturally empowering student, teacher, and community relations; build pride and positive identity; and sustain engagement locally.

While this statement is targeted towards the school sector, its underlying position has strong resonance for early childhood education.

The Stronger Smarter Approach (Stronger Smarter Institute, 2017) stresses the importance of all Indigenous learners embracing a positive Indigenous student identity. It is critical that, while the children are developing strong and positive identities as learners of mathematics, they also have opportunities to maintain and enhance their identities as Indigenous people. In Australian schools, this has not always been the case, with many of the practices involved in learning mathematics in children’s homes, communities and early childhood settings not being recognised or supported in schools (Maher & Buxton, 2015). Hence, children learn that what has gone before, so far as their mathematics education is concerned, is not valued. Their identities as mathematics learners are consequently diminished or devalued (Matthews et al., 2005). The impact on children’s identities resulting from differences between prior-to-school experiences and school is reinforced by Maher and Buxton (2015, p. 4):

Children who were extremely well adjusted within community life, seeing themselves as efficacious learners and contributors to this life, were suddenly seeing themselves as incompetent on entry into formal schooling where the medium of instruction was not their home language and where the pedagogy was foreign to them.

By recognising what children bring to their learning from their homes and communities, educators can build on the meaningful ways in which children have learned previously to enhance children’s future mathematical knowledge, skills, and identities as mathematicians. This can be achieved without endangering children’s cultural identities. It is important that “teachers also need to be cognizant of their students’ mathematical identities – their knowledge, skills, attitudes, dispositions, beliefs, and prior mathematical experiences” (Sullivan & Grootenboer, 2010, p. 1).

Matthews et al. (2005, p. 516) provide some more specific advice linking context and culture with children's mathematical learning:

consideration of Indigenous cultural contexts for mathematics (e.g., kinship relationships) requires a rethink of mathematics and what is important in it. It may be that their culture will enable mathematical understanding to be a strength of Indigenous students if the mathematics is taught holistically through pattern and structure (rather than through sequential teaching of number and algorithm).

However, as Matthews et al. (2005, p. 518) point out, constraints on some Indigenous children's contexts can erode this efficacy:

The contextualisation of mathematics education has been recognised as an important strategy to improve educational outcomes for Indigenous students in mathematics ... However, given that Indigenous culture and people have not been represented positively within the education system, the contextualisation of mathematics education could be problematic.

Anderson et al. (2017, p. 96) discuss 'culturally relevant pedagogy' also abbreviated to CRP and include, as one of its essential components, that "it requires teachers to recognise the explicit connection between culture and learning, and see all students' cultural capital as an asset and not a detriment to their school success".

Rigney et al. (2019) introduce 'creative and body-based learning (CBL)' as an approach to CRP designed to facilitate mathematics learning of both Aboriginal and non-Aboriginal primary school students in South Australia. While CBL bases learning in context, it uses the strengths of arts-based approaches to introduce mathematical ideas in novel ways that do not carry the sometimes negative connotations of traditional approaches to mathematics teaching and learning. The results of this approach are encouraging and, given the preponderance of arts-based approaches in early childhood settings, may have some relevance to the revision of the *Let's Count* program. Rigney et al. (2019, p. 13) report that:

The strategies not only drew out mathematical thinking skills, but allowed non-Aboriginal students to engage empathetically with complex Aboriginal concepts around Country and place while also enabling Aboriginal students who have been displaced from Country to make connections to places of cultural significance. In this instance, mathematical learning could occur within the context of culture.

Many of the pedagogical approaches canvassed in this section of the literature review are suggested as ways in which mathematics

learning can be made more effective for all young children. We have concentrated on the need for the learners' identities, both cultural and mathematical, to be enhanced through appropriate pedagogies rather than one being enhanced partially at the expense of the other. This is the case for all children, not only Aboriginal and Torres Strait Islander children. Recognition of children's family and community contexts, their exposure to mathematical opportunities in these contexts, and their ways of interacting with mathematics are all important considerations for their teachers. Mathematics learning must be meaningful for those who are learning it.

"Identity formation is based on the education of authenticated actions in the context of cultural practises ... [where] meaningful learning is always embedded in cultural practises that make sense to the participants" (van Oers, 2010, p. 26, emphasis in original). Hence, maintaining and enhancing children's cultural identities while also developing strong mathematical identities requires that mathematical examples and explorations are based in contexts and interactions with which the children are familiar. Howard and Perry (2006, p. 299) noted that "Mathematics lessons in which students share in discussions, undertake collaborative work, value each other's ideas, experience relevant community-based mathematics activities and are encouraged to use their cultural and language resources to solve problems provide purposeful mathematics learning".

Maher and Buxton (2015, p. 8) determine that "effective education ... can become a shared vision through ensuring an interface between cultures and not the imposition of a meaningless curriculum on children who have experiences and strengths other than those conceived of by curriculum developers". Strong positive cultural and mathematical identities for all children can be developed simultaneously: "students can excel in mathematics while remaining strong and proud in their culture and heritage if taught actively, contextually, with respect and high expectations, and in a culturally safe manner".

4.3 High-expectations relationships

4.3.1 RELATIONSHIPS

The Stronger Smarter Institute (2017, p. 6) defines "High-Expectations Relationships [as] authentic two-way relationships that are both supportive and challenging. High-Expectations Relationships support educators to build strong relationships with their students, a collegiate work environment, and trusting and collaborative partnerships with parents and the local community."



Bobongie and Jackson (2019, p. 7) provide further detail with specific reference to Indigenous learners:

“Aboriginal culture is based around relationships and connections ... this holistic view is about understanding land, language and culture, time and place and how these relate together. When we see these relationships, the learning is deeper and more likely to be retained.”

Given that one of the principles underpinning effective pedagogy in early childhood education refers to secure, respectful, and reciprocal relationships, how do such relationships manifest in the context of prior-to-school children’s mathematics learning for all children?

Mathematics learning, particularly at the early childhood level, is not a solo act. Strong positive relationships and meaningful interactions within these relationships are paramount. There are many strong, respectful, and trusting relationships that need to be built. Within the early childhood setting, relationships among children are required if they are to play and learn together. Equitable relationships between children and educators are based on each other’s cultural and mathematical strengths and recognise each individual as a powerful learner. Similar trusting and respectful relationships are required between children and their families and between educators and the families and communities to which their children belong. Such relationships encourage sharing of knowledge and skills and allow learning to be provoked through exploration and discussion in play situations.

It is through interactions among people encouraged by such relationships that learning will occur. Perry and Howard (2008, p. 9) believed “If educators strive to build mutually trusting and respectful relationships with themselves, their students and their communities, then ... outstanding learning in many areas will occur”, while Owens (2015, p. 58) makes a similar point: “Strong community partnerships are reflected in mathematics teaching when there is a whole school and community effort and when the voices of parents, teachers, and Aboriginal children are heard”. With particular reference to Indigenous children, families and communities, Bobongie and Jackson (2019, p. 8) provide further reasoning as to why such relationships are important, as well as ways in which they might be developed:

The deep listening and genuine interest with non-judgement establishes equal power relationships where students and parents can voice their needs and desires for their education and feel part of a school system that values their strengths and culture.

In their survey of the Australasian literature concerning equity, social justice, and ethics in mathematics education, Vale et al. (2020) reflect that, particularly for Māori, Pasifika, Aboriginal and Torres Strait Islander, and Papuan communities, it is important for educators and systems to build strong relationships that value and use Indigenous languages and pedagogical/knowledge systems in mathematics learning.



Equitable relationships between children and educators are based on each other’s cultural and mathematical strengths and recognize each individual as a powerful learner.



4.3.2 HIGH EXPECTATIONS

It is well accepted that all young children can be powerful mathematicians. In their 2006 position statement on early childhood mathematics, the Australian Association for Mathematics Teachers (AAMT) and Early Childhood Australia (ECA), the peak professional bodies in Australia for mathematics education and early childhood education respectively, state:

All children in their early childhood years are capable of accessing powerful mathematical ideas that are both relevant to their current lives and form a critical foundation for their future mathematical and other learning. Children should be given the opportunity to access these ideas through high quality child- centred activities in their homes, communities, prior-to-school settings and schools (AAMT & ECA, 2006, p. 1).

The 2006 position statement has subsequently been accepted by early childhood mathematics educators, researchers, and policymakers in Australia (see, for example, DEEWR, 2009; Downton et al., 2020; MacDonald & Murphy, 2019; Perry & Dockett, 2013). To summarise:

Children demonstrate highly variable mathematical skills in the early years and have the capacity to master deep understanding of mathematical concepts prior to starting formal school education (Cohrssen & Niklas, 2019, p. 335).

The EYLF (DEEWR, 2009) emphasises this approach for young children, their educators, families, and communities:

The Framework conveys the highest expectations for all children’s learning from birth to five years and through the transitions to school. (p. 8)

Viewing children as active participants and decision makers opens up possibilities for educators to move beyond pre-conceived expectations about what children can do and learn. This requires educators to respect and work with each child’s unique qualities and abilities. (p. 9)

Early childhood educators who are committed to equity believe in all children’s capacities to succeed, regardless of diverse circumstances and abilities. Children progress well when they, their parents, and educators hold high expectations for their achievement in learning. (p. 12)

Having high expectations – in and for young children’s learning and the teaching of young children – is one key aspect of early childhood mathematics education. Such expectations support and challenge learners in ways that fit with their interests, contexts, and needs, and that are also both firm and fair (Bobongie & Jackson, 2019).

High expectations are not only required for children’s mathematics learning, but also when considering relationships between families and educators. While Perry & Dockett (2013) proclaim that everyone is a ‘powerful mathematician’, there are many early childhood educators and adult family and community members who do not see themselves in this light (Anthony & Walshaw, 2007; The Smith Family, 2015). However, if young children are to thrive through programs such as *Let’s Count*, these people, as well as the children in their care, need to have high expectations both of themselves and their ability to do mathematics.

Because “supporting children’s mathematical development involves working collaboratively with those who are in a position to facilitate meaningful, ongoing, regular, reciprocal, and increasingly complex interactions with mathematics at their core” (Perry & Dockett, 2018, p. 615), educators and family members supporting young children’s mathematics learning through programs such as *Let’s Count* need to have confidence in their own and each other’s competence. As might be expected, “parents vary greatly in their competence in scaffolding their children’s learning of number concepts at home, and some parents even fail to grasp opportunities to initiate numeracy-related exchanges with their children during home activities” (Cheung & McBride, 2017, p. 574), but there is no room for deficit perceptions about some groups of parents by “presuming that they ‘don’t care’ or are ‘not involved’” (Wadham, Darragh, & Eil, 2019, p. 732). If young children are to thrive in their mathematics learning, the significant adults around them must fly.

4.4 Play

Play is a fundamental and critical part of young children learning mathematics (Arthur et al., 2018). It is a central feature of the EYLF (DEEWR, 2009) and is prominent in the early childhood mathematics education literature reviewed.

The Framework forms the foundation for ensuring that children in all early childhood education and care settings experience quality teaching and learning. It has a specific emphasis on play-based learning and recognises the importance of communication and language (including early literacy and numeracy) and social and emotional development (DEEWR, 2009, p. 1).

Much has already been written about the importance of play as a leading pedagogy in early childhood. Children’s play opens up many different opportunities for them to explore mathematics, incorporating:

substantial amounts of foundational math as [children] explore patterns, shapes, and spatial relations; compare magnitudes; engineer with various materials; and explore scientific phenomena and concepts. (Clements et al., 2020, p. 2)

Play also facilitates the use of mathematical language as young children interact with their peers and with adults.

Children acquire both mathematical language and conceptual understanding when they are provided with multiple opportunities to participate in language-rich interactions and to rehearse mathematical thinking playfully, supported by well-paced, contingent interactions that facilitate the acquisition of both concepts and associated language. (Cohrssen & Niklas, 2019, p. 322)

Through their play, young children are encouraged to bring aspects of their different cultures to bear on their learning and, as Worthington and van Oers (2016, p. 63) report, they draw:

extensively on their personal cultural knowledge in their pretend play, exploring and elaborating their mathematical knowledge within the context of their unstructured pretense and imagination. Their cultural knowledge influence[s] their mathematical thinking by providing coherent contextual and mathematical meanings within their chosen play narratives.

However, the EYLF (DEEWR, 2009) does not suggest that play is the only way young children learn. In much of the mathematics education literature reviewed, other pedagogies are also suggested. Many of these involve the role of ‘knowing’ adults in children’s play:

Good-fit interactions, in which teachers provide just the right amount of guidance to children in their play, predict math learning. This suggests that teachers should observe and interpret children’s play needs and select just the strategies that will help them to play in complex and independent ways. When teachers do this, according to our findings, they not only support play development, but also enhance academic outcomes. (Trawick-Smith, Swaminathan, & Liu, 2016, p. 728)

Warren et al. (2011, p. 105) suggest that:

young Indigenous children can engage with challenging mathematical concepts, and that the learning of mathematics can be integrated into a play-based context. The teachers have a vital role in this learning. They have a role in orchestrating the learning, planning the activities and encouraging all children to participate. They also have a role as a facilitator of the conversations that occur between the children, ensuring that children are extracting the key mathematical concepts from the experiences.

Other researchers suggest that differing levels of adult intervention into children’s play can be beneficial, or even critical, to the mathematics learning that might emanate from this play:

play and other informal activities are considered particularly important contexts in which adults provide children with information, support their skill development, and extend their conceptual understanding. (Ramani, Rowe, Eason, & Leech, 2015, p. 16)

Play activities, and particularly role play, may serve as teaching opportunities if the teacher participates and is able to make use of occurring mathematical phenomena. The role

of the teacher is then to extend children's encounters with mathematics, in addition to organizing a rich environment that offers opportunities to explore new as well as familiar notions. (Björklund, Magnusson, & Palmér, 2018, p. 471).

Typical classroom play materials, such as blocks, games, and toy collections, offer potentially rich opportunities for children to learn and practice early number concepts; however, without teachers who intentionally intervene to mathematize play by attaching mathematical language to play, scaffolding more complex play, and directing student attention toward potential mathematics, children are unlikely to get the full benefits from their mathematically oriented play. (Wager & Parks, 2016, p. 992)

The emphasis on 'intentional teaching' is reflected in the EYLF, as has been noted earlier in this review. In the context of play pedagogy in early childhood mathematics education, intentional teaching may involve knowing adults taking on the role of 'provocateur' (Edwards et al., 1998) or engaging in sustained shared thinking (Siraj-Blatchford, 2009; Siraj-Blatchford & Sylva, 2004) to make children's play – and thinking – more complex and profound. In many cases, these adults will be early childhood educators, but they could also be parents or other family members.

4.5 Mathematics and culture

In a statement concerning the principle of 'respect for diversity', the EYLF (DEEWR, 2009, p. 13) synthesises many of the key themes developed to this point in the literature review.

There are many ways of living, being and of knowing. Children are born belonging to a culture, which is not only influenced by traditional practices, heritage and ancestral knowledge, but also by the experiences, values and beliefs of individual families and communities. Respecting diversity means within the curriculum valuing and reflecting the practices, values, and beliefs of families. Educators honour the histories, cultures, languages, traditions, child rearing practices, and lifestyle choices of families. They value children's different capacities and abilities and respect differences in families' home lives.

The recognition that all people are immersed in (their) various cultures is a critical aspect to consider in the mathematics learning of young children. While the first cultures to come to mind might be those of the home, community, or cultural group, early childhood centres and mathematics also have particular cultures that impact children's learning.

Anderson et al. (2017, p. 96) list one of the essential components of culturally relevant pedagogy as requiring "teachers to recognise the explicit connection between culture and learning, and see all students' cultural capital as an asset and not a detriment to their school success".

In the past, mathematics has been seen as a 'culture-free' subject (d'Entremont, 2015) where, regardless of the cultural context, the mathematics being learned, and the ways of learning have been independent of culture. This is clearly not the case, particularly in terms of the ways of learning mathematics.

Exposure to artefacts, knowledge, and pedagogies that grow from their cultures is important to all learners:

[M]athematics is an integral component of all cultural contexts and the significance of all cultural contexts is influenced by the interpretation [of] the individual within that culture. To take advantage of these rich cultural experiences means that students should be exposed to a variety of experiences and cultural resources. (d'Entremont, 2015, p. 2819)

While it is clear that there are different ways of learning mathematics in different cultures and contexts, it is less clear that the mathematics itself may be different. Some researchers argue that the mathematical concepts themselves can be different while others argue that while the concepts remain substantively consistent, ways of interpreting them and engaging with them may differ across cultures. For example, Warren et al. (2011, p. 98) argue that "Australian Indigenous children come from a culture with their own concept of mathematics, [and] these concepts differ from Western mathematics. These differences often reflect the different contexts in which they live." On the other hand, Bishop (1988, p. 182) has argued that there are six fundamental mathematical activities that "are both universal, in that they appear to be carried out by every cultural group ever studied, and also necessary and sufficient for the development of mathematical knowledge". These activities – counting, locating, measuring, designing, playing, and explaining – are promoted by Bishop as the key components of all mathematics, arguing that:

Mathematics, as cultural knowledge, derives from humans engaging in these six universal activities in a sustained, and conscious manner. The activities can either be performed in a mutually exclusive way or, perhaps more significantly, by interacting together, as in 'playing with numbers'. (Bishop, 1988, p. 183)

Can d'Entremont, Warren, and Bishop, and many others, all be correct about the relationship between mathematics and culture? If we consider that Bishop is focused particularly on mathematical activities and not as clearly on mathematical learning, then each perspective has something to offer early childhood mathematics education. One of the key bases for *Let's Count* has been a recognition of Bishop's six fundamental mathematical activities and the universality of these across cultures.

4.6 What mathematics is appropriate for preschool children?

There is a great deal of pressure on early childhood educators, families, and children to ensure that young children are 'ready for school'. While this literature review is not the place to go into a deep discussion about what this phrase might mean, it is important to think about how different determinations of what it means to be 'ready for school' might impact what is deemed appropriate mathematical content and pedagogy for young children before they start school.

Many early childhood educators feel under a great deal of pressure to ensure that children are literate and numerate

because these skills are seen as a foundation for future school studies, future employment and life success. The pressure has resulted in many early childhood settings becoming more like schools; that is, focusing more on academic attainment than child-centred development than might be seen as appropriate. This ‘schoolification’, which “threatens to bring inappropriate practice into early childhood education, narrowing the education on offer as a focus on literacy and numeracy” (Moss, 2013, p. 15), could also result in other important areas of learning being neglected. Schoolification is not generally seen to be a positive direction for early childhood education, but it does have its advocates. Within mathematics education, many of these advocates build on the large quantity of recent research (Carmichael, MacDonald, & McFarland-Piazza, 2014; Claessens & Engel, 2013; Duncan et al., 2007; Geary, Hoard, Nugent, & Bailey, 2013) that shows a positive relationship between the mathematics with which children are competent before they start school and their later school performance. However, some researchers have questioned the strength of the research and counsel against believing that early learning is “an inoculation that necessarily produces later achievement gains” (Watts, Duncan, Clements, & Sarana, 2018, p. 551).

What seems to be needed, both in early childhood education settings and in the home, are approaches through which young children can engage successfully with appropriate mathematics in ways they enjoy and that inspire them to continue their learning, but which avoid potential ‘collateral damage’. Moss (2014, p. 37) summarises this.

While mathematics, language and science matter, the question is how best to work with them in early childhood education; while the problem is how to avoid them contributing to further schoolification by the spread of crude and oversimplified educational approaches that are at odds with the learning strategies of young children and that end up doing more harm than good.

When early childhood educators have been asked what they think might be appropriate mathematics content for children before they start school, most suggest:

- number (especially counting)
- shapes and position
- patterns
- measuring

(Hunting et al., 2012; Hunting, Mousley, & Perry, 2012; Lee & Ginsburg, 2009).

The EYLF (DEEWR, 2009, p. 38) extends on this list of mathematical content by listing eight ‘powerful mathematical ideas’:

It is essential that the mathematical ideas with which young children interact are relevant and meaningful in the context of their current lives ... Spatial sense, structure and pattern, number, measurement, data, argumentation, connections

and exploring the world mathematically are the powerful mathematical ideas children need to become numerate.

An early list of powerful mathematical ideas was originally promulgated in *The Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics, 2000). This list was further developed with particular reference to early childhood mathematics education by Perry and Dockett (2002a, pp. 88–89), resulting in the following list:

- *mathematisation*
- *connections*
- *argumentation*
- *number sense and mental computation*
- *algebraic reasoning*
- *spatial and geometric thinking*
- *data and probability sense.*

With a slight change of language, most notably: ‘mathematisation’ becoming ‘exploring the world mathematically’, ‘algebraic reasoning’ becoming ‘structure and pattern’ and ‘number sense and mental computation’ becoming ‘number’, these are the eight powerful mathematical ideas suggested in the national curriculum document. They are reiterated in state and territory curriculum documents for pre-schools (for example, Queensland Curriculum and Assessment Authority, 2018; Queensland Department of Education, Training and Employment, 2013; South Australian Department for Education and Child Development, 2015) and have been advocated consistently in *Let’s Count*. In particular, the three ‘process’ ideas – mathematisation, connections, argumentation - are critical. These address important aspects of mathematical thinking, while the other ‘powerful ideas’ generally address mathematical knowledge and skills. In many jurisdictions across the world, including Australian states and territories, the emphasis given to process and content varies as children move from prior-to-school settings to school, at least partly due to differences in the values on which curricula are based (Pettersen & Volden, 2019; Seah, Andersson, Bishop, & Clarkson, 2016).

In *Let’s Count*, all eight powerful mathematical ideas need to be addressed in line with the EYLF, with an emphasis on the three ‘process’ ideas.

All children in the year before they start school know a great deal of mathematics. Some even know most of what they will encounter in the first year of school (Bassok, Latham, & Rorem, 2016; Engel, Claessens, & Finch, 2013; Gervasoni & Perry, 2015a; Gould, 2012). Many will have learned what they know in informal ways, through their play and interactions with peers and adults. Such approaches need to continue, even though the mathematics itself may become more complex, as it is through these approaches that the children have developed their identities as ‘powerful mathematicians’ (Perry & Dockett, 2013).

5. FAMILY ENGAGEMENT IN CHILDREN'S MATHEMATICS LEARNING

5.1 What is family engagement in children's education?

In her foundational work, Epstein (2011) outlined the historical development of school, family, and community partnerships. Within this work, she described how schools were initially seen as solely responsible for a child's education, particularly in the basics of language and mathematics. From there, parents were reluctantly (at least on the part of schools) 'allowed' to be involved with schools, but only at the school's request. Later, a two-way but still inequitable relationship developed, in which parents and families took some responsibility for their children's schooling. Based on her 'overlapping spheres' model, Epstein (2011) also developed a framework including six types of 'parental (family) involvement' in children's schooling, ranging from "parenting (helping families establish home environments to support children) through to collaborating with community (integrating community resources into educational programs)" (Dockett, Griebel, & Perry, 2017, p. 11). While there are many models for family engagement in children's education (see, for example, Goodall, 2018; Gross et al., 2020), there is affinity between Epstein's overlapping spheres with the core of the Stronger Smarter Approach (Stronger Smarter Institute, 2017).

Goodall and Montgomery (2014) propose a continuum in relationships between schools and parents/families from parental involvement with school to parental engagement with children's learning. In their terms, 'parental involvement with school' (p. 402) has the following characteristics:

This point on the continuum is characterised by the agency of the school; school staff predominate in the relationship with parents. The school is in control of the relationships and the flow of information; information is given to parents but not sought from them. Parents may be involved in activities, but those activities are instigated and controlled by the school. For the most part, these activities will take place in and around the school.

An interim point on the continuum arises with parental/family involvement 'in schooling', rather than just 'with school'. This level of involvement "can take place either in school or in the home, and is characterised by an interchange of information between parents and school staff. The focus of this interaction is schooling – the processes which surround learning" (Goodall & Montgomery, 2014, p. 404).

Towards the other end of the continuum (p. 405), parental/family engagement with children's learning

is characterised by the greatest exercise of parental agency. Parents' actions may be informed by the school, or based on information provided by the school, but the choice of action and involvement remains with the parent ... it is likely to arise from conversations between parents and school staff, or to be based on the wider understanding of the student gained at the second point on the continuum. Parents at this point are engaged with the learning of their children not due to dictates from the school but because of their own perceptions of their role as parents.



The overwhelming agreement from this research is that the quality of the home learning environment is a major predictor of young children's learning.



Based on the analysis undertaken by Goodall, the guide to parental and family engagement published by the Australian Research Alliance for Children and Youth (Barker & Harris, 2020, p. 12) suggests the following conceptualisation of parent and family engagement:

Parent and family engagement in learning is the capacity of families, in partnership with schools, to support student learning and achievement by promoting interactions with children and young people that nurture positive attitudes towards learning, confidence as learners, and the development of subjective learning resources.

Barker and Harris (2020, p. 13) expand on this definition and provide specific examples of what is meant by parent and family engagement: "we are talking about learning that happens in homes, in cars, in communities – anywhere that families spend time together, through everyday activities. This has been described as 'anywhere, anytime learning'".

While Goodall and Montgomery (2014) and Barker and Harris (2020) are specifically focused on parental engagement with schools, a similar analysis can be undertaken concerning young children's learning prior to starting school and the engagement of parents, families, and communities in this learning (Barnett et al., 2020; Einarsdóttir & Jónsdóttir, 2019; Gerlach & Gignac, 2019; Grace, Bowes, & Elcombe, 2014; Gross et al., 2020; Melhuish et al., 2008). However, Barnett et al. (2020) note that there can be some confusion in the proliferation of terms used. These researchers promote the conceptualisation provided by Ferguson (2014, p. 1):

The concept of parent engagement has been used to describe parent behavior, expectations, and activities that have the potential to promote children's learning and development. Here the term is used to refer to parents' support for their young children's learning fostered through relationships with child care and early education programs and providers, which includes parent engagement with programs, as well as their involvement in their children's learning activities.

In light of much of the literature canvassed previously in this review, and in line with both *Belonging, Being & Becoming: The Early Years Learning Framework for Australia* (DEEWR, 2009) and the *Stronger Smarter Approach* (Stronger Smarter Institute, 2017), comes Gerlach and Gignac's (2019, p. 60) description of family engagement "as a reciprocal, strengths-based, and ongoing partnership between families and early childhood program staff". These features are well-established in the *Let's Count* program (Gervasoni & Perry, 2017; The Smith Family, 2015).

5.2 Is family engagement important in young children's learning?

Many of the research articles analysed present evidence that family engagement in children's learning is important. As outlined above, however, acceptance of such a claim needs to be nuanced by, at least, the understanding of what 'family engagement' is, how it might be 'important', and for what.

As defined above by both Ferguson (2014) and Gerlach and Gignac (2019), 'family engagement' brings together three critical microsystems in young children's learning – the child's home, community, and early childhood setting. Within these microsystems, children, educators, and parents/family members engage in proximal processes which, according to Bronfenbrenner and Morris (2006), are the primary drivers of children's development. These interactions "constitute a critical mesosystem, that is, an interaction between two microsystems that uniquely impacts child development" (Barnett et al., 2020, p. 261).

The nature and frequency of communication between the parents/family members and early childhood educators are important parameters in these interactions. In most early childhood education settings, there are opportunities for parents and educators to talk, even if briefly, at drop-off and pick-up times. These opportunities make it more likely that such conversations will occur before children start school, compared to when they are at school (Murray, McFarland-Piazza, & Harrison, 2015), but they do not ensure that meaningful communication about the child's learning takes place. Given that the proximal processes on which engagement relies requires meaningful communication

[i]t is important that educators explore a range of strategies for maintaining ongoing communication with families and, with family input, select those that are most appropriate for the different families using the early childhood or school setting (Arthur et al., 2021, p. 57).

A similar approach is advocated by Lin et al. (2019) who see parent/educator communication as a critical piece in partnerships and shared responsibility for children's education, particularly as it extends to the home.

Parent-educator communication regarding how to maximize home-based involvement is, thus, one area that pre-school educators can contribute to strengthening further (Lin et al., 2019, p. 767).

Family engagement in young children's learning may sometimes include parents or other family members being involved in the early childhood setting as a volunteer or an observer. While such roles can be important to children's learning and to the parent/family member's collaborative partnership with the early childhood educators in that setting, they are not the focus of this review as *Let's Count* involves the parent/family member interacting with their child in the home or other family context. However, it has been shown that involvement in the early childhood setting can have a positive impact on the home learning environment because of gains the parent/family member can make in terms of knowledge, confidence, and access to activities. In other words, "ECE providers' engagement with parents may positively impact children's learning by improving parental engagement in home learning activities" (Barnett et al., 2020, p. 261). While, in this study, the more parents engaged in activities within the early childhood setting, the more learning activities they provided for their children at home, the amount of engagement in the centre did not seem to impact on the quality of the activities provided at home (Barnett et al., 2020). It seems that the 'engagement' per se is not sufficient to ensure quality home learning experiences for children.

The relationship between family engagement in early childhood setting-based activities and home-based activities for their young children is not one way. For example, Murray et al. (2015, p. 1049) suggest that "[g]enerally, parents who were more involved in educational activities with their child at home were also more involved at the prior-to-school or school settings, and communicated more with educators".

The home learning environment is a critical component of parents/family members' engagement with young children's learning and has been studied by many researchers (Cole, 2011; Fehrer & Tognozzi, 2018; Gross et al., 2020; Hayes, Berthelsen, Nicholson, & Walker, 2018; Lehl, Smidt, Grosse, & Richter, 2014; Lukie, Skwarchuk, LeFevre, & Sowinski, 2014; Melhuish et al., 2008; Napoli & Purpura, 2018; Tamis-LeMonda et al., 2019; Williams, Berthelsen, Viviani, & Nicholson, 2016). The overwhelming agreement from this research is that the quality of the home learning environment is a major predictor of young children's learning. For example, Gross et al. (2020, p. 753) suggest that "there was strong consensus among stakeholders that parent participation in their child's education through home-based activities was an important dimension of parent engagement", while Lin et al. (2019, p. 758) report that "[h]ome-based parent involvement has been found to be the most significant predictor of preschoolers' outcomes, relative to other types of parent involvement", and Godwin, Rupley, Capraro, and Capraro (2016, p. 45) have found that

[f]amilies that nurture their children's learning in the home are helping these children form a positive attitude about learning and an interest in discovery; that will aide them in later academic achievement.

Moreover, the quality of the home learning environment is a stronger influence on this learning than many other more

commonly cited characteristics of families, including cultural background, socioeconomic status, parental education, and the availability of resources. Melhuish et al. (2008, p. 106) suggest that

[w]hile other family factors such as parents' education and SES are also important, the extent of home learning activities exerts a greater and independent influence on educational attainment.

This reinforces what has become an iconic statement in the field of parent engagement, that the quality of the home environment is “more important for intellectual and social development than parental occupation, education or income. What parents do is more important than who parents are” (Sylva et al., 2004, p. 1). Given that The Smith Family works primarily with communities and families experiencing some form of disadvantage, these results provide reinforcement for the approach taken in *Let's Count*, which is designed to enhance parent engagement in their children's mathematics through both communication among early childhood educators and parents/family members and the development of home learning environments in mathematics (Lin et al., 2019). Barnett et al. (2020, p. 270) even suggest that “[c]hildren from economically disadvantaged families ... may be particularly likely to benefit from parent engagement in ECE settings”.

Parent/family members' engagement in their young children's learning is based on the pedagogical characteristics of high expectations, respect, and strengths, all of which have been canvassed earlier in this review. Parents/family members and early childhood educators need to recognise each other's strengths and respect their differences. “To feel a sense of belonging, children, families and communities need to experience respectful attitudes and interactions that appreciate diversity and see the strengths in difference” (Arthur et al., 2021, p. 44). This sense of belonging is critical to the relationships that early childhood educators and families will need if they are to maximise opportunities for their young children's learning. These relationships can take time to build and will be characterised by trust and respect as well as high expectations of all involved (Gerlach & Gignac, 2019). The onus to build these relationships is on all involved:

Relationships with family members and effective, respectful ways of working with families will be achieved when educators and educational leaders commit time to learn about their communities and acknowledge the strengths and capabilities of the children and their families, regardless of their circumstances. Such understandings and relationships can only be achieved over time. (Rogers, 2018, pp. 184–185)

The strengths of Indigenous families in engagement with early childhood educators to enhance their young children's learning has been the subject of some research in recent years, both in Australia and internationally (Gerlach & Gignac, 2019; Lowell et al., 2018; Murray et al., 2015; Williams et al., 2016). For example, Gerlach and Gignac (2019, pp. 60–61) consider the nature of Canadian Indigenous families and suggest that a broadening of the notion of family may be required when seeking to build respectful relationships for family engagement:

family engagement has been described as a reciprocal, strengths-based, and ongoing partnership between families and early childhood program staff. In moving beyond universal assumptions of engaging with a nuclear family, a broad and inclusive orientation toward program engagement reflects the inclusion of extended family members and conveys a broad conception of their participation with early childhood programs and the wider community. The inclusion of extended family members is also aligned with how young children are raised in many Indigenous families and communities.

The importance of seeking family engagement in young children's learning in ways that fit with Aboriginal and Torres Strait Islander approaches to children's education is considered by Murray et al. (2015) in their study on ways in which such engagement changes as children move from pre-school to school. Contrary to perceptions of some educators and community members that Aboriginal and Torres Strait Islander families are not really interested in their children's schooling (Higgins & Morley, 2014), there are many ways in which families might be engaged:

although Indigenous parents may not be as visible in their involvement with their children's education, Indigenous and other minority cultural groups may be actively involved in their child's education in other ways; for example, via home learning activities that are more congruent with their cultural values. (Murray et al., 2015, p. 1035)

The importance of Indigenous cultures and ways of knowing in family engagement in young children's learning is further emphasised by Gerlach and Gignac (2019, p. 70) when they conclude that

[a] tacit relational orientation to family engagement appears to be well aligned with Indigenous knowledge systems and approaches to individual and collective holistic health and well-being.

In the following section of this review, the characteristics of effective family engagement in young children's learning and with early childhood education settings are applied to the specific case of young children's mathematics learning and home learning environments in mathematics, as these are the critical supports in the *Let's Count* program.

5.3 Family engagement in young children's mathematics learning

While early childhood educators are crucial participants in the program, *Let's Count* relies on parents and other family members using opportunities for children to engage with mathematics in their everyday lives, talk about it, document it and extend it in ways that are relevant to them. This leads to the *Let's Count* mantra: **Notice, Explore and Talk about Mathematics**. In this section of the literature review, the engagement of parents and other family members in young children's mathematics experiences is explored.

The concept of the Home Learning Environment (HLE), or, in the mathematics context, the Home Numeracy Environment



(HNE) is one that has been explored by many researchers (Anders et al., 2012; Anderson & Anderson, 2018; Cheung & McBride, 2017; LeFevre et al., 2010; Niklas & Schneider, 2014; Schwarchuk, Sowinski, & LeFevre, 2014; Zippert, Douglas, Smith, & Rittle-Johnson 2020; Zippert & Rittle-Johnson, 2020). The characteristics of the HNE can impact children's mathematics learning. While the research is equivocal about the particular aspects of the HNE that affect children's mathematics learning (Missall, Hojnosi, Caskie, & Repasky, 2015), it is clear that critical to the quality of the HNE are the mathematical experiences that it encourages and the frequency of interaction between children and adults within these experiences.

Researchers have made a distinction between 'formal' and 'informal' mathematics activities that might be initiated in a HNE (Clements et al., 2020; Dunst, Hamby, Wilkie, & Scott Dunst, 2017; Elliott & Bachman, 2018; Skwarchuk et al., 2014). Formal activities include those that might be thought of as leading into school mathematics and that are generally seen to have a lesser role in the child's normal environment. These might include counting and arithmetical activities, focusing on the geometric properties of shapes, or sorting objects according to prescribed criteria. Informal activities are those that occur naturally in the child's environment and that – while they incorporate mathematical ideas and skills – do not have these as their primary focus. These might include activities such as cooking, outdoor play, games, puzzles, and constructions. Other aspects which might differ between formal and informal activities include the motive for the activity (for example, learning mathematics versus playing) and the level of child control.

Both types of activities will occur in HNEs but there is some evidence that informal activities might be particularly beneficial for the child in terms of enjoyment, wellbeing, and mathematics

learning. For example, Dunst et al. (2017, p. 120) suggest that "informal learning opportunities were better predictors of children's mathematics achievement compared to formal teaching activities", while Schwarchuk et al. (2014, p. 80) report that "both formal and informal home experiences are important in children's mathematical development".

Extending the importance of the motive for the learning within the HNE, Elliott and Bachman (2018, p. 18) note that "[f]amily-based research tentatively suggests that activities initiated or driven by children's interests may predict children's math learning more effectively than activities that are highly structured or planned by parents". Recalling the eight powerful mathematical ideas provides another view of the importance of the HNE, not only for learning in the mathematical knowledge fields but also in the fields of mathematical thinking: mathematisation, argumentation, and connections. Krummheuer (2018, p. 112) summarises his view of the critical aspects of a HNE by suggesting that "[t]hey [children] need an emotionally warm and cognitively challenging social environment in which they can ask questions, formulate hypotheses and can argue for their ideas concerning mathematics, and receive supportive responses". In summary, despite there being some challenges in knowing what particular aspects of a HNE have the greatest impact on children's mathematical learning and wellbeing, it seems clear that a nurturing, challenging and supportive environment – where children can undertake tasks they are interested in and have some control over in the presence of a knowing other – would be a very good start.

All researchers agree on one characteristic of an effective HNE – the presence of meaningful interactions between the child and at least one parent or family member.

This recalls the earlier discussion of the zone of proximal development (Vygotsky, 1978), sustained shared thinking (Siraj-Blatchford, 2009), and scaffolding (MacNaughton & Williams, 2009). One feature of such meaningful interactions is communication. Without strong and active communication, many opportunities for mathematical learning will be missed. Such 'math talk' is a critical element of mathematical learning (Cheung & McBride, 2017; Fuson et al., 2015; Ginsburg, Duch, Ertle, & Noble, 2012; Hendershot, Austin, Blevins-Knabe, & Ota, 2016; Hendrix, Hojnoski, & Missall, 2019; Jacobi-Vessels, Brown, Molfese, & Do, 2016; Purpura & Reid, 2016; Ramani et al., 2015; Trawick-Smith et al., 2016; Uscianowski, Ma, & Ginsburg, 2020). Jacobi-Vessels et al. (2016, p. 7) describe math talk as the "key to children's development". It has also been noted that "language is required to express and justify mathematical thinking" (Ginsburg et al., 2012, p. 53). The level and quality of math talk has been shown to be a predictor of children's future mathematics performance (Cheung & McBride, 2017; Purpura & Reid, 2016; Ramani et al., 2015). Math talk encourages participation in the HNE by assisting in the development of warm and responsive environments

that provide opportunities for children to cooperate and reason with co-learners in a playful situation and to exchange ideas, explanations and justifications of the 'mathematics' that they might invent in their interaction. In these mathematical play situations, the children are assisted by an adult. (Krummheuer et al., 2013, p. 187)

Recent work from Thippana et al. (2020) has shown that there may be some gender (of the child) and educational level (of the parents) differences in the ways math talk is implemented in families. For example, even though there were no such differences noted in the amount or nature of number talk during activities directly identifiable as mathematical.

[P]arents with higher education levels were more likely to use number talk than parents with lower education levels during activities not related to math. Significant gender differences were only seen in non-math-related activities, where parents were more likely to use number talk with boys compared to girls. (Thippana et al., 2020, p. 256)

Much meaningful math talk can be generated through interactions in activities such as puzzles, games, storytelling, and storybook reading (Clements et al., 2020; Matthews, 2015; Niklas & Schneider, 2014; Uscianowski et al., 2020), among many other activities both within and outside the home. For example, "playing dice or number games in families in everyday life seems to be an easy way of enhancing children's mathematical competencies" (Niklas & Schneider, 2014, p. 338), while discussing the shapes and numbers on road signs (Perry & Dockett, 2002b) can also open up many opportunities.

Noticing young children's mathematics in their everyday lives, exploring or playing with the mathematical ideas that have been noticed, and talking about these ideas forms the basis of the approach embodied within *Let's Count*. While the mantra is simple to recite, it is not necessarily simple to use. Parents

and other family members may need to be assisted in the development of their confidence and competence in applying and enacting the mantra (Gervasoni & Perry, 2016).

Many parents and family members will not necessarily see mathematics as one of their strengths, but they do know their children and want the best for them. Whatever their circumstances, most parents will engage their children in activities that will contain some mathematics, and, while the children will play with the mathematical ideas, the adults may be unaware of them. "[E]veryday mathematics is not an imposition from adults; indeed adults, including teachers, are often blissfully ignorant of it" (Ginsburg et al., 2012, p. 53). Parents/family members may need help in noticing their children's mathematics and in stimulating meaningful and enjoyable interactions based on this mathematics. From their study on the development of mathematical ideas from storybook reading, Uscianowski et al. (2020, p. 40) note that "our findings suggest that parents may benefit from support in engaging their children in challenging and abstract math-related talk about number and shape ... in order to promote their children's mathematical development".

There has been a number of interventions designed to assist parents/family members to develop effective HNEs to enhance young children's mathematics learning. For example, Niklas, Cohrssen, and Tayler (2016) provided a non-intensive intervention program for parents that resulted in higher quality HNEs and greater gains in mathematical competencies in the children of participating parents versus parents who did not participate in the intervention. Krummheuer et al. (2013) encouraged families to develop "learning environments that provide opportunities for children to cooperate and reason with co-learners in a playful situation and to exchange ideas, explanations and justifications of the 'mathematics' that they might invent in their interaction" (p. 187). The adults in this intervention needed support in implementing the strategy, as "[t]here are substantial differences in awareness by families of their capacity to support their children's mathematics learning and of the strategies they can use for that support" (Phillipson, Sullivan, & Gervasoni, 2017b, p. 12). While it might be expected that low SES parents may find it more difficult than others to develop effective HNEs, there is evidence to suggest that, given appropriate support, success can be theirs.

Early childhood educators can play an important role in building the knowledge and confidence of parents/family members as they are encouraged to facilitate their children's mathematics learning. For social justice reasons, it is important for all parents to have the opportunity. As Ginsburg et al. (2012, p. 61) note: "[S]truggling, low-SES parents do need help; but they too have something valuable to contribute to their children's education. Assuming that they don't is a poor strategy for eliciting their best efforts".

One challenge often heard from early childhood educators is that some parents are difficult to reach because of cultural, language, or social differences. However, as Streit-Lehmann (2017, p. 157) notes:

[B]y creating a personal relationship between parents and preschool teachers the majority of parents can be reached well. Some parents usually do not attend parent-teacher conferences, especially those with grave language barriers, but often there is the opportunity for positive face-to-face encounters in passing while parents bring and pick up their children.


Early childhood educators have an important role to play in establishing in the parents of the children in their setting a belief that they can be an asset in the mathematical learning of their children. By building positive relationships with the parents and sharing information and encouragement, early childhood educators can play a pivotal part in building confidence.

[E]ducators can play a keen role in encouraging early learning at home by linking learning that happens in the kindergarten with home related activities. When educators involve parents in what happens in the kindergarten or early learning centres, the communication between educators and parents provides clarification about the capitals that parents have access to including, their beliefs pertaining their children's health and knowledge. A good relationship between parents and educators provides opportunities for parents to engage with the relevant resources in their environment and to contribute

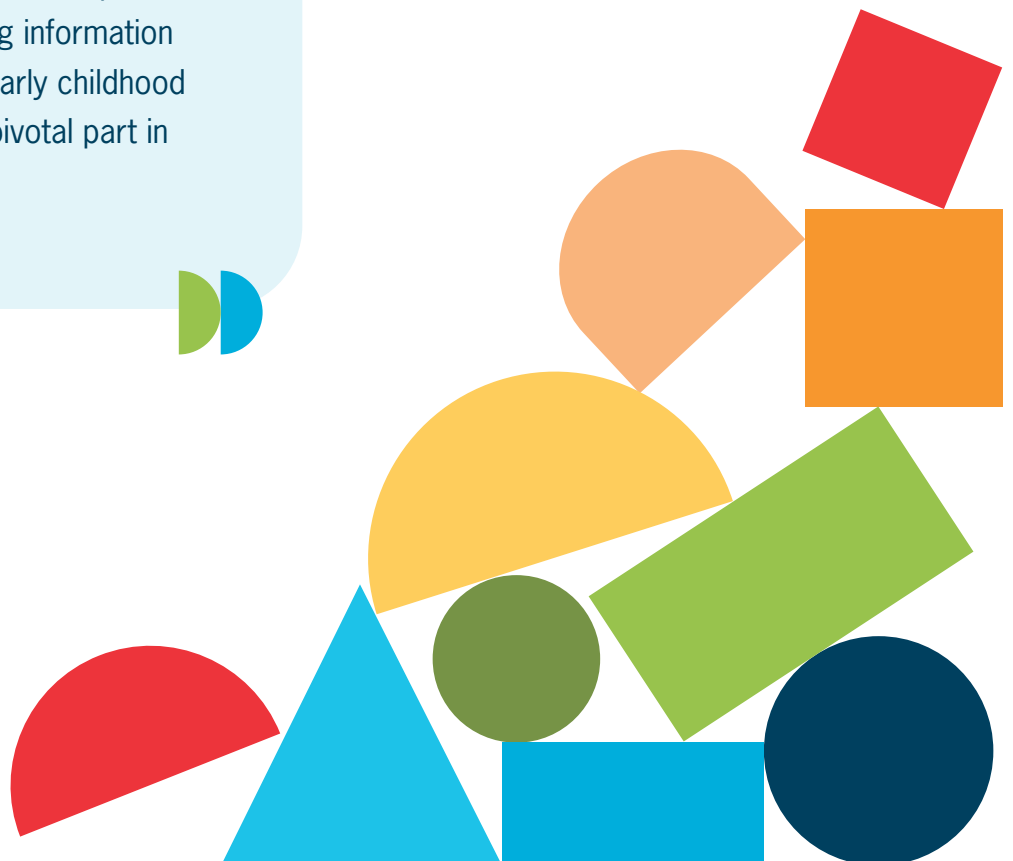

further to their children's capacity in early mathematical learning. A good relationship between parents and educators also allows for educators to be aware of parents' aspirations for their children's learning, which can be crucial to children's future success. (Phillipson, Richards, & Sullivan, 2017, p. 143)

In summary, there is ample evidence of the importance of family engagement in young children's mathematics learning. The establishment of effective HNEs is possible for most parents with the support of early childhood educators. These HNEs provide opportunities for parents/family members and children to interact in a warm, challenging, and supportive environment based on activities that interest the children and which elicit substantial math talk. They encourage parents/family members to **Notice, Explore and Talk about Mathematics** in everyday situations.

Phillipson et al. (2017b, p. 12) make the point that "families are as important as formal childcare, preschool and school experiences for stimulating the learning of young children", and the establishment of HNEs is a critical way to build this learning, particularly in mathematics. One way of doing this is through *Let's Count*.



By building positive relationships with the parents and sharing information and encouragement, early childhood educators can play a pivotal part in building confidence.



6. FINDINGS FROM THE EVALUATIONS OF LET'S COUNT

There have been many evaluations of the effectiveness of the many variations of the *Let's Count* program (Gervasoni, 2017; Gervasoni, MacDonald, Perry, & Roche, 2019; Gervasoni & Perry, 2013, 2014, 2015a, 2015b, 2016, 2017; Gervasoni, Perry, & Parish, 2015; Peridot Education Pty Ltd, 2019; Perry, Gervasoni, & Dockett, 2012; Perry, Gervasoni, Hampshire, & O'Neill, 2016; Perry, Gervasoni, & Kearney, 2012; The Smith Family, 2015). Many of these reports and papers make recommendations that should be considered in the revision of *Let's Count*.

6.1 Recommendations from the evaluation of the *Let's Count* pilot in 2010–2011

This evaluation generated data from educators and parents/family members with no direct generation of mathematics performance data from children. It showed that, at least for the adults involved in the program, *Let's Count* was a successful approach.

Data drawn from both the interviews and surveys suggested that *Let's Count* provided participants with many opportunities to enhance the mathematical outcomes of children and their families. As well, educators, parents and children enhanced their dispositions and confidence towards mathematics. Interview and survey data demonstrated that there was a positive change in attitude in key areas including improved attitudes to mathematics, increased awareness of the innovative ways it can be taught, and an increased understanding of how to engage mathematical learning through every day experiences. The importance of talking about mathematics and the significance of using mathematical language was emphasised by both educators and parents. (Perry, Gervasoni, & Kearney, 2012, p. 5)

The final evaluation report made 13 recommendations.

RECOMMENDATION 2012/1

That the *Let's Count* program be scaled to all TSF sites in Australia.

RECOMMENDATION 2012/2

That the target group for *Let's Count* be clarified so that it is clear whether the program is designed to cater for school as well as prior-to-school, educators, children and families.

RECOMMENDATION 2012/3

That any development or revision of materials for *Let's Count* targets the sectors determined as a result of Recommendation 2.

RECOMMENDATION 2012/4

That the fundamental content, structures and pedagogical approaches of Modules 1 and 2 be retained.

RECOMMENDATION 2012/5

That further examples of games that target areas of mathematics beyond number be included in Modules 1 and 2.

RECOMMENDATION 2012/6

That consideration be given to the development of associated materials for educators and families such as DVDs, posters and brochures.

RECOMMENDATION 2012/7

That consideration be given to the creation of a digital hub that would allow participants to access and share resources and ideas.

RECOMMENDATION 2012/8

That possible presenters for the scaled *Let's Count* program be identified, with the following characteristics:

- successful experience with families and educators in low socio-economic areas of Australia;
- leadership of professional development for early childhood educators; and
- knowledge in, and enthusiasm for, early childhood mathematics education.

RECOMMENDATION 2012/9

That, in each site, a local *Let's Count* champion be identified to support, encourage, visit and assist educators in their implementation of the program.



RECOMMENDATION 2012/10

That follow-up workshops or 'get-togethers' be held in each site at regular times after the second workshop to allow participants to reconnect with each other and to refresh their ideas and approaches.

RECOMMENDATION 2012/11

That consideration be given to ways in which successful implementation of *Let's Count* might be used by educators to contribute to further qualifications.

RECOMMENDATION 2012/12

That consideration be given to changing the name of the *Let's Count* program so that the title better exemplifies the diverse nature of mathematics and mathematics learning.

RECOMMENDATION 2012/13

That the possibility of an ARC Linkage project that explores the impact of the *Let's Count* program on a variety of variables including children's learning outcomes and dispositions, educators' attitudes, beliefs and practices and families' interaction with their children's mathematics be investigated.

The Smith Family considered all of these recommendations and made changes to the program. Another result of the report was the publication of *Strengthening Early Numeracy Learning: The Let's Count Program* (The Smith Family, 2015), which was highly influential in continuing and expanding the program.

6.2 Recommendations from the longitudinal evaluation of *Let's Count* in 2013-2014

Gervasoni and Perry's (2015b) evaluation built on the methodology of the evaluation of the pilot program (Perry, Gervasoni, & Kearney, 2012). However, it differed in two significant ways:

- the period of the evaluation was extended
- measures of children's mathematics performance were included.

This evaluation showed that *Let's Count* made a significant, positive difference to young children's mathematics learning and reinforced the previous findings around qualitative benefits to adults and children's confidence, competence, and dispositions in learning and teaching mathematics. For example,

the cohorts of children who experienced *Let's Count* in 2013 and 2014 showed noteworthy growth in their performance on the MAI [Mathematics Assessment Instrument] from the beginning of their preschool year to its end ... involvement in *Let's Count* is associated with greater mathematics learning than might be typically expected. (Gervasoni & Perry, 2015b, p. 5)

The early childhood educators involved in the evaluation praised *Let's Count* for providing them "with many opportunities to enhance the mathematical outcomes of children and their families" and enhancing "their dispositions and confidence towards mathematics" (Gervasoni & Perry, 2015b, p. 5).



This evaluation showed that *Let's Count* made a significant, positive difference to young children's mathematics learning and reinforced the previous findings around qualitative benefits to adults and children's confidence, competence and dispositions in learning and teaching mathematics.



Parents and other family members praised *Let's Count* for facilitating their children's mathematics learning and "commented on their own improved understanding of 'mathematics in everything' and their improved ability to 'notice' mathematics in their children's everyday environments" (Gervasoni & Perry, 2015b, p. 6).

In the light of the documented effectiveness of the *Let's Count* program, the longitudinal evaluation made five recommendations for future implementation, "with the aim of continuing to implement what has been shown to be a successful approach to enhancing young children's mathematical dispositions, knowledge and skills, as well as those of the children's early childhood educators and families" (Gervasoni & Perry, 2015b, p. 66).

RECOMMENDATION 2015/1

That The Smith Family, in conjunction with early childhood education providers and appropriate funding authorities, seek to implement the *Let's Count* program in all sites in which it has a presence.

RECOMMENDATION 2015/2

That the authors of the *Let's Count* program consider strengthening program content dealing with sustaining educator/parent communication across the entire year of implementation, including considering the feasibility of an enhanced resource for parents/families.

RECOMMENDATION 2015/3

That consideration be given to the appropriate publications that might emanate from the *Let's Count* program and its Longitudinal Evaluation, including Research Reports, academic chapters and journal articles

RECOMMENDATION 2015/4

That The Smith Family, in conjunction with appropriate tertiary institutions, continue to investigate the online offering of the educator professional learning modules with consequent accreditation.

RECOMMENDATION 2015/5

That The Smith Family seek funding opportunities to research the impact of *Let's Count* on children's mathematics learning following their transition to school.

The longitudinal evaluation showed *Let's Count* was highly effective for all participant groups and could safely be scaled up to a broader clientele.

Numerous papers and presentations have been drawn from the evaluation of the pilot program and the longitudinal evaluation of *Let's Count*. Many of these have already been canvassed in this literature review but the following recommendations drawn from the findings of the longitudinal evaluation provide insight into ways in which adults can support young children's mathematics learning.

1. Provoke children to notice, explore and talk about the mathematics that is part of everyday activities;
2. Provide prompts and suggestions for parents and educators about the range of mathematical activities that children encounter as part of everyday life. These include exploring and comparing shapes and patterns, comparing the size of objects through measurement, comparing numbers and groups, organising and discussing collections and data, and discussing the likelihood of events occurring;
3. Create sustained communication opportunities for parents to discuss the mathematics they notice their children using and exploring, and provide suggestions about how to extend this learning; and
4. Provide suggestions and prompts about games, songs and stories that can provoke mathematical interest, discussion and exploration. (Gervasoni, 2017, p. 213)

These recommendations reference the key elements of *Let's Count*.

6.3 Recommendations from the *Let's Count Online* evaluation in 2018

With assistance from the Australian Government, The Smith Family developed an online version of the educator program for *Let's Count* (The Smith Family, 2020b) in 2018. This was undertaken to expand the reach of the program and offer an alternative to the established face-to-face approach. During 2018–2019, an evaluation of this online approach was conducted “to determine the extent to which the outcomes achieved by educators who participated in the *Let's Count Online* professional learning in 2018 were similar to or varied from the outcomes achieved by educators who participated in the face to face model” (Gervasoni et al., 2019, p. 5). The evaluation of *Let's Count Online* showed that:

the participants in the evaluation were very positive about *Let's Count Online*, and many appreciated the chance to access the professional learning when opportunities for the face-to-face workshops were not available in their region. There were some important differences noted when comparing the *Let's Count Online* evaluation findings with those of the *Let's Count Longitudinal Evaluation* which

explored the impact of the *Let's Count* face-to-face course. These differences provide direction for how *Let's Count Online* may be refined and strengthened to align with the aims of *Let's Count*. (Gervasoni et al., 2019, p. 6)

While *Let's Count Online* was seen as an effective platform for offering professional learning for educators, there were eight recommendations made to help it remain “faithful to the underlying philosophical and pedagogical approach espoused by *Let's Count*” (Gervasoni et al., 2019, p. 9).

RECOMMENDATION 2018/1

Continue to develop the *Let's Count Online* course and expand its offering with due consideration of the subsequent recommendations.

RECOMMENDATION 2018/2

Increase the level of professional rigour, active engagement and accountability for learning embedded in the *Let's Count Online* course.

RECOMMENDATION 2018/3

Develop opportunities for feedback associated with learning opportunities embedded in *Let's Count Online*. This may include a *Let's Count Online* facilitator who can provide online or real-time feedback, or the opportunity for participants to complete the course in groups within a workplace or early years setting, with a leader in each setting facilitating discussion about the professional learning, and monitoring and supporting engagements with parents, and observations about children's mathematics use, language and learning.

RECOMMENDATION 2018/4

Review the *Let's Count Online* content and materials to identify and alleviate any dissonance with the theoretical underpinnings of *Let's Count*, early childhood approaches to learning and teaching, including those espoused by the Early Years Learning Framework for Australia, or reform approaches to mathematics education.

RECOMMENDATION 2018/5

Ensure that any refinement of the *Let's Count Online* course includes:

- Sustained emphasis on the *Let's Count* mantra – notice, explore and talk about mathematics in everyday contexts.
- More emphasis on the role of families and educators in developing children's mathematics language.
- Strategies to sustain educator/parent communication across an entire year of implementation, including consideration of an enhanced resource for parents/families.
- Inclusion of more diversity in children and families referred to and depicted in the *Let's Count Online* materials.

RECOMMENDATION 2018/6

Ensure that any refinement of the e-learning platform for *Let's Count Online* includes:

- a prominent help-line that is actively monitored, including an email address and phone support; and
- email prompts for all participants to begin modules and reminders to complete modules.

RECOMMENDATION 2018/7

Commission further evaluation of the impact of educators participating in *Let's Count Online* on children's mathematics learning and learning dispositions, and parents' engagement in their child's mathematics learning.

RECOMMENDATION 2018/8

Development of a primary school version of *Let's Count*, initially in a face-to-face mode, to increase the continuity of the *Let's Count* mantra and activities across and beyond the transition to school (Sarama & Clements, 2015). This may reduce the noted fade out effect of promising early years' interventions once children begin school. It also responds to noted interest amongst primary school educators in the *Let's Count Online* evaluation.

6.4 Recommendations from the *Let's Count* Community Professionals pilot evaluation in 2019

The Smith Family implemented the *Let's Count* Community Professionals pilot in six sites across three states in 2019.

The aim of the pilot program was to implement the *Let's Count* face-to-face program for the first time with a group of people who work with young children and their families but who are not trained early years educators working within early childhood education and care centres. (Peridot Education, 2019, p. 4)

Involving these 'community professionals' is recognition that the *Let's Count* program can be broadened. Participants were trained in a 'mixed cohort', consisting of trained early years educators and other community professionals, and generally found the arrangement to be effective for all concerned. Of particular note was the diversity of experiences, outlooks, and ways of interacting with families represented in each site group. Seven recommendations were made to encourage the permanent inclusion of community professionals in *Let's Count* programs.

RECOMMENDATION 2019/1

That the 'mixed cohort' model used in the *Let's Count* Community Professionals Pilot 2019 become the usual method of offering for *Let's Count* face-to-face training.

RECOMMENDATION 2019/2

That TSF Program Coordinators in each of the TSF communities identify potential community professionals and their organisations for future invitations to participate in *Let's Count*.

RECOMMENDATION 2019/3

That *Let's Count* materials, including handbooks, presentation PowerPoints, tip sheets, and activity bags be reviewed and revised with a view to incorporating the latest relevant research and the changing nature of participants resulting from Recommendation 1.

RECOMMENDATION 2019/4

That, while preference would be for the 'mixed cohort' model highlighted in Recommendation 1, consideration be given to running 'community professional only' training in *Let's Count*, particularly in TSF communities where the centre-based early childhood education potential has been saturated through repeated offering of the program or where an organisation is able to contribute sufficient numbers of community professionals to make a viable training group.

RECOMMENDATION 2019/5

That the community professionals who have participated in the *Let's Count* Community Professionals Pilot 2019 be contacted near the end of 2019 and asked to complete a survey about the ongoing impact of the program in their context.

RECOMMENDATION 2019/6

That consideration be given to including materials in the *Let's Count online* course which directly target, and reflect the perspectives of, community professionals. A starting point for the development of such materials could be the reported examples of how community professionals have used *Let's Count* in their own contexts.

RECOMMENDATION 2019/7

That the results of the evaluation of *Let's Count* Community Professionals Pilot 2019 be published on the *Let's Count* website and in other outlets as a celebration of yet another successful component of the overall *Let's Count* initiative.

Most of the recommendations from the four evaluations of *Let's Count* have already been acted on in previous revisions of the program and its materials. However, the recommendations could also be usefully revisited to rethink approaches and develop materials that cater to the full diversity of families who are potential *Let's Count* participants.



7. AUSTRALIAN GOVERNMENT POLICY ON EARLY CHILDHOOD MATHEMATICS EDUCATION

The 2015 National Innovation and Science Agenda (NISA) made a commitment to improve the science, technology, engineering and mathematics (STEM) skills of all young Australians. Many education initiatives followed, including the National STEM School Education Strategy 2016–2026.

NISA funded three initiatives aimed at building young children's pre-foundational skills and dispositions, engaging young children's families and communities, and providing early learning STEM resources and training for early childhood educators. These three initiatives were:

- Early Learning STEM Australia (ELSA) (2020)
- *Let's Count* (The Smith Family, 2020a)
- Little Scientists (Little Scientists Australia, 2020).

The *Let's Count* program has already been described in this document. Brief summaries of the intent of the other programs are drawn from their websites.

EARLY LEARNING STEM AUSTRALIA

Early Learning STEM Australia (ELSA) is a play-based digital learning program for children in preschool to explore science, technology, engineering and mathematics (STEM). ELSA allows children to play, experiment and make sense of the world around them – which is part of STEM, and also part of being a child. ELSA's STEM Practices encourage children to ask questions, make predictions, experiment, and reflect on what happened and why. (ELSA, 2020)

LITTLE SCIENTISTS

Little Scientists Australia is a not-for-profit professional development program for early childhood educators and teachers. The project is supported and funded by the Australian Government's Department of Education and Training through the National Innovation and Science Agenda.

Our affordable, hands-on workshops combine inquiry-based learning with age-appropriate STEM exploration and encourage daily scientific exploration with children aged 3 to 6 years. (Little Scientists Australia, 2020)

7.1 Evaluation of early learning and schools initiatives in the national innovation and science agenda

In 2019, the Australian Government commissioned dandolopartners to evaluate 15 NISA initiatives across the education portfolio, including the three early learning initiatives, to inform future government decisions about support for STEM teaching and learning initiatives. In general, dandolopartners found that most of the 15 initiatives were successful in reaching their audiences, most were positively received, and most provided opportunities for increasing STEM confidence and engagement (DESE, 2020a).



Stakeholders spoke highly about the research base for *Let's Count* and its aim “to fill a gap in supporting parents to develop the mathematics skills of the children in their care by noticing, exploring, and talking about mathematics using everyday activities”



The dandolopartners evaluations of the three early learning initiatives may have some useful messages for the current revision of *Let's Count*, so a brief summary of each is provided here.

7.1.1 EARLY LEARNING STEM AUSTRALIA

Both educators and children had high levels of engagement with the ELSA apps, and the strong links between the apps and *Belonging, Being & Becoming: The Early Years Learning Framework for Australia* (EYLF) were recognised. Of particular note was the inclusivity of the ELSA pedagogy.

Some stakeholders thought ELSA was successful at promoting STEM thinking and STEM skills and gave children an opportunity to creatively engage with a range of media. They also said ELSA is appropriately aligned with the EYLF. However, some stakeholders report that ELSA had not appropriately engaged with the early childhood sector, and the initiative was developed with limited experience in early childhood education, and pedagogical knowledge. (DESE, 2020a, p. 131)

7.1.2 LET'S COUNT

Stakeholders spoke highly about the research base for *Let's Count* and its aim “to fill a gap in supporting parents to develop the mathematics skills of the children in their care by noticing, exploring, and talking about mathematics using everyday activities” (DESE, 2020a, p. 135). *Let's Count Online* was seen as a successful innovation, particularly in terms of the flexibility it provided for educators. One of the challenges found for *Let's Count* into the future was “finding a balance between expanding the initiative to reach more people and ensuring that the initiative serves participants from disadvantaged backgrounds” (DESE, 2020a, p. 136).

7.1.3 LITTLE SCIENTISTS

Stakeholders were positive about the research base and professional development offerings from Little Scientists.

Data collected over two years of the program indicates that the Little Scientists program is favourably received by the participants. Strengths include the focus on the everyday nature of STEM, and the ability to integrate the Little Scientists activities into a range of early childhood education and care settings. Participation in the Little Scientists workshops appears to have a positive impact upon educators' confidence and practices, and in turn impacts positively upon children's STEM learning opportunities. (DESE, 2020a, p. 140)

Dandolopartners was asked to recommend future STEM priorities for the Australian Government. It recommended the following:

There is a clear opportunity to prioritise activities in:

- Continuing to build STEM capability among educators across the education system
- Continuing to prioritise scaling up initiatives to a national level
- Building a robust and consistent national evidence base on what success looks like in STEM education
- Leveraging existing networks and relationships to coordinate and link actors in the STEM space for collaboration (DESE, 2020a, p. 58).

The revised *Let's Count* program could contribute to each of these priorities.



8. LINKS WITH THE LEARNING OUTCOMES FROM *BELONGING, BEING & BECOMING: THE AUSTRALIAN EARLY YEARS LEARNING FRAMEWORK*

In Australia, early childhood programs are required to implement approved curricula consistent with *Belonging, Being & Becoming: The Early Years Learning Framework for Australia* (EYLF). *Let's Count* supports young children's overall learning and development consistent with the EYLF approach and contributes to children achieving the EYLF's five learning outcomes.

8.1 Learning Outcome 1: Children have a strong sense of identity

Children learn about themselves and construct their own identity within the context of their families and communities. This includes their relationships with people, places and things and the actions and responses of others. Identity is not fixed. It is shaped by experiences. When children have positive experiences, they develop an understanding of themselves as significant and respected. (DEEWR, 2009, p. 20)

Within their families, communities, and early childhood settings, young children can feel safe and secure as they are nurtured in their learning and development by supportive adults and peers. Adults also find support through relationships that are characterised by trust and respect. Through supported challenge in tasks that utilise their interests and current knowledge, children, families, and educators depend on each other and build their agency. There may be setbacks as tasks are tackled and problems for investigation are identified and addressed, but the strength of the relationships and support may also instil resilience. By recognising the strengths of children and adults and promoting positive identities as learners, parents and educators develop and confidence increases. All people display many identities, including identities as powerful mathematicians. These are nurtured in supportive but challenging environments with high expectations. *Let's Count* promotes environments that recognise cultural knowledge and build on the strengths of all involved.

8.2 Learning Outcome 2: Children are connected with and contribute to their world

Experiences of relationships and participation in communities contribute to children's belonging, being and becoming. From birth children experience living and learning with others in a range of communities. These might include families, local communities or early childhood settings ...

Children's connectedness and different ways of belonging with people, country and communities helps them to learn ways of being which reflect the values, traditions and practices of their families and communities. Over time this learning transforms the ways they interact with others. (DEEWR, 2009, p. 26)

Mathematics learning is an interactive sport, occurring in groups that cooperate, and that respect, trust, and support their members. All people, including children, have rights to be heard and respected on matters of importance to them, including

their culture and learning. The adoption of culturally responsive pedagogies in *Let's Count* assists the development of respect for diversity as mathematics learning occurs. A major aspect of this development will occur as a natural consequence of play, during which children develop an understanding of their own rights and the rights of others. If it is to be successful, collaborative play requires active participation and reflection. One of the eight powerful mathematical ideas is 'connections', not only within mathematics but between mathematics and the worlds of the learner. Through connecting to their worlds, children can gain a greater understanding and respect for their environments and the people in them.

8.3 Learning Outcome 3: Children have a strong sense of wellbeing

Wellbeing includes good physical health, feelings of happiness, satisfaction and successful social functioning. It influences the way children interact in their environments. A strong sense of wellbeing provides children with confidence and optimism which maximise their learning potential. It encourages the development of children's innate exploratory drive, a sense of agency and a desire to interact with responsive others.

Wellbeing is correlated with resilience, providing children with the capacity to cope with day-to-day stress and challenges. The readiness to persevere when faced with unfamiliar and challenging learning situations creates the opportunity for success and achievement. (DEEWR, 2009, p. 30)

Children's wellbeing is nurtured in environments of trust, respect, challenge, support, and success. Wellbeing is enhanced when each child's funds of knowledge, such as language or cultural background, is celebrated in the family, community, and early childhood setting. As children engage with mathematics learning through *Let's Count*, their wellbeing and agency encourages them to take risks, experience times of frustration and confusion, and demonstrate trust, confidence, and respect for others and other ways of doing things. Negotiating challenging mathematics tasks within a high-expectations pedagogy requires perseverance and stamina, both important components of wellbeing. For parents and family members whose past experiences with mathematics are not seen to have been successful, even agreeing to engage with *Let's Count* will involve some risk. However, the supportive and collaborative pedagogies used in *Let's Count* also provide ample opportunity to enhance adults' sense of wellbeing on many fronts.

8.4 Learning Outcome 4: Children are confident and involved learners

Children are more likely to be confident and involved learners when their family and community experiences and understandings are recognised and included in the early childhood setting ...

Children use processes such as exploration, collaboration and problem solving across all aspects of curriculum. Developing dispositions such as curiosity, persistence and creativity enables children to participate in and gain from learning. Effective learners are also able to transfer and adapt what they have learned from one context to another ...

Children develop understandings of themselves and their world through active, hands-on investigation ...

Active involvement in learning builds children's understandings of concepts and the creative thinking and inquiry processes that are necessary for lifelong learning. They can challenge and extend their own thinking, and that of others, and create new knowledge in collaborative interactions and negotiations. (DEEWR, 2009, p. 33)

Child-initiated, child-centred play encourages children to use their curiosity to explore their world, including the world of mathematical ideas. Children engage in play and display their developing skills in problem solving, investigation, research, and mathematisation. They use their knowledge of mathematics skills and processes to complexify their play and challenge their and their peers' ideas. Children can follow their own interests in play, and they learn from play, particularly when they interact with others. Adults also play and learn, particularly with their children. One of the ways in which this happens is through sustained shared thinking in a culturally and mathematically appropriate environment. Children do not need to be told 'correct' answers to questions, but they do need to be asked challenging questions and given support to help them answer them or find another question. The pedagogies used in *Let's Count* are designed to support adults – both educators and parents/family members – to learn how to formulate and ask these questions so that children may experience the sustained shared thinking that is characteristic of mathematics learning.

8.5 Learning Outcome 5: Children are effective communicators

[Children] are social beings who are intrinsically motivated to exchange ideas, thoughts, questions and feelings, and to use a range of tools and media, including music, dance and drama, to express themselves, connect with others and extend their learning. ...

Children's use of their home languages underpins their sense of identity and their conceptual development ...

Numeracy is the capacity, confidence and disposition to use mathematics in daily life. Children bring new mathematical understandings through engaging with problem solving. It is essential that the mathematical ideas with which young children interact are relevant and meaningful in the context of their current lives ...

Positive attitudes and competencies in literacy and numeracy are essential for children's successful learning. (DEEWR, 2009, p. 38)

The importance of interactions among learners or between children and 'knowing others' has been well established throughout this literature review. The role of language – in the broadest sense – is critical to the success of these interactions. The importance of 'math talk' – between educators and parents/family members, between children and parents/family members in the home numeracy environment, and among children – has been established. Even though *Let's Count* provides a great opportunity to experience mathematics in home language, not everyone is confident with math talk. One of the features of *Let's Count* needs to be the development of math talk.

While there is mathematics in everything, the essence of mathematics is in the study of patterns, and the rules that derive from these patterns. These patterns can occur in numbers, shapes, measurement, and data; all ideas that children and adults will find in their worlds. Symbolic representations can be used to communicate mathematical ideas but are not necessary with young children unless they express a desire to use them. Children can develop their own 'marks' to demonstrate their thinking and these should be honoured in the same ways as any other learning. While *Let's Count* recognises that young children are becoming more and more 'tech savvy', there has not as yet been a concerted attempt to introduce technology into activities with children, although the recent introduction of the *Let's Count* Parent bot may herald further work in this area.



9. RECOMMENDATIONS ARISING FROM THE LITERATURE REVIEW

This literature review has been constructed to inform the revision of the *Let's Count* program. To this end, the following recommendations have been made to guide the program going forward. Cross-references to sections in the literature review that provide further detail, explanation, and justification appear in parentheses.

RECOMMENDATION 1

That the revision of *Let's Count* maintains and enhances its strengths-based pedagogical approach for all participants. (3.3, 4.1, 4.2, 5.1, 5.2, A2, A3)

RECOMMENDATION 2

That the revision of *Let's Count* continues its emphasis on high expectations of everyone involved: families; communities; early childhood educators and other community professionals; children; and Smith Family facilitators. (3.2, 3.3, 4.3, 5.1, 5.2, 8.1, 8.3, A2, A3)

RECOMMENDATION 3

That the revision of *Let's Count* uses culturally responsive pedagogies to develop learning and teaching approaches and materials that are culturally appropriate for all participants. (3.3, 4.2, 8.2, A2)

RECOMMENDATION 4

That *Let's Count* incorporates Aboriginal and Torres Strait Islander knowledges, and learning and teaching approaches, into its pedagogical basis, and into specific examples. (3.1, 3.3, 4.1, 4.2, 4.3, 4.5, A2)

RECOMMENDATION 5

That the development of strong, positive, collaborative, and respectful partnerships among family members, communities, and early childhood educators or other community professionals be central to *Let's Count*. (3.3, 5.1, 5.2, A1, A2, A3)



That the revision of *Let's Count* continues its emphasis on high expectations of everyone involved: families; communities; early childhood educators and other community professionals; children; and facilitators from The Smith Family.



RECOMMENDATION 6

That the elements of effective early years pedagogy be applied to the development of mathematical experiences within *Let's Count*. These elements are:

- child-led, child-initiated, and adult-supported experiences
- opportunities that are generated through the interests, curiosity, culture, and experiences of children and family members to promote meaningful and relevant learning experiences and outcomes
- both planned and incidental activities
- high expectations based on knowledge of individual children and their strengths
- children's rights, particularly their rights to have input into their experiences, to be listened to, and to be treated as capable
- play as a context for learning
- a diverse range of materials and resources.

(3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 5.3, 8.3, A2, A3)

RECOMMENDATION 7

That *Let's Count* provides guidance for families to engage in sustained shared thinking in mathematics. (3.1, 4.4, 5.3, 8.4)

RECOMMENDATION 8

That *Let's Count* maintains **Notice, Explore and Talk About Mathematics** as the program's mantra. (4.1, 5.3, 6.3, A1)

RECOMMENDATION 9

That *Let's Count* uses Bishop's six universal mathematical activities, the eight powerful mathematical ideas, and culturally responsive practice to determine mathematical content. (3.3, 4.2, 4.3, 4.5, 4.6, 5.3, 8.2, A2)

RECOMMENDATION 10

That *Let's Count* is underpinned by recognition that all participants can be powerful mathematicians. (4.1, 4.3, 8.1)

10. REFERENCES FOR LITERATURE REVIEW

- Adams, K., Bull, R., & Maynes, M.L. (2016). Early childhood spirituality in education: Towards an understanding of the distinctive features of young children's spirituality. *European Early Childhood Education Research Journal*, 24, 760–774.
- Anders, Y., Rossbach, H.-G., Weinert, S., Ebert, S., Kuger, S., Lehl, S., & von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly*, 27, 231–244.
- Anderson, A., & Anderson, J. (2018). Instruction and construction of mathematics at home: An exploratory study. In C. Benz, A.S. Steinweg, H. Gasteiger, P. Schöner, H. Vollmuth, & J. Zöllner (Eds.), *Mathematics education in the early years* (pp. 281–298). Cham: Springer.
- Anderson, R., Stütz, A., Cooper, T., & Nason, R. (2017). Developing a theoretical framework to inform the design of a teacher professional development program to enable Foundation to Year 2 teachers of mathematics to build on Indigenous and low-SES students' cultural capital. *Mathematics Teacher Education and Development*, 19(3), 94–116.
- Anthony, G., & Walshaw, M. (2007). *Effective pedagogy in mathematics/pāngarau*. Wellington: Ministry of Education. <https://www.educationcounts.govt.nz/publications/series/2515/5951>
- Armstrong, S., Buckley, S., Lonsdale, M., Milgate, G., Bennetts Kneebone, L., Cook, L., & Skelton, F. (2012). *Starting school: A strengths-based approach towards Aboriginal and Torres Strait Islander children*. Melbourne: Australian Council for Educational Research. https://research.acer.edu.au/cgi/viewcontent.cgi?article=1027&context=indigenous_education
- Aronson, B., & Laughter, J. (2016). The theory and practice of culturally relevant education: A synthesis of research across content areas. *Review of Educational Research*, 86, 163–206.
- Arthur, L., Beecher, B., Death, E., Dockett, S., & Farmer, S. (2018). *Programming and planning in early childhood settings* (7th ed.). Melbourne: Cengage.
- Arthur, L., Beecher, B., Death, E., Dockett, S., & Farmer, S. (2021). *Programming and planning in early childhood settings* (8th ed.). Melbourne: Cengage.
- Australian Association of Mathematics Teachers and Early Childhood Australia (AAMT/ECA). (2006). *Position paper on early childhood mathematics*. <https://aamt.edu.au/About-AAMT/Position-statements/Early-childhood>
- Bainbridge, R., McCalman, J., Clifford, A., & Tsey, K. (2015). *Cultural competency in the delivery of health services for Indigenous people*. Issue paper no. 13. Melbourne: Closing the Gap Clearinghouse, Australian Institute of Health and Welfare. <https://www.aihw.gov.au/reports/indigenous-australians/cultural-competency-in-the-delivery-of-health-services-for-indigenous-people/contents/table-of-contents>
- Barblett, L., Knaus, M., & Barratt-Pugh, C. (2016). The pushes and pulls of pedagogy in the early years: Competing knowledges and the erosion of play-based learning. *Australasian Journal of Early Childhood*, 41(4), 36–43.
- Barker, B., & Harris, D. (2020). *Parent and family engagement: An implementation guide for school communities*. Canberra: Australian Research Alliance for Children and Youth.
- Barnett, M.A., Paschall, K.W., Mastergeorge, A.M., Cutshaw, C.A., & Warren, S.M. (2020). Influences of parent engagement in early childhood education centers and the home on Kindergarten school readiness. *Early Childhood Research Quarterly*, 53, 260–273.
- Barrable, A. (2019). The case for nature connectedness as a distinct goal of early childhood education. *International Journal of Early Childhood Environmental Education*, 6(2), 59–70.
- Bassok, D., Latham, S., & Rorem, A. (2016). Is Kindergarten the new first grade? *AERA Open*, 1(4), 1–31.
- Beneke, M., & Cheatham, G. (2016). Inclusive, democratic family-professional partnerships: (Re)conceptualising culture and language in teacher preparation. *Topics in Early Childhood Special Education*, 35(4), 234–44. <https://doi.org/10.1177/0271121415581611>
- Bennett, S., Gunn, A., Gayle-Evans, G., Barrera, E., & Leung, C. (2018). Culturally responsive literacy practices in an early childhood community. *Early Childhood Education Journal*, 46(2), 241–248. <https://doi.org/10.1007/s10643-017-0839-9>
- Benz, C., Steinweg, A.S., Gasteiger, H., Schöner, P., Vollmuth, H., & Zöllner, J. (Eds.). (2018). *Mathematics education in the early years*. Cham: Springer.
- Bishop, A. J. (1988). Mathematics education in its cultural context. *Educational Studies in Mathematics*, 19, 179–191.
- Björklund, C., Magnusson, M., & Palmér, H. (2018). Teachers' involvement in children's mathematizing – Beyond dichotomization between play and teaching. *European Early Childhood Education Research Journal*, 26(4), 469–480.
- Bobongie, F., & Jackson, C. (2019). Stronger Smarter – Transformational change for Australian schools with rock-solid foundations in the Early Years. In J. Allan, V. Harwood, & C. Rubner Jorgensen (Eds.), *World yearbook of education 2020: Schooling, governance and Inequalities* (pp. 161–176). London: Routledge. (Pre- publication copy, pp. 1–18).

- Bone, J. (2008). Creating relational spaces: Everyday spirituality in early childhood settings. *European Early Childhood Education Research Journal*, 16(3), 343–356. <https://doi.org/10.1080/13502930802292122>
- Bone, J., Cullen, J., & Loveridge, J. (2007). Everyday spirituality: An aspect of the holistic curriculum in action. *Contemporary Issues in Early Childhood*, 8(4), 344–354. <https://doi.org/10.2304/ciec.2007.8.4.344>
- Bowman, B., Donovan, M.S., & Burns, M.S., (Eds.). (2001). *Eager to learn: Educating our preschoolers*. Washington, DC: National Academy Press.
- Boyle, T., Petriwskyj, A., & Grieshaber, S. (2018). Reframing transitions to school as continuity practices: The role of practice architectures. *Australian Educational Researcher*, 45, 419–434. <https://doi.org/10.1007/s13384-018-0272-0>
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22(6), 723–742. <https://doi.org/10.1037/0012-1649.22.6.723>
- Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In W. Damon & R.M. Lerner (Eds.), *Handbook of child psychology, Theoretical models of human development* (Vol. 1, 6th ed.) (pp. 993–1023). New York: Wiley.
- Brown-Jeffy, S., & Cooper, J.E. (2011, winter). Toward a conceptual framework of culturally relevant pedagogy: An overview of the conceptual and theoretical literature. *Teacher Education Quarterly*, 65–84.
- Buxton, L. (2017). Ditching deficit thinking: Changing to a culture of high expectations. *Issues in Educational Research*, 27(2), 198–214.
- Carmichael, C., MacDonald, A., & McFarland-Piazza, L. (2014). Predictors of numeracy performance in national testing programs: Insights from the longitudinal study of Australian children. *British Educational Research Journal*, 40(4), 637–659.
- Campbell, C., & Speldewinde, C. (2018). Bush kinder in Australia: A new learning 'place' and its effect on local policy. *Policy Futures in Education*, 17(4), 541–559.
- Carr, M., & Lee, W. (2012). *Learning stories: Constructing learner identities in early education*. London: SAGE.
- Carr, M., & Lee, W. (2019). *Learning stories in practice*. London: SAGE.
- Cedric, D., Cassidy, D., Barber, U., Page, M., & Callinan, S. (2014). Cultural competence. *Educating Young Children: Learning and Teaching in the Early Childhood Years*, 20(1), 11–13.
- Chawla, L. (2015). Benefits of nature contact for children. *Journal of Planning Literature*, 30(4), 433–452.
- Cheeseman, J. (2019). Young children are natural inquirers: Posing and solving mathematical problems. *Waikato Journal of Education*, 25(2), 11–22.
- Cheung, S.K., & McBride, C. (2017). Effectiveness of parent-child number board game playing in promoting Chinese kindergarteners' numeracy skills and mathematics interest. *Early Education and Development*, 28(5), 572–589.
- Chu, M. (2014). Preparing tomorrow's early childhood educators: Observe and reflect about culturally responsive teachers. *YC Young Children*, 69(2), 82–87.
- Claessens, A., & Engel, M. (2013). How important is where you start? Early mathematics knowledge and later school success. *Teachers College Record*, 115(6). <http://eric.ed.gov/?id=EJ1020177>
- Claessens, A., & Garrett, R. (2014). The role of early childhood settings for 4–5 year old children in early academic skills and later achievement in Australia. *Early Childhood Research Quarterly*, 29, 550-561. <https://doi.org/10.1016/j.ecresq.2014.06.006>
- Clements, D.H., Vinh, M., Lim, C-I., & Sarama, J. (2020). STEM for inclusive excellence and equity, *Early Education and Development*. <https://doi.org/10.1080/10409289.2020.1755776>
- Cohen, D, Raudenbush, S., & Ball, D. (2003). Resources, instruction, and research. *Educational Evaluation and Policy Analysis*, 25(2), 119–142. <https://doi.org/10.3102/01623737025002119>
- Cohrssen, C., & Niklas, F. (2019). Using mathematics games in preschool settings to support the development of children's numeracy skills, *International Journal of Early Years Education*, 27(3), 322–339.
- Cohrssen, C., Church, A., & Tayler, C. (2011). *Practice principle 5: Respectful relationships and responsive engagement*. Melbourne: Department of Education and Early Childhood Development (Victoria). <https://www.education.vic.gov.au/Documents/childhood/providers/edcare/respectrelns.pdf>
- Cole, J. (2011). *A research review: The importance of families and the home environment*. London: National Literacy Trust. <https://literacytrust.org.uk/research-services/research-reports/importance-families-and-home-environment-2011-research-review/>
- Colmer, K., Rutherford, L., & Murphy, P. (2011). Attachment theory and primary caregiving. *Australasian Journal of Early Childhood*, 36(4), 16–20.
- Cooper, M., & Hedges, H. (2014). Beyond participation: What we learned from Hunter about collaboration with Pasifika children and families. *Contemporary Issues in Early Childhood*, 15(2), 165–175.

- d'Entremont, Y. (2015). Linking mathematics, culture and community. *Procedia – Social and Behavioral Sciences*, 174, 2818–2824.
- Daniels-Mayes, S., & Sinclair, K. (2014). Improving education for Aboriginal children and youth – “More than bums on seats in classrooms”: The significance of cultural competence and culturally responsive pedagogy. [Paper presentation]. Australian Sociological Association Annual Conference, Adelaide.
- de Lissovoy, N. (2010). Pedagogy in common: Democratic education in the global era. *Educational Philosophy and Theory*, 43(10), 1119–1134.
- De Souza, M. (2016). The spiritual dimension of education – addressing issues of identity and belonging. *Discourse and Communication for Sustainable Education*, 7(1), 125–138.
- Deans, J. (2016). Thinking, feeling and relating: Young children learning through dance. *Australasian Journal of Early Childhood*, 41(3), 46–57.
- Degotardi, S., Sweller, N., & Pearson, E. (2013). Why relationships matter: Parent and early childhood teacher perspectives about the provisions afforded by young children's relationships. *International Journal of Early Years*, 21(1), 4–21.
- Department of Education, Employment and Workplace Relations (DEEWR). (2009). *Belonging, Being & Becoming: The Early Years Learning Framework for Australia*. Canberra: DEEWR. https://www.acecqa.gov.au/sites/default/files/2018-02/belonging_being_and_becoming_the_early_years_learning_framework_for_australia.pdf
- DEEWR. (2010). *Educators guide to the Early Years Learning Framework for Australia*. Canberra: DEEWR. <https://www.dese.gov.au/national-quality-framework-early-childhood-education-and-care/resources/educators-guide-early-years-learning-framework-australia>
- Department of Education, Skills and Employment (DESE). (2020b). Support for science, technology, engineering and mathematics (STEM). <https://www.education.gov.au/support-science-technology-engineering-and-mathematics>
- Dockett, S. (2014). Transition to school: Normative or relative? In B. Perry, S. Dockett, & A. Petriwskyj, (Eds.), *Transitions to school – International research, policy and practice* (pp. 187–200). Dordrecht: Springer.
- Dockett, S., & Einarsdóttir, J. (2017). Continuity and change as children start school. In N. Ballam, B. Perry, & A. Garpelin (Eds.), *Pedagogies of educational transitions: European and antipodean research* (pp. 133–149). Cham: Springer.
- Dockett, S., Einarsdóttir, J., & Perry, B. (Eds.) (2019). *Listening to children's advice about starting school and school age care*. London: Routledge.
- Dockett, S., & Goff, W. (2013). Noticing young children's mathematical strengths and agency. In V. Steinle, L. Ball, & C. Bardini (Eds.), *Mathematics education: Yesterday, today and tomorrow* (Proceedings of the 36th annual conference of Mathematics Education Research Group of Australasia Inc. 2013) (pp. 771–774). Melbourne: MERGA.
- Dockett, S., Griebel, W., & Perry, B. (2017). Transition to school: A family affair. In S. Dockett, W. Griebel, & B. Perry (Eds.), *Families and transition to school* (pp. 1–18). Cham: Springer.
- Dockett, S., & Perry, B. (2009). Readiness for school: A relational construct. *Australasian Journal of Early Childhood*, 34(1), 20–26.
- Dockett, S., & Perry, B. (2013). Trends and tensions: Australian and international research about starting school. *International Journal of Early Years Education*, 21(2–3), 163–177. <https://doi.org/10.1080/09669760.2013.832943>
- Dockett, S., & Perry, B. (2014). *Continuity of learning: A resource to support effective transition to school and school age care*. Canberra, ACT: Australian Government Department of Education. <https://www.dese.gov.au/child-care-package/resources/continuity-learning-resource-support-effective-transition-school-and-school-age-care>
- Dockett, S., & Perry, B. (2015). Transition to school: Times of opportunity, expectation, aspiration and entitlement. In W. Parnell & J. O'rio (Eds.), *Rethinking readiness in early childhood education: Implications for policy and practice* (pp. 123–140). New York: Palgrave Macmillan.
- Doucet, F. (2017). What does a culturally sustaining learning climate look like? *Theory into Practice*, 56, 195–204. <https://doi.org/10.1080/00405841.2017.1354618>
- Downton, A., MacDonald, A., Cheeseman, J., Russo, J., & McChesney, J. (2020). Mathematics learning and education from birth to eight years. In J. Way, C. Attard, J. Anderson, J. Bobis, H. McMaster, & K. Cartwright (Eds.), *Research in Mathematics Education in Australasia 2016–2019*, (pp. 209–244). Singapore: Springer.
- Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., & Huston, A.C. (2007). School readiness and later achievement. *Developmental Psychology*, 43(6), 1428–1446.
- Dunlop, A.-W. (2007). Bridging research policy and practice. In A.-W. Dunlop & H. Fabian (Eds.), *Informing transitions in the early years* (pp. 151–168). Maidenhead: Open University Press.
- Dunst, C.J., Hamby, D.W., Wilkie, H., & Scott Dunst, K. (2017). Meta-analysis of the relationship between home and family experiences and young children's early numeracy learning. In S. Phillipson, P. Sullivan, & A. Gervasoni (Eds.), *Engaging families as the first mathematics educators of children: Early mathematics learning and development* (pp. 105–125). Singapore: Springer.

- Durden, T., Escalante, R., & Blitch, E. (2015). Start with us! Culturally relevant pedagogy in the preschool classroom. *Early Childhood Education Journal*, 43(3), 223–232. <https://doi.org/10.1007/s10643-014-0651-8>
- Early Learning STEM Australia (ELSA). (2020). *Early learning STEM Australia*. <https://elsa.edu.au/>
- Educational Transitions and Change (ETC) Research Group. (2011). *Transition to school: Position statement*. Albury- Wodonga: Research Institute for Professional Practice, Learning and Education, Charles Sturt University. <https://arts-ed.csu.edu.au/education/transitions/publications/Position-Statement.pdf>
- Edwards, C., Gandini, L., & Forman, G. (Eds.). (1998). *The hundred languages of children* (2nd ed.). Greenwich, CT: Ablex.
- Edwards, S. (2017). Play-based learning and intentional teaching: Forever different? *Australasian Journal of Early Childhood*, 42(2), 1–11.
- Edwards, S., & Cutter-Mackenzie, A. (2013). Pedagogical play-types: What do they suggest for learning about sustainability in early childhood education? *International Journal of Early Childhood*, 4(3), 327–346.
- Einarsdóttir, J., & Jónsdóttir, A.H. (2019). Parent-preschool partnership: Many levels of power. *Early Years*, 39(2), 175–189. <https://doi.org/10.1080/09575146.2017.1358700>
- Elliott, L., & Bachman, H.J. (2018). How do parents foster young children's math skills? *Child Development Perspectives*, online, 12(1), 16-21. <https://doi.org/10.1111/cdep.12249>
- Elliott, S., & Young, T. (2016). Nature by default in early childhood education for sustainability. *Australian Journal of Environmental Education*, 32(1), 57-64. <https://doi.org/10.1017/aee.2015.44>
- Engel, M., Claessens, A., & Finch, M.A. (2013). Teaching students what they already know? The (mis)alignment between mathematics instructional content and student knowledge in kindergarten. *Educational Evaluation and Policy Analysis*, 35(2), 157–178. <https://doi.org/10.3102/0162373712461850>
- English, L.D., & Mulligan, J.T. (2013). *Reconceptualizing early mathematics learning*. Dordrecht: Springer.
- Epstein, J.L. (2011). *School, family, and community partnerships: Preparing educators and improving schools* (2nd ed.). Boulder, CO: Westview Press.
- Erickson, K.I., Hillman, C.H., & Kramer, A.F. (2015). Physical activity, brain, and cognition. *Current Opinion in Behavioral Sciences*, 4, 27–32.
- Farquhar, S., & White, E.J. (2014). Philosophy and pedagogy of early childhood. *Educational Philosophy and Theory*, 46(8), 821–832. <https://doi.org/10.1080/00131857.2013.783964>
- Fasoli, L., Benbow, R., Deveraux, K., Falk, I., Harris, R., James, R., Johns, V., Preece, C., & Railton, K. (2004). 'Both ways' children's services report, *Batchelor Institute of Indigenous Tertiary Education*. Batchelor, NT: Batchelor Press. <https://www.snaicc.org.au/wp-content/uploads/2016/01/02325.pdf>
- Fasoli, L., & Wunungmurra, A. (2015). What is play for, in your culture? Investigating remote Australian Aboriginal perspectives through participatory practitioner research. In L. Newman & C. Woodrow (Eds.), *Practitioner research in early childhood: International issues and perspectives* (pp. 55–69). London: SAGE.
- Fehrer, K., & Tognozzi, N. (2018). *Cultural & linguistic responsiveness and meaningful family engagement: Why it matters in early education*. Stanford, CA: John W. Gardner Center for Youth and Their Communities.
- Fenton, A., MacDonald, A., & McFarland, L. (2016). A strengths approach to supporting early mathematics learning in family contexts. *Australasian Journal of Early Childhood*, 41(1), 45–53.
- Ferguson, D. (2014). *Research connections: Parental engagement*. <https://www.researchconnections.org/childcare/resources/29762/pdf>
- Fisher, K., Hirsh-Pasek, K., Golinkoff, R.M., Singer, D., & Berk, L.E. (2010). Playing around in school: Implications for learning and educational policy. In A. Pellegrini (Ed.), *The Oxford handbook of play* (pp. 341–363). New York, NY: Oxford University Press.
- Fleer, M., Anning, A., & Cullen, J. (Eds.). (2004). *Early childhood education: Society and culture*. London: SAGE.
- Fleet, A., & Harcourt, D. (2018). (Co)-researching with children. In M. Fleer & B. van Oers (Eds.) *International handbook of early childhood education* (pp. 165–201). Dordrecht: Springer.
- Fleet, A., Patterson C., & Robertson, J. (Eds.). (2017). *Pedagogical documentation in early years practice: Seeing through multiple perspectives*. London: SAGE.
- Flückiger, B., Diamond, P., & Jones, W. (2012). Yarning space: Leading literacy learning through family-school partnerships. *Australasian Journal of Early Childhood*, 37(3), 53–9.
- Fogarty, W., Lovell, M., Langenberg, J., & Heron, M-J. (2018). *Deficit discourse and strengths-based approaches. Changing the narrative of Aboriginal and Torres Strait Islander health and wellbeing*. Melbourne: The Lowitja Institute. <https://www.lowitja.org.au/page/services/resources/Cultural-and-social-determinants/racism/deficit-discourse-strengths-based>

- Fuson, K.C., Clements, D.H., & Sarama, J. (2015). Making early math education work for all children. *Kappan*, 97(3), 63–68.
- Gay, G. (2018). *Culturally responsive teaching: Theory, practice, and research* (3rd ed.). New York: Teachers College Press.
- Gear, A.L. (2012). A cultural introduction to math. *Teaching Children Mathematics*, 18(6), 354–360.
- Geary, D.C., Hoard, M.K., Nugent, L., & Bailey, D.H. (2013). Adolescents' functional numeracy is predicted by their school entry number system knowledge. *PLOS ONE*, 8(1), e54651. <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0054651>
- Gerlach, A.J., & Gignac, J. (2019). Exploring continuities between family engagement and well-being in Aboriginal Head Start programs in Canada. *Infants & Young Children*, 32(1), 60–74.
- Gervasoni, A. (2017). Bringing families and preschool educators together to support young children's learning through noticing, exploring and talking about mathematics. In S. Phillipson, P. Sullivan, & A. Gervasoni (Eds.), *Engaging families as the first mathematics educators of children: Early mathematics learning and development* (pp. 199–216). Singapore: Springer.
- Gervasoni, A., MacDonald, A., Perry, B., & Roche, A. (2019). *Let's Count Online evaluation*. Sydney: The Smith Family.
- Gervasoni, A., & Perry, B. (2013). Children's mathematical knowledge prior to starting school. In V. Steinle, L. Ball, & C. Bordini (Eds.), *Mathematics education: Yesterday, today and tomorrow*. (Proceedings of the 36th annual conference of the Mathematics Education Research Group of Australasia (Vol. 1, pp. 338–345)). Melbourne: MERGA.
- Gervasoni, A., & Perry, B. (2014). Families and educators acting together to assist young children to notice, explore and discuss mathematics. In Meaney, T. (Ed.), *A mathematics education perspective on early mathematics learning between the poles of instruction and construction*. (Online Proceedings of the POEM2 Conference). Malmö University, June 16–17. <http://www.mah.se/poem>
- Gervasoni, A., & Perry, B. (2015a). Children's mathematical knowledge prior to starting school and implications for transition. In B. Perry, A. MacDonald, & A. Gervasoni, *Mathematics and transition to school – International perspectives* (pp. 47–64). Dordrecht: Springer.
- Gervasoni, A., & Perry, B. (2015b). *Let's Count longitudinal evaluation: Final report*. Sydney: The Smith Family.
- Gervasoni, A., & Perry, B. (2016). The impact on learning when families and educators act together to assist young children to notice, explore and discuss mathematics. In T. Meaney, O. Helenius, M.L. Johansson, T. Lange, & A. Wernberg (Eds.), *Mathematics education in the early years* (pp. 115–135). Dordrecht: Springer.
- Gervasoni, A., & Perry, B. (2017). Notice, explore, and talk about mathematics: Making a positive difference for preschool children, families, and educators in Australian communities that experience multiple disadvantages. In J. Sarama, D.H. Clements, C. Germeroth, & C. Day-Hess (Eds.), *Advances in child development and behavior*, Vol. 53 (pp. 169–225). Burlington: Academic Press.
- Gervasoni, A., Perry, B., & Parish, L. (2015). The impact of *Let's Count* on children's mathematics learning. In M. Marshman, V. Geiger, & A. Bennison (Eds.), *Mathematics education in the margins* (Proceedings of the 38th annual conference of the Mathematics Education Research Group of Australasia, pp. 253–260). Sunshine Coast: MERGA.
- Gillanders, C., Iruka, I., Ritchie, S., & Cobb, C.T. (2012). Restructuring and aligning early education opportunities for cultural, language, and ethnic minority children. In R.C. Pianta, W.S. Barnett, L.M. Justice, & S.M. Sheridan (Eds.), *Handbook of early education* (pp. 111–136). New York: The Guilford Press.
- Gillanders, C., & Kantor, R. (2019). Research in early childhood care and education since 1970. In C. Brown, M. McMullen, & N. File (Eds.), *The Wiley handbook of early childhood care and education* (pp. 99–117). New York: John Wiley & Sons.
- Ginsburg, H.P. (2016). Helping early childhood educators to understand and assess young children's mathematical minds. *ZDM Mathematics Education*, 48, 941–946.
- Ginsburg, H., Duch, H., Ertle, B., & Noble, K. (2012). How can parents help their children learn math? In B.H. Wasik (Ed.), *Handbook of family literacy* (pp. 51–65). New York, NY: Routledge.
- Godwin, A.J., Rupley, W.H., Capraro, R.M., & Capraro, M.M. (2016). Reading and mathematics bound together: Creating a home environment for preschool learning. *Journal of Education and Learning*, 5(1), 44–59. <https://doi.org/10.5539/jel.v5n1p44>
- González, N., Moll, L., & Amanti, C. (Eds.). (2005). *Funds of knowledge: Theorising practices in households, communities, and classrooms*. Mahwah, NJ: Lawrence Erlbaum & Associates.
- Goodall, J. (2018). Learning-centred parental engagement: Freire reimagined. *Educational Review*, 70(5), 603–621. <https://doi.org/10.1080/00131911.2017.1358697>
- Goodall, J., & Montgomery, C. (2014). Parental involvement to parental engagement: A continuum. *Educational Review*, 66(4), 399–410. <https://doi.org/10.1080/00131911.2013.781576>
- Gould, P. (2012). What number knowledge do children have when starting Kindergarten in NSW? *Australasian Journal of Early Childhood*, 37(3), 105–110.

- Grace, R., Bowes, J., & Elcombe, E. (2014). Child participation and family engagement with early childhood education and care services in disadvantaged Australian communities. *International Journal of Early Childhood*, 46(2), 271–298. <https://doi.org/10.1007/s13158-014-0112-y>
- Grace, R., & Trudgett, M. (2012). It's not rocket science: The perspectives of Indigenous early childhood workers on supporting the engagement of Indigenous families in early childhood settings. *Australasian Journal of Early Childhood*, 37(2), 10–18.
- Grace, R., Walsh, R., & Baird, K. (2018). Connection, special objects and congruence: The perspectives of young children from disadvantaged communities on participation in early childhood education settings. *Early Child Development and Care*, 188(8), 1176–1189. <https://doi.org/10.1080/03004430.2016.1251915>
- Grajczonek, J. (2012). Interrogating the spiritual as constructed in Belonging, Being and Becoming: The Early Years Learning Framework for Australia. *Australasian Journal of Early Childhood*, 37(1), 152–160.
- Graue, M.E., Whyte, K.L., & Karabon, A.E. (2015). The power of improvisational teaching. *Teaching and Teacher Education*, 48, 13–21. <https://doi.org/10.1016/j.tate.2015.01.014>
- Graue, M.E., Whyte, K., & Delaney, K. (2014). Fostering culturally and developmentally responsive teaching through improvisational practice. *Journal of Early Childhood Teacher Education*, 35(4), 297–317. <https://doi.org/10.1080/10901027.2014.968296>
- Greenwood, D. (2011). Why place matters: Environment, culture, and education. In S. Tozer, B. Gallegos, A. Henry, M.B. Greiner, & P. Groves-Price (Eds.), *Handbook of research in the social foundations of education* (pp. 632–640). New York: Routledge.
- Gross, D., Bettencourt, A.F., Taylor, K., Francis, L., Bower, K., & Singleton, D.L. (2020). What is parent engagement in early learning? Depends on who you ask. *Journal of Child and Family Studies*, 29, 747–760.
- Grootenboer, P., & Sullivan, P. (2013). Remote Indigenous students' understandings of measurement. *International Journal of Science and Mathematics Education*, 11, 169–189.
- Guilfoyle, A., Saggars, S., Sims, M., & Hutchins, T. (2010). Culturally strong child care programs for Indigenous children, families and communities. *Australasian Journal of Early Childhood*, 35(3), 68–75.
- Hakkarainen, P., Bredikyte, M., Jakkula, K., & Munter, H. (2013). Adult play guidance and children's play development in a narrative play world. *European Early Childhood Education Research Journal*, 21(2), 213–225. <https://doi.org/10.1080/1350293X.2013.789189>
- Harrison, L., Sumsion, J., Bradley, B., Letsch, K., & Salamon, A. (2017). Flourishing on the margins: A study of babies and belonging in an Australian Aboriginal community childcare centre. *European Early Childhood Education Research Journal*, 25(2), 189–205. <https://doi.org/10.1080/1350293X.2017.1288015205>
- Hartley, C., Rogers, P., Smith, J., Peters, S., & Carr, M. (2012). *Crossing the border: A community negotiates the transition from early childhood to primary school*. Wellington: New Zealand Council for Educational Research.
- Hassinger-Das, B., Bustamante, A., Hirsh-Pasek, K., & Golinkoff, R. (2018). Learning landscapes: Playing the way to learning and engagement in public spaces. *Education Sciences*, 8, 74–95. <https://doi.org/10.3390/educi8020074>
- Hattie, J. (2008). *Visible learning: A synthesis of meta-analyses relating to achievement*. London: Routledge.
- Hayes, N., Berthelsen, D.C., Nicholson, J.M., & Walker, S. (2018). Trajectories of parental involvement in home learning activities across the early years: Associations with socio-demographic characteristics and children's learning outcomes. *Early Child Development and Care*, 188(10), 1405–1418. <https://doi.org/10.1080/03004430.2016.1262362>
- Hedges, H., & Cooper, M. (2016). Inquiring minds: Theorizing children's interests. *Journal of Curriculum Studies*, 48(3), 303–322. <https://doi.org/10.1080/00220272.2015.1109711>
- Hendershot, S.M., Austin, A.M.B., Blevins-Knabe, B., & Ota, C. (2016). Young children's mathematics references during free play in family childcare settings. *Early Child Development and Care* 186(7), 1126–1141. <https://doi.org/10.1080/03004430.2015.1077819>
- Hendrix, N.M., Hojnoski, R.L., & Missall, K.N. (2019). Shared book reading to promote math talk in parent-child dyads in low-income families. *Topics in Early Childhood Special Education*, 39(1), 45–55.
- Hesterman, S., & Targowska, A. (2020). The status-quo of play-based pedagogies in Western Australia: Reflections of early childhood education practitioners. *Australasian Journal of Early Childhood*, 45(1), 30–42. <https://doi.org/10.1177/1836939119885305>
- Higgins, D., & Morley, S. (2014). *Engaging Indigenous parents in their children's education. Resource sheet no. 32. Closing the Gap Clearinghouse*. Canberra: Australian Institute of Health and Welfare & Melbourne: Australian Institute of Family Studies. <https://aifs.gov.au/publications/archived/4588>
- Hohepa, M., & McIntosh, L. (2017). Transition to school for Indigenous children. In N. Ballam, B. Perry, & A. Garpelin (Eds.), *Pedagogies of educational transitions: European and antipodean research* (pp. 77–94). Cham: Springer.

- Hopps-Wallis, K., Fenton, A., & Dockett, S. (2016). Focusing on strengths as children start school: What does it mean in practice? *Australasian Journal of Early Childhood*, 41(2), 103–111.
- Howard, P., & Perry, B. (2006). Issues in teaching mathematics to Aboriginal students. In P. Grootenboer, R. Zevenbergen, & M. Chinnappan (Eds.), *Identities, cultures and learning spaces* (pp. 293–300). Sydney: MERGA.
- Hunt, J. (2013). *Engaging with Indigenous Australia—Exploring the conditions for effective relationships with Aboriginal and Torres Strait Islander communities*. Closing the Gap Clearinghouse, Issue paper no. 5. Melbourne: Australian Institute of Family Studies.
<http://www.aihw.gov.au/uploadedFiles/ClosingTheGap/Content/Publications/2013 /ctgc-ip5.pdf>
- Hunting, R., Bobis, J., Doig, B., English, L., Mousley, J., Mulligan, J., Papic, M., Pearn, C., Perry, B., Robbins, J., Wright, R., & Young-Loveridge, J. (2012). *Mathematical thinking of preschool children in rural and regional Australia: Research and practice*. Melbourne: Australian Council for Educational Research.
- Hunting, R., Mousley, J., & Perry, B. (2012). *Young children learning mathematics: A guide for educators and families*. Melbourne: Australian Council for Educational Research.
- Immordino-Tang, M., Darling-Hammond, L., & Krone, C. (2018). The brain basis for integrated social, emotional and academic development. Washington, DC: The Aspen Institute.
<https://files.eric.ed.gov/fulltext/ED596337.pdf>
- Jacobi-Vessels, J.L., Brown, E.T., Molfese, V.J., & Do, A. (2016). Teaching preschoolers to count: Effective strategies for achieving early mathematics milestones. *Early Childhood Education Journal*, 44, 1–9.
- Johansson, G. (2009). Parental involvement in the development of a culture-based school curriculum. *Intercultural Education*, 20(4), 311–319.
- Jones, E. (2012). Giving ourselves permission to take risks. *Exchange*, July/August.
<https://www.childcareexchange.com/catalog/product/giving-ourselves-permission-to-take-risks/5020646/>
- Jorgensen, R. (2011). Language, culture and learning mathematics: A Bourdieuan analysis of Indigenous learning. In C. Wyatt-Smith, J. Elkins, & S. Gunn (Eds.), *Multiple perspectives on difficulties in learning literacy and numeracy* (pp. 315–329). Dordrecht: Springer.
- Kaplun, C., Grace, R., Knight, J., Anderson, J., West, N., Mack, H., Comino, E., & Kemp, L. (2017). Everybody has got their own story: Urban Aboriginal families and the transition to school. In S. Dockett, W. Griebel, & B. Perry (Eds.), *Families and transition to school* (pp. 67–82). Cham: Springer.
- Kearney, E., McIntosh, L., Perry, B., Dockett, S., & Clayton, K. (2014). Building positive relationships with Indigenous children, families and communities: Learning at the cultural interface. *Critical Studies in Education*, 55(3), 338–352.
<https://doi.org/10.1080/17508487.2014.914963>
- Kinnear, V., Lai, M.Y., & Muir, T. (Eds.). (2018). *Forging connections in early mathematics teaching and learning*. New York: Springer.
- Klenowski, V., Tobias, S., Funnell, B., Vance, F., & Kaesehagen, C. (2010). Culture-fair assessment: Challenging Indigenous students through effortful mathematics teaching. [Paper presentation]. Annual Conference of the Australian Association for Research in Education, Melbourne.
- Knight-McKenna, M., & Hollingsworth, H. (2016). Fostering family-teacher partnerships: Principles in practice. *Childhood Education*, 92(5), 383–390.
- Krummheuer, G. (2018). The genesis of children’s mathematical thinking in their early years. In C. Benz, A.S. Steinweg, H. Gasteiger, P. Schöner, H. Vollmuth, & J. Zöllner (Eds.), *Mathematics education in the early years* (pp. 111–122). Cham: Springer.
- Krummheuer, G., Leuzinger-Bohleber, M., Müller-Kirchhof, M., Münz, M., & Vogel, R. (2013). Explaining the mathematical creativity of a young boy: An interdisciplinary venture between mathematics education and psychoanalysis. *Educational Studies in Mathematics*, 84, 183–199.
- Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African American children*. San Francisco: Jossey-Bass.
- Lee, C., & Bailie, P. (2019). Nature-based education: Using nature trails as a tool to promote inquiry-based science and math learning in young children. *Science Activities*, 56(4), 147–158.
<https://doi.org/10.1080/00368121.2020.1742641>
- Lee, J.S., & Ginsburg, H.P. (2009). Early childhood teachers’ misconceptions about mathematics education for young children in the United States. *Australasian Journal of Early Childhood*, 34(4), 37–45.
- Lee-Hammond, L., & Jackson-Barrett, E. (2019). Indigenous children’s linguistic rights in the 21st century: Intentions and tensions in practice. *International Journal of Early Childhood*, 51, 301–318.
<https://doi.org/10.1007/s13158-019-00251-6>
- LeFevre, J.-A., Polyzoi, E., Skwarchuk, S.-L., Fast, L., & Sowinski, C. (2010). Do home numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children? *International Journal of Early Years Education*, 18(1), 55–70.
<https://doi.org/10.1080/09669761003693926>

- Lehrl, S., Smidt, W., Grosse, C., & Richter, D. (2014). Patterns of literacy and numeracy activities in preschool and their relation to structural characteristics and children's home activities. *Research Papers in Education*, 29(5), 577–597. <https://doi.org/10.1080/02671522.2013.792865>
- Little Scientists Australia. (2020). Little scientists. <https://littlescientists.org.au/>
- Lin, J., Litkowski, E., Schmerold, K., Elicker, J., Schmitt, S.A., & Purpura, D.J. (2019). Parent-educator communication linked to more frequent home learning activities for preschoolers. *Child & Youth Care Forum*, 48, 757–772.
- Lobman, C. (2005). Improvisation: Postmodern play for early childhood teachers. *Advances in Early Education and Day Care*, 13, 243–272.
- Lohoar, S., Butera, N., & E. Kennedy, E. (2014). Strengths of Australian Aboriginal cultural practices in family life and child rearing. Child Family Community Australia Information Exchange Paper No. 24. <https://aifs.gov.au/cfca/publications/strengths-australian-aboriginal-cultural-practices-family-life-and-child-r>
- Lowell, A., Maypilama, E.L., Fasoli, L., Gundjarranbuy, R., Godwin-Thompson, J., Guyula, A., Yuninpingu, M., Armstrong, E., Garrutju, J., & McEldowney, R. (2018). Building Yolgnu skills, knowledge, and priorities into early childhood assessment and support: Protocol for a qualitative study. *JMIR Research Protocols*, 7(3), 1–8.
- Lukie, I.K., Skwarchuk, S-L., LeFevre, J-O., & Sowinski, C. (2014). The role of child interests and collaborative parent-child interactions in fostering numeracy and literacy development in Canadian homes. *Early Childhood Education Journal*, 42, 251–259.
- MacNaughton, G. & Williams, G. (2009). *Techniques for teaching young children*, (3rd ed.). Frenchs Forest NSW: Pearson.
- MacDonald, A., Goff, W., Dockett, S., & Perry, B. (2016). Mathematics education in the early years. In K. Makar, S. Dole, J. Visnovska, M. Goos, A. Bennison, & K. Fry (Eds.), *Research in mathematics education in Australasia 2012–2015* (pp. 165–186). Singapore: Springer.
- MacDonald, A., & Murphy, S. (2019). Mathematics education for children under four years of age: A systematic review of the literature. *Early Years*. <https://doi.org/10.1080/09575146.2019.1624507>
- Maher, M., & Buxton, L. (2015). Early childhood education at the cultural interface. *The Australian Journal of Indigenous Education*, 44(1), 1–10. <https://doi.org/10.1017/jie.2015.5>
- Martin, K. (2003). Ways of knowing, being and doing: A theoretical framework and methods for Indigenous and indigenist research. *Journal of Australian Studies*, 27, 203–214.
- Martin, K.L. (2005). *Thinkin' you know... getting' it wrong... and us missin' out – Aboriginal worldview and knowledge, English literacy – great expectations or grating obsessions?* [Keynote presentation]. Dare to Lead National Conference, What a Difference a Good Start Makes: Indigenous Early Childhood Approaches, Melbourne.
- Martin, K.L. (2009). Aboriginal worldview, knowledge and relatedness: Reconceptualising Aboriginal schooling as a teaching-learning and research interface. *Journal of Australian Indigenous Issues*, 12(4), 66–78.
- Martin, K.L. (2016). Aboriginal early childhood education: Contexts and conditions. In K.L. Martin (Ed.), *Voices and visions: Aboriginal early childhood education in Australia* (pp. 9–19). Mt Victoria, Australia: Pademelon Press.
- Massey, D. (2005). *For space*. London: SAGE.
- Matthews, C. (2015). Maths as storytelling: Maths is beautiful. In K. Price (Ed.) *Aboriginal and Torres Strait Islander education: An introduction for the teaching profession* (2nd ed.) (pp. 102–120). Melbourne: Cambridge University Press.
- Matthews, C., Watego, L., Cooper, T.J., & Baturo, A.R. (2005). Does mathematics education in Australia devalue Indigenous culture? Indigenous perspectives and non-Indigenous reflections. In P. Clarkson, A. Downton, D. Gronn, M. Horne, A. McDonough, R. Pierce, & A. Roche (Eds.), *Building connections: Research, theory and Practice*. (Proceedings of the 28th annual conference of the Mathematics Education Research Group of Australasia, pp. 513–520). Melbourne: MERGA.
- McLachlan, C. (2018). Te Whāriki revisited: How approaches to assessment can make valued learning visible. *He Kupu The Word*, 5, 45–56.
- McNally, S., & Slutsky, R. (2018). Teacher–child relationships make all the difference: constructing quality interactions in early childhood settings. *Early Child Development and Care*, 188(5), 508–523. <https://doi.org/10.1080/03004430.2017.1417854>
- McVittie, J. (2018). Sensuous and language learning: Children's embodied and playful connection to nature. *International Journal of Early Childhood Environmental Education*, 6(1), 21–34.
- Melhuish, E.C., Phan, M.B., Sylva, K., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2008). Effects of the home learning environment and preschool center experience upon literacy and numeracy development in early primary school. *Journal of Social Issues*, 64, 95–114. <https://doi.org/10.1111/j.1540-4560.2008.00550.x>
- Milgate, G. (2016). Building empowering partnerships between schools and communities. In N. Harrison & J. Sellwood, (Eds.), *Learning and teaching in Aboriginal and Torres Strait Islander education* (pp. 193–206). South Melbourne, Victoria: Oxford University Press.

- Miller, M. (2015). Consultation with Aboriginal and Torres Strait Islander people in early childhood education: The impact of colonial discourses. *Australian Educational Researcher*, 42, 549–565. <https://doi.org/10.1007/s13384-015-0186-z>
- Ministry of Education New Zealand. (2017). *Te Whāriki*. <https://education.govt.nz/assets/Documents/Early-Childhood/ELS-Te-Whariki-Early-Childhood-Curriculum-ENG-Web.pdf>
- Missall, K., Hojnoski, R.L., Caskie, G.I.L., & Repasky, P. (2015). Home numeracy environments of preschoolers: Examining relations among mathematical activities, parent mathematical beliefs, and early mathematical skills. *Early Education & Development*, 26(3), 356–376. <https://doi.org/10.1080/10409289.2015.968243>
- Mitchell, L., & Bateman, A. (2018). Belonging and culturally nuanced communication in a refugee early childhood centre in Aoteoroa New Zealand. *Contemporary Issues in Early Childhood*, 19(4), 379–391.
- Mitchell, L., Bateman, A., Gerrity, R., & Myint, H. (2017). Bridging transitions through cultural understandings and identity. In N. Ballam, B. Perry, & A. Garpelin (Eds.), *Pedagogies of educational transitions: European and antipodean research* (pp. 29–42). Cham: Springer.
- Moll, L.C., Soto-Santiago, S.L., & Schwartz, L. (2013). Funds of knowledge in changing communities. In K. Hall, T. Cremin, B. Comber, & L.C. Moll (Eds.), *International handbook of research on children's literacy, learning and culture* (pp. 172–83). Chichester, UK: Wiley-Blackwell.
- Morris, J. (2010). In-between, across, and within difference: An examination of 'cultural competence'. *International Journal of Child, Youth and Family Studies*, 1(3–4), 315–325. <https://doi.org/10.18357/ijcyfs13/4201102092>
- Morrison, A., Rigney, L-I., Hattam, R., & Diplock, A. (2019). *Toward an Australian culturally responsive pedagogy: A narrative review of the literature*. Adelaide: University of South Australia. <https://apo.org.au/sites/default/files/resource-files/2019-08/apo-nid262951.pdf>
- Moss, P. (2013). The relationship between early childhood education and compulsory education: A proper political question. In P. Moss (Ed.), *Early childhood and compulsory education: Reconceptualising the relationship* (pp. 2–49). London: Routledge.
- Moss, P. (2014). *Transformative change and real Utopias in early childhood education*. London: Routledge.
- Moyle, K. (2019). *Literature review: Indigenous early childhood education, school readiness and transition programs into primary school*. Camberwell, VIC: Australian Council for Educational Research. <https://research.acer.edu.au/cgi/viewcontent.cgi?article=1001&context=littlebigcuz>
- Munns, G., Cole, B., & Sawyer, W. (Eds.). (2013). *Exemplary teachers of students in poverty*. London: Routledge.
- Murray, E., McFarland-Piazza, L., & Harrison, L.J. (2015). Changing patterns of parent–teacher communication and parent involvement from preschool to school. *Early Child Development and Care*, 185, 1031–1052. <https://doi.org/10.1080/03004430.2014.975223>
- Nakata, M. (2007). The cultural interface. *The Australian Journal of Indigenous Education*, 36(S1), 7–14. <https://doi.org/10.1017/S1326011100004646>
- Napoli, A.R., & Purpura, D.J. (2018). The home literacy and numeracy environment in preschool: Cross-domain relations of parent–child practices and child outcomes. *Journal of Experimental Child Psychology*, 166, 581–603. <https://doi.org/10.1016/j.jecp.2017.10.002>
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: Author.
- Neitzel, C., Alexander, J., & Johnson, K. (2016). Young children's interest-oriented activity and later academic self-regulation strategies in kindergarten. *Journal of Research in Childhood Education*, 30(4), 474–493. <https://doi.org/10.1080/02568543.2016.1215360>
- Newman, L., Arthur, L., Staples, K., & Woodrow, C. (2016). Recognition of family engagement in young children's literacy learning. *Australasian Journal of Early Childhood*, 41(1), 73–81. <https://doi.org/10.1177/183693911604100110>
- Nganga, L. (2015). Culturally responsive and anti-biased teaching benefits early childhood pre-service teachers. *Journal of Curriculum and Teaching*, 4(2), 1–16. <https://doi.org/10.5430/jct.v4n2p1>
- Nikiforidou, Z. (2017). Risk literacy: Concepts and pedagogical implications for early childhood education. *Contemporary Issues in Early Childhood* 18(3), 322–332. <https://doi.org/10.1177/14639491177311027>
- Niklas, F., Cahrssen, C., & Tayler, C. (2016). Improving preschoolers' numerical abilities by enhancing the home numeracy environment. *Early Education and Development*, 27(3), 372–383.
- Niklas, F., & Schneider, W. (2014). Casting the die before the die is cast: The importance of the home numeracy environment for preschool children. *European Journal for Psychology of Education*, 29, 327–345.
- Nolan, A., Taket, A., & Stagnitti, K. (2014). Supporting resilience in early years classrooms: The role of the teacher. *Teachers and Teaching*, 2(5), 595–608. <https://doi.org/10.1080/13540602.2014.937955>
- O'Connor, E., & McCartney, K. (2007). Attachment and cognitive skills: An investigation of mediating mechanisms. *Journal of Applied Developmental Psychology*, 28(5), 458–476. <https://doi.org/10.1016/j.appdev.2007.06.007>

- Ofsted. (2015). *Teaching and play in the early years – a balancing act?* <https://www.gov.uk/government/publications/teaching-and-play-in-the-early-years-a-balancing-act>
- Ólafsdóttir, S.M., Danby, S., Einarsdóttir, J., & Theobald, M. (2017). 'You need to own cats to be a part of the play': Icelandic preschool children challenge adult-initiated rules in play. *European Early Childhood Education Research Journal*, 25(6), 824–837. <https://doi.org/10.1080/1350293X.2017.1380880>
- Owens, K. (2015). Changing the teaching of mathematics for improved Indigenous education in a rural Australian city. *Journal of Mathematics Teacher Education*, 18, 53–78.
- Papic, M. (2015). An early mathematical patterning assessment: Identifying young Australian Indigenous children's patterning skills. *Mathematics Education Research Journal*, 27(5), 519–534.
- Paris, D. (2012). Culturally sustaining pedagogy: A needed change in stance, terminology, and practice. *Educational Researcher*, 41(3), 93–97.
- Paris, D., & Alim, H. S. (Eds.). (2017). *Culturally sustaining pedagogies: Teaching and learning for justice in a changing world*. New York: Teachers College Press.
- Peridot Education Pty Ltd. (2019). *Evaluation of Let's Count community professionals pilot 2019*. Sydney: The Smith Family.
- Perry, B., & Dockett, S. (2002a). Young children's access to powerful mathematical ideas. In L.D. English (Ed.), *Handbook of international research in mathematics education: Directions for the 21st century* (pp. 81–111). Mahwah, NJ: Lawrence Erlbaum.
- Perry, B., & Dockett, S. (2002b). 999 is a very nice sign. In D. Edge & B.H. Yeap (Eds.), *Mathematics education for a knowledge-based era* (pp. 183–188). Singapore: Association of Mathematics Educators.
- Perry, B., & Dockett, S. (2013). Reflecting on young children's mathematics learning. In L. English & J. Mulligan (Eds.), *Reconceptualising early mathematics learning* (pp. 149–161). Dordrecht: Springer.
- Perry, B., & Dockett, S. (2018). Using a bioecological framework to investigate an early childhood mathematics education intervention. *European Early Childhood Education Research Journal*, 26(4), 604–617.
- Perry, B., & Gervasoni, A. (2016). *Let's Count educators' handbook*. Sydney: The Smith Family.
- Perry, B., Gervasoni, A., & Dockett, S. (2012). *Let's Count: Evaluation of a pilot mathematics program in low socio-economic locations in Australia*. In J. Dindyal, L.P. Cheng, & S.F. Ng (Eds.), *Mathematics education: Expanding horizons* (Proceedings of the 35th annual conference of the Mathematics Education Research Group of Australasia, pp. 594–601). Singapore: MERGA.
- Perry, B., Gervasoni, A., Hampshire, A., & O'Neill, W. (2016). *Let's Count: Improving community approaches to early years mathematics learning, teaching and dispositions through noticing, exploring and talking about mathematics*. In B. White, M. Chinnappan, & S. Trenholm (Eds.), *Opening up mathematics education research* (Proceedings of the 39th annual conference of the Mathematics Education Research Group of Australasia, pp. 75–84). Adelaide: MERGA.
- Perry, B., Gervasoni, A., & Kearney, E. (2012). *Let's Count pilot program: Final evaluation*. Sydney: The Smith Family.
- Perry, B., & Howard, P. (2008). Mathematics in Indigenous contexts. *Australian Primary Mathematics Classroom*, 13(4), 4–9.
- Perry, B., MacDonald, A., & Gervasoni, A. (Eds.). (2015). *Mathematics and transition to school: International perspectives*. Singapore: Springer.
- Perso, T.F. (2012). *Cultural responsiveness and school education: With particular focus on Australia's First Peoples: A review and synthesis of the literature*. Darwin, NT: Menzies School of Health Research, Centre for Child Development and Education.
- Petriwskyj, A., Thorpe K., & Tayler, C. (2005). Trends in construction of transition to school in three western regions. *International Journal of Early Years Education*, 13(1), 55–69. <https://doi.org/10.1080/09669760500048360>
- Pettersen, G.O., & Volden, M. (2019). What can five-, six- and seven-year-olds tell us about the transition from mathematics in kindergarten to that in school in Norway? [Paper presentation]. Eleventh Congress of the European Society for Research in Mathematics Education (CERME11), Utrecht University, Utrecht, Netherlands.
- Phillipson, S., Richards, G., & Sullivan, P. (2017). Parent perceptions of access to capitals and early mathematical learning: Some early insights from Numeracy@Home project. In S. Phillipson, P. Sullivan, & A. Gervasoni (Eds.), *Engaging families as the first mathematics educators of children: Early mathematics learning and development* (pp. 127–146). Singapore: Springer.
- Phillipson, S., Sullivan, P., & Gervasoni, A. (Eds.). (2017a). *Engaging families as the first mathematics educators of children: Early mathematics learning and development*. Singapore: Springer.
- Phillipson, S., Sullivan, P., & Gervasoni, A. (2017b). Engaging families as the first mathematics educators of children. In S. Phillipson, P. Sullivan, & A. Gervasoni (Eds.), *Engaging families as the first mathematics educators of children: Early mathematics learning and development* (pp. 3–14). Singapore: Springer.
- Piantadosi, S.T., Jara-Ettinger, J., & Gibson, E. (2014). Children's learning of number words in an Indigenous farming-foraging group. *Developmental Science*, 17(4), 553–563.

- Pistorova, S., & Slutsky, R. (2018). There is still nothing better than quality play experiences for young children's learning and development: Building the foundation for inquiry in our educational practices. *Early Child Development and Care*, 188(5), 495–507. <https://doi.org/10.1080/03004430.20171403432>
- Pramling-Samuelsson, I., & Asplund Carlsson, M. (2008). The playing learning child: Towards a pedagogy of early childhood. *Scandinavian Journal of Educational Research*, 52(6), 623–641. <https://doi.org/10.1080/00313830802497265>
- Pramling-Samuelsson, I., & Pramling, N. (2014). Children's play and learning and developmental pedagogy. In L. Brooker, M. Blaise, & S. Edwards (Eds.), *The SAGE handbook of play and learning in early childhood* (pp. 169–179). London: SAGE.
- Purpura, D.J., & Reid, E.E. (2016). Mathematics and language: Individual and group differences in mathematical language skills in young children. *Early Childhood Research Quarterly*, 36, 259–268.
- Pyle, A., & Danniels, E. (2017). A continuum of play-based learning: The role of the teacher in a play-based pedagogy and the fear of hijacking play. *Early Education & Development*, 28, 274–289.
- Pyle, A., & DeLuca, C. (2017). Assessment in play-based kindergarten classrooms: An empirical study of teacher perspectives and practices. *The Journal of Educational Research*, 110(5), 457–466. <https://doi.org/10.1080/00220671.2015.1118005>
- Queensland Curriculum & Assessment Authority. (2018). *Queensland curriculum learning guideline*. https://www.qcaa.qld.edu.au/downloads/p_10/qklg_2019.pdf
- Queensland Department of Education, Training and Employment. (2013). *Foundations for success*. <https://www.foundationsforsuccess.qld.edu.au/sites/ffs/files/foundations-for-success.pdf>
- Ramani, G.B., Rowe, M.L., Eason, S.H., & Leech, K.A. (2015). Math talk during informal learning activities in Head Start families. *Cognitive Development*, 35, 15–33.
- Real Play Coalition (2020). *Reclaiming play in cities*. https://www.realplaycoalition.com/wp-content/uploads/2020/05/Reclaiming_Play_in_Cities-1-compressed.pdf
- Rigney, L. (2019a). A time of change and 'super diversity' in early childhood education. *The Spoke*. <http://thespoke.earlychildhoodaustralia.org.au/time-change-super-diversity-early-childhood-education/>
- Rigney, L.I. (2019b). *Early years practice using Aboriginal learner cultural strengths*. *Culturally responsive pedagogies in dialogue with Reggio Emilia*. [Keynote Presentation]. Early Childhood Australia Conference, Adelaide. <https://www.eacaconference.com.au/2021/wp-content/uploads/sites/4/2020/04/Rigney.pdf>
- Rigney, L., Garrett, R., Curry, M., & MacGill, B. (2019). Culturally responsive pedagogy and mathematics through creative and body-based learning: Urban Aboriginal schooling. *Education and Urban Society, online*, 1–22. <https://doi.org/10.1177/0013124519896861>
- Rigney, L.-I., & Hattam, R. (2018, April). Toward a decolonizing Australian culturally responsive pedagogy. [Paper presentation]. American Research Association Conference, New York.
- Roberts, W. (2017). Trust, empathy and time: Relationship building with families experiencing vulnerability and disadvantage in early childhood education and care services. *Australasian Journal of Early Childhood*, 42(4), 4–12.
- Robertson, L. H., Kinos, J., Barbour, N., Pukk, M., & Rosqvist, L. (2015). Child-initiated pedagogies in Finland, Estonia and England: Exploring young children's views on decisions. *Early Child Development and Care*, 185(11–12), 1815–1827. <https://doi.org/10.1080/03004430.2015.1028392>
- Robinson, C. (2019). Young children's spirituality: A focus on engaging with nature. *Australasian Journal of Early Childhood*, 44(4), 339–350. <https://doi.org/10.1177/1836939119870907>
- Rogers, S. (2018). 'She thinks her toys don't understand Romanian': Family engagement with children's learning during the transition to school. *European Early Childhood Education Research Journal*, 26(2), 177–186.
- Rogoff, B. (2003). *The cultural nature of human development*. Oxford: Oxford University Press.
- Rogoff, B., Coppens, A.D., Alcalá, L., Aceves-Azuara, I., Ruvalcaba, O., Lopez, A., & Dayton, A. (2017). Noticing learners' strengths through cultural research. *Perspectives in Psychological Science*, 12(5), 876–888.
- Rolfe, S., & Armstrong, K. (2010). Early childhood professionals as a source of social support: The role of parent-professional communication. *Australasian Journal of Early Childhood*, 35(3), 60–7.
- Rouse, E., Nicholas, M., & Garner, R. (2020). School readiness – what does this mean? Educators' perceptions using a cross sector comparison. *International Journal of Early Years Education*. <https://doi.org/10.1080/09669760.2020.1733938>
- Rouse, E., & O'Brien, D. (2017). Mutuality and reciprocity in parent-teacher relationships: Understanding the nature of partnerships in early childhood education and care provision. *Australasian Journal of Early Childhood*, 42(2), 45–52. <https://doi.org/10.23965/AJEC.42.2.06>
- Russell, G.L., & Chernoff, E.J. (2013). The marginalisation of Indigenous students within school mathematics and the math wars: Seeking resolutions within ethical spaces. *Mathematics Education Research Journal*, 25, 109–127.

- Saffigna, M., Church, A., & Tayler, C. (2011). *Practice Principle 3: High expectations for every child*. Melbourne: Department of Education and Early Childhood Development (Victoria). <https://www.education.vic.gov.au/Documents/childhood/providers/edcare/highexpect.pdf>
- Salmon, A.K. (2016). Learning by thinking during play: The power of reflection to aid performance. *Early Child Development and Care*, 186(3), 480–496. <https://doi.org/10.1080/03004430.2015.1032956>
- Sandseter, E.B.H. (200). Categorising risky play—How can we identify risk-taking in children's play? *European Early Childhood Education Research Journal*, 15(2), 237–252.
- Sarama, J., & Clements, D.H. (2015). Scaling up early mathematics interventions: Transitioning with trajectories and technologies. In B. Perry, A. MacDonald, & A. Gervasoni (Eds.), *Mathematics and transition to school – International perspectives* (pp. 153–169). Dordrecht: Springer.
- Seah, W.T., Andersson, A., Bishop, A., & Clarkson, P. (2016). What would the mathematics curriculum look like if values were the focus? *For the Learning of Mathematics*, 36(1), 14–20.
- Shonkoff, J., & Phillips, D. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington, DC: National Academy Press.
- Sims, M., Ellis, E., & Knox, V. (2017). Parental plurilingual capital in a monolingual context: Investigating strengths to support young children in early childhood settings. *Early Childhood Education Journal*, 45, 777–787.
- Sims, M., & Touse Tiko, L. (2016). We're going on a bear hunt: Reconciling neoliberalism and postcolonialism in Pacific early childhood. *Educational Leadership and Management*, 3. <https://doi.org/10.1080/2331186X.2016.1152673>
- Sinclair, K. (2019a). Disrupting normalised discourses: Ways of knowing, being and doing cultural competence. *The Australian Journal of Indigenous Education*, 48, 1–9. <https://doi.org/10.1017/jie.2018.23>
- Sinclair, K. (2019b). An analysis of educator's understandings of cultural competence. *Methodological Innovations*, 12(1). <https://doi.org/10.1177/2059799119825563>
- Sinclair, K. (2020). Critical challenges of cultural competence professional development. *World Journal of Educational Research*, 7(1), 194–208.
- Siraj-Blatchford, I. (2009). Conceptualising progression in the pedagogy of play and sustained shared thinking in early childhood education: A Vygotskian perspective. *Education and Child Psychology*, 26(2), 77–89.
- Siraj-Blatchford, I., & Sylva, K. (2004). Researching pedagogy in English pre-schools. *British Educational Research Journal*, 30(5), 713–730.
- Siraj-Blatchford, I., Sylva, K., Muttock, S., Gilden, R., & Bell, D. (2002). *Researching effective pedagogy in the early years*. London: Department for Education and Skills. <https://doi.org/10.1080/0141192042000234665>
- Sisson, J. H., Whittington, V., & Shin, A-M. (2020). Teaching culture through culture: A case study of culturally responsive pedagogies in an Australian early childhood/ primary context. *Journal of Research in Childhood Education*, 34(1), 108–126. <https://doi.org/10.1080/02568542.2019.1692110>
- Skwarchuk, S.-L., Sowinski, C., & LeFevre, J.-A. (2014). Formal and informal home learning activities in relation to children's early numeracy and literacy skills: The development of a home numeracy model. *Journal of Experimental Child Psychology*, 121, 63–84. <https://doi.org/10.1016/j.jecp.2013.11.006>
- SNAICC. (2019a). *Ensuring equality for Aboriginal and Torres Strait Islander children in the early years. Discussion Paper*. <https://www.snaicc.org.au/wp-content/uploads/2019/02/SNAICC-ECA-Discussion-Paper-Feb2019.pdf>
- SNAICC. (2019b). *Ensuring equality for Aboriginal and Torres Strait Islander children in the early years. Position Paper*. <https://www.snaicc.org.au/wp-content/uploads/2019/02/SNAICC-ECA-Early-Years-Position-Paper-Feb2019.pdf>
- SNAICC. (2020). *Submission to the House of representatives Standing Committee on Employment, Education and Training: Inquiry into Education in Remote and Complex Environments*. https://www.snaicc.org.au/wp-content/uploads/2020/03/SNAICC-Submission_Education-in-Remote-and-Complex-Environments.pdf
- South Australian Department for Education and Child Development. (2015). *Implementation guidelines for indicators of preschool numeracy and literacy in government preschools*. Adelaide: Government of South Australia. <https://www.decd.sa.gov.au/doc/implementation-guidelines-indicators-preschool-numeracy-and-literacy-government-preschools>
- Souto-Manning, M., Falk, B., Lopez, D., Cruz, L.B., Cardwell, N., McGowan, N., Perez, A., Rabadi-Raol, A., & Rollins, E. (2019). A transdisciplinary approach to equitable teaching in early childhood education. *Review of Research in Education*, 43, 249–276. <https://doi.org/10.3102/0091732X18821122>
- Stephen, C. (2010). Pedagogy: The silent partner in early years learning. *Early Years: An International Research Journal*, 30(1), 15–28.
- Streit-Lehmann, J. (2017). Involving parents in games and picture books. In S. Phillipson, P. Sullivan, & A. Gervasoni (Eds.), *Engaging families as the first mathematics educators of children: Early mathematics learning and development* (pp. 147–163). Singapore: Springer.

- Stronger Smarter Institute. (2017). *Implementing the Stronger Smarter approach. Stronger Smarter Institute Position Paper*. Brisbane: Stronger Smarter Institute.
- Sullivan, P., & Grootenboer, P. (2010). Teaching number by building on students' strengths: An investigation in remote Australian schools. [Paper presentation]. Annual Conference of the Australian Association for Research in Education, Melbourne.
- Swick, K.J. (2004). What parents seek in relations with early childhood family helpers. *Early Childhood Education Journal*, 31(3), 217–220.
- Sylva, K., Melhuish, E., Sammons, P., Siraj-Blatchford, I., & Taggart, B. (2004). *The Effective Provision of Preschool Education (EPPE) project: Findings from pre-school to end of key stage 1*. Nottingham, UK: Department for Education and Skills.
- Sylva K., Melhuish, E., Sammons P., Siraj-Blatchford I., & Taggart B. (2010). *Early childhood matters: Evidence from the Effective Pre-school and Primary Education project*. London: Routledge.
- Taggart, B., Sylva, K., Melhuish, E., Sammons, P., & Siraj, I. (2015). *Effective pre-school, primary and secondary education project (EPPSE 3–16+)*. London: Department for Education. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/455670/RB455_Effective_pre-school_primary_and_secondary_education_project.pdf
- Tamis-LeMonda, C.S., Luo, R., McFadden, K.E., Bandel, E.T., & Valloton, C. (2019). Early home learning environment predicts children's 5th grade academic skills. *Applied Developmental Science*, 23(2), 153–169. <https://doi.org/10.1080/10888691.2017.1345634>
- Taylor, A. (2011). Coming, ready or not: Indigenous children's transition to school in urban Australia and the policy push. *International Journal of Early Years Education*, 19(2), 145–161.
- Tesar, M. (2014). Reconceptualising the child: Power and resistance within early childhood settings. *Contemporary Issues in Early Childhood*, 15(8). <https://doi.org/10.2304/ciec.2014.15.4.360>
- The Smith Family (2015). *Strengthening early numeracy learning: The Let's Count program*. <https://www.thesmithfamily.com.au/-/media/files/research/reports/lets-count-research.pdf>
- The Smith Family (2020a). *Let's Count*. <https://www.thesmithfamily.com.au/programs/numeracy/lets-count>
- The Smith Family (2020b). *Let's Count Online*. <https://letscount.thesmithfamily.com.au/register/>
- Thippana, J., Elliott, L., Gehman, S., Libertus, K., & Libertus, M.E. (2020). Parents' use of number talk with young children: Comparing methods, family factors, activity contexts, and relations to math skills. *Early Childhood Research Quarterly*, 53, 249–259.
- Timmons, K. (2018). Educator expectations in full-day kindergarten: Comparing the factors that contribute to the formation of early childhood educator and teacher expectations. *Early Childhood Education Research Journal*, 46(6), 613–628. <https://doi.org/10.1007/s10643-018-0891-0>
- Torquati, J., & Ernst, J.A. (2013). Beyond the walls: Conceptualizing natural environments as “third educators”. *Journal of Early Childhood Teacher Education*, 34, 191–208.
- Toso, V.M. (2011). Reconceptualising spirituality as a philosophy of practice for Pasifika early childhood education in New Zealand: A Samoan perspective. *Pacific-Asian Education*, 23(2), 129–138.
- Trawick-Smith, J., Swaminathan, S., & Liu, X. (2016). The relationship of teacher-child play interactions to mathematics learning in preschool. *Early Child Development and Care*, 186(5), 716–733.
- Treacy, K., Frid, S., & Jacob, L. (2015). Starting points and pathways in Aboriginal students' learning of number: Recognising different world views. *Mathematics Education Research Journal*, 27, 263–281.
- United Nations. (1989). *Convention on the rights of the child*. <https://www.ohchr.org/EN/ProfessionalInterest/Pages/CRC.aspx>
- United Nations. (2007). *Declaration on the rights of Indigenous peoples*. <https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html>
- Uscianowski, C., Ma, V.A., & Ginsburg, H.P. (2020). Differences in the complexity of math and literacy questions parents pose during storybook reading. *Early Childhood Research Quarterly*, 50, 40–50.
- Vale, C., Averill, R., Hall, J., Forgasz, H., & Leder, G. (2020). Equity, social justice, and ethics. In J. Way, C. Attard, J. Anderson, J. Bobis, H. McMaster, & K. Cartwright (Eds.), *Research in Mathematics Education in Australasia 2016–2019* (pp. 177–208). Singapore: Springer.
- van Oers, B. (2010). Emergent mathematical thinking in the context of play. *Educational Studies in Mathematics*, 74, 23–37.
- Victorian Aboriginal Child Care Agency. (2008). *Aboriginal cultural competence framework*. <https://www.childabuseroyalcommission.gov.au/sites/default/files/VAC.0001.002.0001.pdf>

- Villegas, A.M., & Lucas, T. (2002a). Preparing culturally responsive teachers: Rethinking the curriculum. *Journal of Teacher Education*, 53(1), 20–32.
- Villegas, A.M., & Lucas, T. (2002b). The culturally responsive teacher. *Educational Leadership*, 64(6), 28–32.
- Vygotsky, L. (1978), *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wadham, B., Darragh, L., & Ell, F. (2019). Tensions in mathematics home-school partnerships. In G. Hine, S. Blackley & A. Cooke (Eds.), *Mathematics Education Research: Impacting Practice* (Proceedings of the 42nd annual conference of the Mathematics Education Research Group of Australasia, pp. 731–738). Perth: MERGA.
- Wager, A.A., & Parks, A.N. (2016). Assessing early number learning in play. *ZDM Mathematics Education*, 48, 991–1002.
- Walsh, G., McGuinness, C., & Sproule, L. (2019). 'It's teaching ... but not as we know it': Using participatory learning theories to resolve the dilemma of teaching in play-based practice. *Early Child Development and Care*, 189(7), 1162–1173. <https://doi.org/10.1080/03004430.2017.1369977>
- Warren, E., & Miller, J. (2013). Young Australian Indigenous students' effective engagement in mathematics: The role of language, patterns and structure. *Mathematics Education Research Journal*, 25, 151–171.
- Warren, E., Thomas, L., & DeVries, E. (2011). Engaging Indigenous children in mathematical learning in an early childhood setting. *International Journal of Pedagogies and Learning* 6(2), 97–107.
- Watts, T.W., Duncan, G.J., Clements, D.H., & Sarama, J. (2018). What is the long-run impact of learning mathematics during preschool? *Child Development*, 89(2), 539–555.
- Weisberg, D.S., Zosh, J.M., Hirsh-Pasek, K., & Golinkoff, R.M. (2013). Talking it up: Play, language development, and the role of adult support. *American Journal of Play*, 6, 39–54.
- Williams, K.E., Berthelsen, D., Viviani, M., & Nicholson, J.M. (2016). Participation of Australian Aboriginal and Torres Strait Islander families in a parent support programme: Longitudinal associations between playgroup attendance and child, parent and community outcomes. *Child: Care, Health and Development*, 43(3), 441–450 <https://doi.org/10.1111/cch.12417>
- Williams, K.E., Berthelsen, D., Viviani, M., & Nicholson, J.M. (2018). Facilitated parent-child groups as family support: A systematic literature review of supported playgroup studies. *Journal of Child and Family Studies*. 27, 2367– 2383.
- Worthington, M., & van Oers, B. (2016). Pretend play and the cultural foundations of mathematics. *European Early Childhood Education Research Journal*, 24(1), 51–66.
- Yunkaporta, T., & McGinty, S. (2009). Reclaiming Aboriginal knowledge at the cultural interface. *Australian Educational Researcher*, 36, 55–72.
- Zippert, E.L., Douglas, A., Smith, M.R., & Rittle-Johnson, B. (2020). Preschoolers' broad mathematics experiences with parents during play. *Journal of Experimental Child Psychology*, 192, 104757–104778.
- Zippert, E.L., & Rittle-Johnson, B. (2020). The home math environment: More than numeracy. *Early Childhood Research Quarterly*, 50, 4–15.



APENDICES



APPENDIX 1: WHAT IS LET'S COUNT?

Let's Count is an early mathematics program that has been designed to assist educators in early childhood contexts to work in partnership with parents and other family members to promote positive mathematical experiences for young children (3–5 years). The program aims to foster opportunities for children to engage with the mathematics encountered as part of their everyday lives, talk about it, document it, and explore it in ways that are fun and relevant to them.

Let's Count is an early mathematics program for children aged three to five, developed by The Smith Family, Professor Bob Perry from Charles Sturt University and Associate Professor Ann Gervasoni from Monash University. The program supports parents and early years educators to develop the maths skills of children in their care by noticing, exploring and talking about numbers, counting, measurement and patterns in their daily lives.

... *Let's Count* supports parents and early childhood educators to have the skills and confidence so they can develop the maths skills of the children in their care. The program emphasizes maths in the everyday, and helps children to see maths as relevant, stimulating and fun, which sets them up for future success. (The Smith Family, 2020a)

The *Let's Count* program is offered to early childhood educators and other community professionals and, through them, to families and young children.

Let's Count relies on parents and other family members using opportunities for children to engage with the mathematics in their everyday lives, talk about it, document it, and extend it in ways that are relevant to them. This leads to the *Let's Count* mantra: **Notice, Explore and Talk about Mathematics.**

Let's Count is **not** a mathematics teaching nor a school readiness program. However, it does involve early childhood educators in the role of mentors and advisers to the parents and family members of the children in their settings. Through this process, the educators consider their own pedagogical approaches and add to their repertoire of successful practices.

Both face-to-face and online modes of professional learning are available in *Let's Count* and a Parent Bot has just been released. Large numbers of participants have accessed *Let's Count* since its original development in 2010, as recorded in Table A1.1.

Table A1.1 *Let's Count* Overall Reach

FINANCIAL YEAR	FACE-TO-FACE & ONLINE		
	Early Years Professionals	Families ¹	Children ²
2011/2012 (pilot)	60	900	1,710
2012/2013 (pilot)	70	1,050	1,995
2013/2014	140	2,100	3,990
2014/2015	178	2,670	5,073
2015/2016	345	5,175	9,833
2016/2017	796	11,940	22,686
2017/2018 ³	903	13,545	25,736
2018/2019	1,378	20,670	39,273
2019/2020 ⁴	1,620	24,300	46,169
Totals	5,490	82,350	156,464

¹ Estimated at 15 families per educator based on educator reports

² Estimated at 1.9 children per parent based on a scan of families in The Smith Family database

³ Online commenced in 2017/2018

⁴ Running totals to 30 June 2020

A further aspect of the *Let's Count* suite is *Let's Count* at Work targeted towards organisations seeking a way to build staff engagement for the parents and carers in the organisation. *Let's Count* at Work is “a highly effective one-hour workshop conducted by The Smith Family. Designed specifically for parents and carers in your organisation, it gives them the confidence and skills to help their children develop numeracy skills that will prepare them for primary school.” (The Smith Family, 2020b). To date, approximately 40 *Let's Count* at Work sessions have been held, with 575 participants.

Regular evaluations of the various modes of the *Let's Count* program have been carried out (Gervasoni, MacDonald, Perry, & Roche, 2019; Gervasoni & Perry, 2015; Peridot Education Pty Ltd, 2019; Perry, Gervasoni, Hampshire, & O'Neill, 2016; Perry, Gervasoni, & Kearney, 2012; The Smith Family, 2015). These evaluations have informed ongoing developments in *Let's Count* and will inform the revision of the program.

Since its commencement in 2010, *Let's Count* has been supported by Blackrock Investments, The Origin Foundation, Orica, The Bank of Queensland, Ian Potter Foundation and Equity Trustees – James Hartley Charitable Trust.

References for What is Let's Count

- Gervasoni, A., MacDonald, A., Perry, B., & Roche, A. (2019). *Let's Count Online Evaluation*. Sydney: The Smith Family.
- Gervasoni, A., & Perry, B. (2015). *Let's Count longitudinal evaluation: Final report*. Sydney: The Smith Family. <https://letscount.thesmithfamily.com.au/course/view.php?id=3>
- Peridot Education Pty Ltd. (2019). *Evaluation of Let's Count Community Professionals Pilot 2019*. Sydney: The Smith Family.
- Perry, B., Gervasoni, A., Hampshire, A., & O'Neill, W. (2016). *Let's Count: Improving community approaches to early years mathematics learning, teaching and dispositions through noticing, exploring and talking about mathematics*. In B. White, M. Chinnappan, & S. Trenholm (Eds.). *Opening up mathematics education research* (proceedings of the 39th annual conference of the Mathematics Education Research Group of Australasia) pp. 75–84. Adelaide: MERGA.
- Perry, B., Gervasoni, A., & Kearney, E. (2012). *Let's Count pilot program: Final evaluation*. Sydney: The Smith Family.
- The Smith Family (2015). *Strengthening early numeracy learning: The Let's Count program*. Sydney: Author. <https://www.thesmithfamily.com.au//media/files/research/reports/lets-count-research.pdf>
- The Smith Family (2020a). *Let's Count*. <https://www.thesmithfamily.com.au/programs/numeracy/lets-count>
- The Smith Family (2020b). *Let's Count at Work*. <https://www.thesmithfamily.com.au/get-involved/partnerships/corporate-social-responsibility/lets-count-at-work>

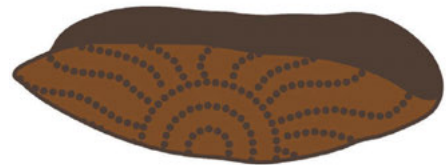


Let's Count is **not** a mathematics teaching nor a school readiness program. However, it does involve early childhood educators in the role of mentors and advisers to the parents and family members of the children in their settings. Through this process, the educators consider their own pedagogical approaches and add to their repertoire of successful practices.



APPENDIX 2: ELEMENTS OF THE STRONGER SMARTER APPROACH™

The Stronger Smarter Approach asserts confidently that we give Indigenous children hope, if we work from the assumption that they have strengths, and if we do things with them and their communities, then there is a tendency ... for them to succeed in education' (Sarra, 2017).



The Stronger Smarter Institute is represented by the soaring eagle. Honouring the contributions made by the Cherbourg community when the inaugural Institute logo was developed, the eagle symbolises pride and a strong sense of identity.

The eagle soars high towards a new horizon, towards a new era for Indigenous education – where we move beyond hope through high expectations relationships to positive outcomes and great achievements for Indigenous children.

The waves symbolise our connection with all Australians, with the belief that people connected to saltwater, freshwater or the deserts can identify with a stronger smarter way of life.



At the Stronger Smarter Institute, we use the coolamon metaphor. The coolamon is an oval vessel cut out of the bark of trees that is used for cradling and rocking babies.

The coolamon can carry our Jarjums safely, proud, strong, smart and deadly through the sectors of the early childhood years and create a solid foundation to begin their schooling.

In our metaphor, the coolamon has *High-Expectations Relationships* as a foundation.



What our young ones are saying.

“When you think of an Aboriginal or Torres Strait Islander kid, or in fact, any kid, imagine what’s possible. Don’t define us through the lens of disadvantage or label us as limited. Test us. Expect the best of us. Expect the unexpected. Expect us to continue carrying the custodianship of imagination, entrepreneurial spirit and genius. Expect us to be complex. And then let us spread our wings, and soar higher than ever before.”

(NITV, 2019)



The Stronger Smarter Approach™

The Stronger Smarter Institute, founded by Dr Chris Sarra 14+ years ago, has worked with schools across the nation to directly transform education for Aboriginal and Torres Strait Islander Jarjums.¹ The Stronger Smarter Approach™ incorporates partnering with parents, communities and educators to continually develop and refine innovative approaches that feed the strengths of our Jarjums. We also partner with non-school organisations who are on the path to bring change for our very young ones before they enter the formal education systems.

Several key points come out of a survey of literature about transforming the education experience and outcomes for Aboriginal and Torres Strait Islander students and there is widespread consensus regarding some important underpinnings. Educators can individually and collectively adopt practices that will lead to a new way Jarjums experience school and much more equitable outcomes. This can occur from the earliest contact Jarjums and their families have with education settings.

The survey of literature also reveals that research has been and continues to be conducted around the globe in settler-colonial societies where First Nations peoples have similar experiences of dispossession, marginalisation and oppression. Work of significance is coming out of Aotearoa/New Zealand, Canada and the United States.

To begin to undo the results of deficit discourse of policy and practice in the area of Aboriginal and Torres Strait Islander education various educators have sought to develop Culturally Responsive Pedagogies (CRPs). In a comprehensive review of literature in the field Morrison, Rigney, Hattam & Diplock, (2019, p. 1–2) define CRPs as ‘those pedagogies that actively value, and mobilise as resources, the cultural repertoires and intelligences that students bring to the learning relationship’ and position the foundational work in the area as grounded in a ‘cogent rejection of deficit discourses’ (Morrison et al, 2019, p.16). Rejection of the deficit discourses comes about when people engage in reflection to identify the out-of-awareness beliefs they hold in relation to Aboriginal and Torres Strait Islander peoples and come to understand how negative stereotypes have framed interpersonal interactions.



Indigenous peoples have the right to the dignity and diversity of their cultures, traditions, histories and aspirations which shall be appropriately reflected in education and public information.

United Nations Declaration on the Rights of Indigenous Peoples, 2007.



¹ Jarjums is a Bundjalung/Yugambeh word for children used on Australia's eastern coast.



Stronger Smarter Approach™ Framework

One way to enact Culturally Responsive Pedagogies is through the Stronger Smarter Approach Framework. 'The Stronger Smarter Approach™ articulates the philosophical framework developed by Dr Chris Sarra, which he has described as the Stronger Smarter Philosophy and Metastrategies.

The Stronger Smarter Metastrategies provide a set of five context-specific strategies. School leaders can use these as appropriate for their local context, using processes of relationship-building and co-creation to determine priorities. The Metastrategies are interconnected, so that as schools work on one area, things also start to change in other areas.

In the Stronger Smarter Approach™ we describe four cornerstones that we believe need to be in place for the Stronger Smarter Metastrategies. Again, there is interconnection with the Metastrategies themselves. These four key elements are²

- Responsibility for change (professional accountability)
- Taking a strength-based approach
- Embracing a positive Indigenous student identity (Strong and Smart)
- Building High-Expectations' (SSI, 2017, p4).

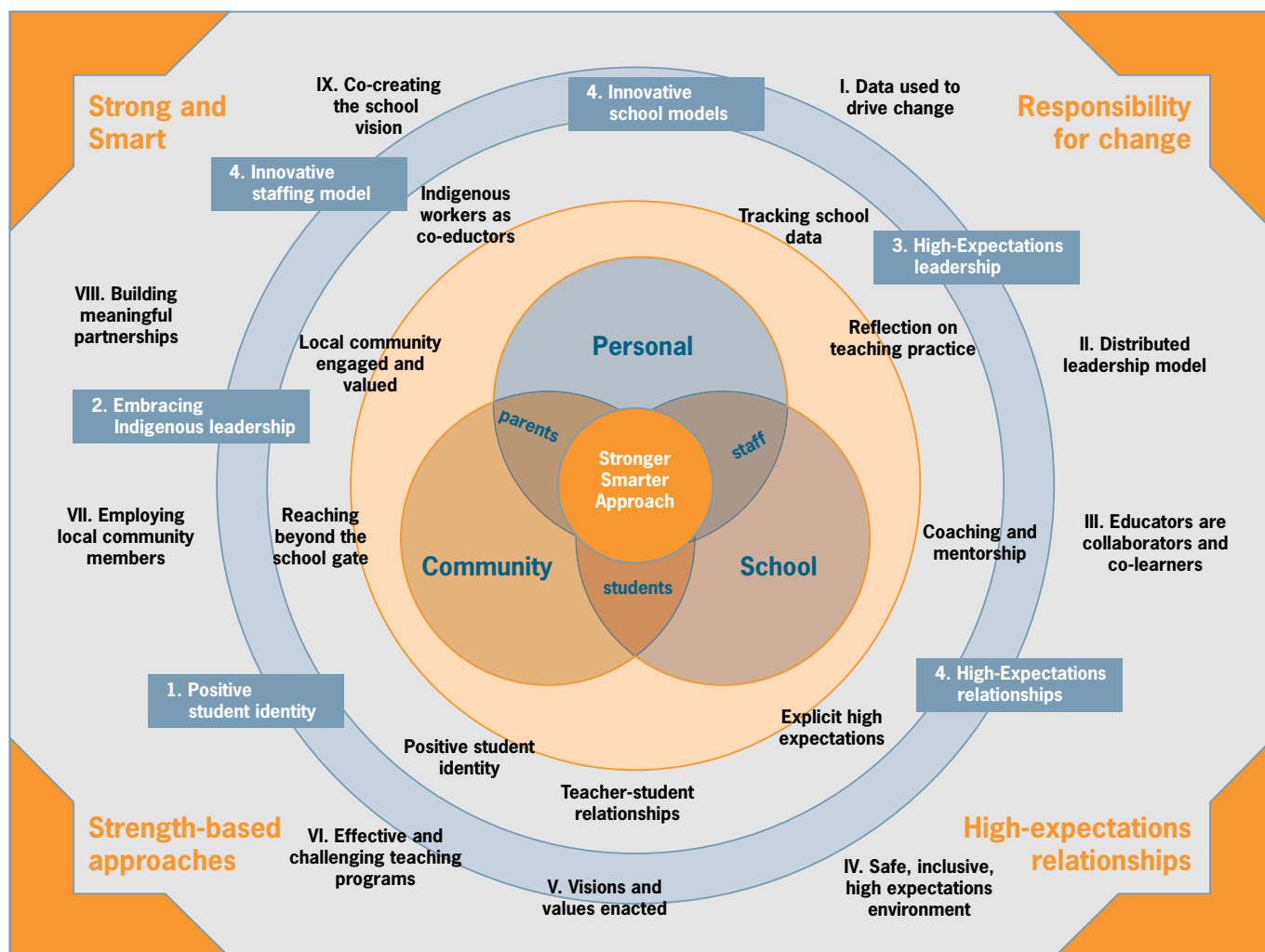
A cross-over or flow space between separate moving parts is part of Indigenous Knowledge thought worlds. The spheres of the personal, school and community come together as the Stronger Smarter Approach in a connecting space of innovation and creation' (SSI, 2017, p.11). In the personal sphere the Stronger Smarter Leadership Program (SSLPTM) challenges educators to reflect on 'out-of-awareness' assumptions that lead to a deficit discourse about Jarjums and supports the development of confidence to be an agent of change. In the school sphere school leaders³ are provided with tools that can be adapted to different contexts to change the tide of low expectations. And in the community sphere High-Expectations Relationships develop authentic relations with local community that facilitate collaboration in developing Culturally Responsive Pedagogies and curricula materials.

These metastrategies and cornerstones are mapped against the spheres in Figure A2.1.

2 The four key elements are also referred to as the pillars of the Stronger Smarter Approach™

3 School leaders are not just principals. The term refers to all people who embark on the journey to transform education for Jarjums.

Figure A2.1: The Stronger Smarter Framework



For early childhood educators introducing programs and/or materials for Jarjums to use in the home or community settings, engaging authentically with community members is crucial. Community includes mothers, fathers, family, clan and wider community who are part of the lives of Jarjums. Community engagement is not something that you do today and tick the box and it's done. Once you start it is ongoing, it's every day and it's everything you do. It's about your ability to talk to community and have open and honest conversations' (SSI, 2017, p.48). For educators purposefully pursuing authentic engagement going outside the school gates can be very important. The SSA™ (2017, p.44) offers the following suggestions:

- creating opportunities for staff to meet with parents and community in environments that best suit the community
- educators contacting parents and carers with positive news about their children to build relationships
- specific activities might include yarn ups, cultural activity days, playgroups, school gardens, and events such as NAIDOC week, Coming of the Light Festival, and Reconciliation events.
- educators sensitive to the effects of parents' negative experiences of school, or feelings that they lack skills and knowledge to support their students.



What we want is smart Aboriginal kids. We don't want to make the kids smart white kids, because they're not white kids. They're Aboriginal kids and we want them to embrace that sense of self, embrace who they are and value that as something important, that to be as good as the next person you don't have to be white. You can be an Aboriginal person and be as good as the next person.



Identity and culture

Sarra (2005, p.175) argues that all schools with Aboriginal and Torres Strait Islander Jarjums have a role to play in challenging Jarjums to confront negative beliefs they may hold about being Aboriginal and/or Torres Strait Islander and how these beliefs impact on their engagement with education. Adults working with Jarjums also need to confront deficit assumptions that shape their interactions. 'We cannot expect to get the best out of people when our perceptions and expectations of them are negatively skewed (Sarra, 2011, p.9) Once the negative constructs around identity have been brought out into the open the school staff have a responsibility to 'nurture and provide opportunities for to develop a more positive perception and then embrace that positive identity.

Linked to this is viewing the cultures that Jarjums represent as positive, rich, vibrant, living cultures that give their young ones strengths and cultural capital. From this stance Indigenous Knowledge can be fore-fronted in education providing culturally responsive pedagogies for all.



"We want them (Aboriginal and Torres Strait children) to embrace that sense of self, embrace who they are and value that as something important, that to be as good as the next person you don't have to be white. You can be an Aboriginal person and be as good as the next person."

Donna Bridge, Principal



Tom Calma, Aboriginal and Torres Strait Islander Social Justice Commissioner, describes culture as ‘an important building block for every child’s future. Not only does it provide a platform for enhanced learning, but it also provides a ‘recognition space’ where young people can learn in an environment that respects and acknowledges where they come from, who they are, and what they may already know (Calma, 2008).

In a comprehensive review of literature regarding culturally responsive pedagogies Morrison et al (2019, p. 1–2) define CRPs as ‘those pedagogies that actively value, and mobilise as resources, the cultural repertoires and intelligences that students bring to the learning relationship’ (Morrison et al, 2019, p.16).

Relationships that are respectful and caring form a foundation for CRPs (Morrison et al (2019, p. 21). This relationship need has been identified on an international level. Castagno & Brayboy (2008, p.970) point to the centrality of the importance of caring relationships in the literature.



“It is a fundamental human right of our children to have an education that makes them stronger, in a way that enables them to develop a rich and positive sense of their own cultural identity: and smarter in a way that enables them to participate in modern society as any other Australian would.”

(Sarra, 2011, p. 1).



Relationships

The *Indigenous Children Growing Up Strong* report (Walter, Martin & Bodkin-Andrews, 2017), based on data from the Longitudinal Study of Indigenous Children and completed by a group of Aboriginal researchers, explores the cultural, social, educational and family dynamics of the lives of Aboriginal and Torres Strait Islander Jarjums. They describe the subtle differences to the normalized Euro-Australian parameters for family structures, arrangements and practices, and the different views on the values that Jarjums should learn at home. A significant conclusion is the importance of relationships between educators, Jarjums and parents, and the fact that this relationship must move beyond a homogeneous and Eurocentric understanding of what constitutes Aboriginal and Torres Strait Islander parents and their families.

A key cornerstone of the Stronger Smarter Approach™ is High-Expectations Relationships (H-ER). This is described as an ‘authentic, two-way relationship that is both supportive and challenging’ (SSI, 2014, p.8). These relationships need to be based in high levels of trust. Inherent in High-Expectations Relationships is having the courage to challenge yourself and your actions/attitudes that may lead to undermining the strengths our young ones have.

Building and maintaining High Expectations Relationships involves authentic dialogue with and between all in a context of equal power. Yarning circles are valuable for this. They are defined by Davis (2017.p xviii) as ‘the customary practice of setting and sitting in a circle to communicate. This again connects to the higher order thought process of creating equal and equitable communication systems.’ Expanding on this Davis (2017 p.103) offers that ‘Yarning represents a way of sitting, communicating and being present which builds a strong sense of self and promotes wellbeing and connectedness’. Yarning is a time to ‘sit, listen, share and create spaces for deeper earing (Davis 2017.103).

Many Western people are uncomfortable with silences in a conversation and jump in to fill the ‘gaps. As Auntie Miriam-Rose Ungunmerr-Bauman states in describing ‘dadirri’⁴ ‘my people are not threatened by silence. They are completely at home in it. They have lived for thousands of years with Nature’s quietness’ (Ungunmerr, 1998, p.2). She presents dadirri as ‘inner, deep listening and quiet, still awareness (Ungunmerr, 1998, p.1). In yarning taking the time to listen means accepting the ‘quiet stillness and the waiting... We don’t like to hurry. There is nothing more important than what we are attending to. There is nothing more urgent that we must hurry away for.’ (Ungunmerr, 1989, p.2–3)



“You know Fiona is an amazing woman. Initially she really frightened me, she would say something and there would be silence – because I’m a bit of an anxious person I always wanted to fill the silence and it made me nervous, the silence. Then I realised she’s not actually just sitting there in silence, she is just sitting there thinking and weighing things up, so I started doing that too and I was like I actually quite like this.”

SSLP alumni



4 The word, concept and spiritual practice that is *dadirri* (*da-did-ee*) is from the Ngan’gikurunggurr and Ngen’giwumirri languages of the Aboriginal peoples of the Daly River region (Northern Territory, Australia). Permission to use *dadirri* can be sought from Miriam-Rose Ungunmerr.

Using these processes contributes to the building of High-Expectations Relationships as two-way relationships that are both supportive and challenging. This is both 'firm' and 'fair'. Being 'fair' in the relationship means engaging in enabling processes and is essential to establish trust and safety. Being 'firm' is characterised by courage, resilience, and rigour to challenge mindsets in self and others. (Stronger Smarter Institute, 2014; Sarra, Spillman, Jackson, Davis & Bray, 2018) (SSI, 2019a, p. 11).

There is widespread agreement on the value of positive relations between educators and the families of young ones. High-Expectations Relationships can be used to 'develop community partnerships built on cohesion and collaboration' (Stronger Smarter Institute, 2017, p.12). One alumnus describes building relationships:

Engaging with community is difficult to define if you don't know what you want. It is a combination of so many things. I need to understand the needs of the community from a community perspective. It's about me door knocking, talking with families.

"The challenge of doing things with people not to them means having to assume Indigenous people have a sense of agency and then actively embracing and engaging that capacity at a local level ..."

(Sarra, quoted in Karvelas, 2018).

Strength Based Approaches

Strength based approaches are also promoted by many. Morrison et al (2019, p.22) describe CRP as 'an asset-based pedagogy... that purposefully identifies and draw on the assets or strengths of students, their families and their communities'. Strength-based approaches are another pillar of the Stronger Smarter Approach™ which 'is about schools recognising the strengths that exist in their local communities, working in partnership, and embracing positive Indigenous community leadership' (Stronger Smarter Institute, 2017, p.5). A strength-based approach 'involves doing things *with people not to people*' (Stronger Smarter Institute, 2017, p.6).

By recognising and valuing the strengths that Aboriginal and Torres Strait Islander ways of Knowing, Being and Doing imbue in Jarjums educators can provide a setting where Aboriginal and Torres Strait Islander families and Jarjums feel a part of a schooling system that honours their cultural identity and provides



"We didn't go to Cherbourg and give the children a sense of being 'Strong and Smart'... That was inside them already.... That sense of being strong and smart resides in every Aboriginal and Torres Strait Islander child."

Dr Chris Sarra



culturally appropriate pathways to success (Martin, 2008). Building on strengths in the early childhood context, forefronting Indigenous Knowledges in the design of age appropriate, play based learning activities is not just about supporting Aboriginal and Torres Strait Islander Jarjums but will benefit all Australian Jarjums. Taking an anti-racist, strength-based approach has the potential for societal change. If we point the compass in a slightly different direction, we could end up somewhere very different for Aboriginal and Torres Strait Islander education in Australia.

"What works' for Indigenous people is not about teaching Aboriginal and Torres Strait Islander Jarjums differently. A strength-based approach is about ensuring that all students receive the same opportunities as everyone else. When students bring different strengths to the classroom, providing equal opportunity means treating all students as individual learners and taking the time to develop individual learning plans for every student." (SSI, 2019b, p.10).

'Adopting an approach that acknowledges and values the strengths students, their families and their communities can bring to the learning environment steers a new course for Aboriginal and Torres Strait Islander Jarjums' (SSI, 2019b, p25). This requires recognition of the diversity within the Australian Aboriginal and Torres Strait Islander population and from that recognition comes the awareness of the need to develop place-based approaches.

Place Based Approaches

The Stronger Smarter Approach™ purports an underlying belief that to improve outcomes for Indigenous students, we need to do things differently (Sarra, 2011, p.163). One aspect of 'doing things differently' is to adopt local approaches 'to support our unique and diverse communities, we need local approaches





As McLaren and Giroux (1990), two critical educators in the Freirean tradition observe, critical pedagogies are inherently pedagogies of place. To understand the place-based struggles of Indigenous communities requires an engagement with the pedagogies created by that place; the experiences, problems, languages and histories these communities rely upon to construct a narrative of collective identity.

Johnson, 2012, p. 834



(National Aboriginal and Torres Strait Islander Education Strategy, 2015). We see transformation as not only a change process for the school but also a personal leadership approach. Taking personal responsibility for change and working with others to co-create strategies provides the starting point for creating local approaches (SSI, 2017, p.11).

Guenther et al, (2016, p.90) introduce the concept of contextually responsive education. Summarising the qualitative data from their research they state that 'contextually responsive teachers bring a degree of self-reflexivity to their roles in schools and communities, being aware of the differences that present to them within the context and responding with flexibility'. They define this as contributing to 'an education that supports the identity, language, land and culture imperatives of local people' (Guenther et al, p.92) which has a clear link to the assertion that 'culturally responsive pedagogies are 'connected to students' life worlds' (Morrison et al, 2019, p.22). Curriculum that is connected to prior learning and connected to students' lives and worlds is 'more interesting, effective and authentic (Castagno & Brayboy, 2008, p.962).

In reviewing best-practice in Indigenous education internationally Griffiths (2011, p.72) concludes 'The development of culturally responsive education initiatives, particularly those driven by local communities, also presents an opportunity for Indigenous peoples to counter a historical legacy of educational dispossession'.

The Stronger Smarter Approach™ actively embraces place-based approaches by working with educators to develop workplace challenges specific to their school context and community. The approach promotes the employment of local Indigenous staff and the co-creation of a school's vision in collaboration with Aboriginal and Torres Strait Islander community members using circle processes.

The Stronger Smarter Approach™ "involves processes of co-creation' or doing things 'with people' not 'to people' (SSI, 2017, p.41) and dovetails well with 'parents as first teachers' approaches reflected in federal and state government education documents in various forms. In co-creating with people, a place-based focus is enacted. Co-creating with people also means engaging in the third cultural space.

The third cultural space

The colonial education system put in place in Australia and many other colonised countries presented Western knowledge as science and as a binary opposite to Indigenous knowledge (Chilisa, p.52) which was discounted. Scheurich and Young (1997, p.4) tell us how this is the result of processes around power:

when any group within a large, complex civilization significantly dominates other groups for hundreds of years, the ways of the dominant group (its epistemologies, ontologies, and axiologies), not only become the dominant ways of that civilization, but also these ways become so deeply embedded that they typically are seen as "natural" or appropriate norms rather than as historically evolved social constructions'.

Rigney (1999, p.113) asserts that this led to the classification of Indigenous knowledge, histories and experiences as irrelevant. He goes on to present a case for Indigenous people defining, controlling and owning epistemologies and ontologies that value and legitimate the Indigenous experience' (Rigney, 1999, p.114). Martin (2009, p.211) pursues the same theme in centring 'the interrelationship between our Ways of Knowing, Ways of Being and Ways of Doing' in any representation of Aboriginal and Torres Strait Islander worlds.⁵



"Governments and institutions need to see and to find ways of working with different knowledges.... Together in the twenty-first century we can construct a unique way of life here, inspired by the traditions of Aboriginal Australia and of Europe and Asia."

Mandawuy Yunupingu, 1994



5 Indigenous knowledges are not homogenous. They are demarcated by regional, class, ethnic, gender and religious differences, and in fact, all knowledges are social and political creations serving specific interests. (Dei, 2008. p.8)



Western and Indigenous Knowledges meet in many contexts and the term the 'cultural interface' has been used (Nakata 1997, Yunkaporta & McGinty 2009) to describe the space where this happens. Working in a remote Indigenous community located on the junction of three rivers and three traditional territories Yunkaporta & McGinty (2009, p.56) incorporate local knowledge to develop 'a central metaphor for working synergistically in the overlap between multiple social realities and ways of knowing'.

An alternative term for the meeting spaces is the 'third space' which is often attributed to the work of Homi Bhabha (1994) who put forward the concept of 'the space in between' where 'all cultural statements and systems are constructed, therefore all hierarchical claims to the inherent originality or 'purity' of cultures are untenable" (Bhabha, 1994, p. 54). In this third space authentic dialogue can occur between members of different cultural groups and essential is the creation/acceptance of equal positions of power. It is a space where people's experiences are not denied, the impact of these are not diminished and people are not demeaned. Third spaces are places of potential for growth and change.

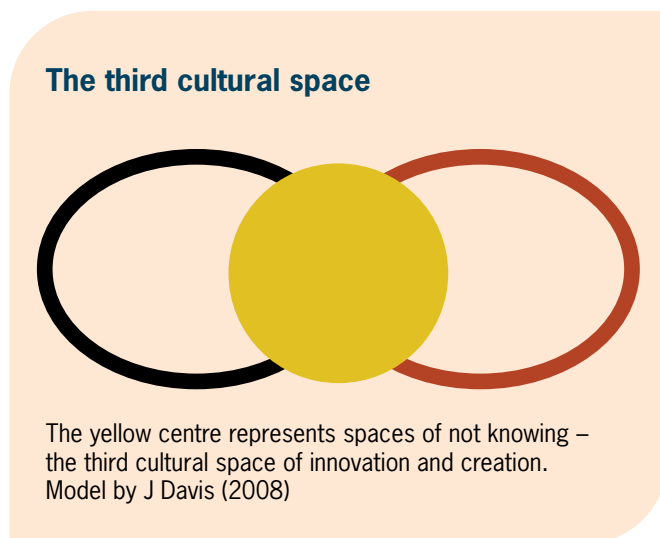
With the diversity of Australia's population educators work in the third cultural space every day. Dr John Davis explains the third cultural space in the 2011 Embedding Aboriginal and Torres Strait Islander Perspectives in schools guide (p.9). He explains the concept in relation to the diagram below (Figure 1) as follows:

'The third cultural space recognises that Indigenous communities have distinct and deep cultural and world views — views that differ from those found in most Western education systems. When Western and Indigenous systems are acknowledged and valued equally, the overlapping or merging of views represents a new way of educating' (DET, 2011. p.9).

Within the third cultural space, the relationship is built on valuing strengths, holding high expectations, and deep listening to understand the perspectives, expectations, hopes and aspirations of others. The expectation is with the educator to get to know Jarjums and their families and understand the strengths they bring to the Early Years space. This is the starting point to creating a learning space of positive cultural identity, belonging and participation where Jarjums can continue to build the resilience and socio-emotional skills they need for the future (SSI, 2019a, p.5).

Educators can actively pursue the third cultural space in relation to the knowledge in different contexts. What is the area of innovation and creation with the Jarjums, with the families and with the wider community? What innovative and creative approaches are there for the way that Jarjums are 'taught'? What is the third cultural space in relation to the content of different learning areas?

Matthews et al (2005) present a compelling case that mathematics education as it has long occurred in Australia devalues Indigenous culture and marginalises Aboriginal and Torres Strait Islander Jarjums. They argue that their cultures are presented as 'too primitive to contribute to today's society' (Matthews et al, 2005, p.1). They outline how the notion of 'technological progress' is reinforced by STEM curriculum and that cultures 'that have not developed the same type of technologies, are considered primitive, simplistic and less advanced' (Matthews, 2005, p.3) and that this denies Aboriginal and Torres Strait Islander peoples a space in maths and science education. This is in spite of the exploitation of Indigenous knowledges for Western science.



In the diagram, the black circle represents Indigenous ways of knowing, being and doing, and the red circle represents Western ways.



"Mathematics is important too. In fact, we have spent a lot of time and words developing a maths curriculum for our kids, a genuine Aboriginal mathematics. We have called this a Ganma Maths curriculum. It enables our children to work intellectually with the balances they must achieve in their lives."

Mandawuy Yunupingu, 1994



In 2015 Matthews presents 'Maths as Storytelling' in which he skilfully weaves his knowledges of applied mathematics and theory with his embodied and learnt cultural knowledge as a Nunukal man. The power of this approach and definition of the pedagogy is in Matthew's third space creation, the balance or definition of the spaces of overlap and seeking of areas of balance and interface (Ganma theory, Yirrkala CEC, 1998; Chilisa, 2012; Yunupingu in Craven; 1989, Davis, 2010). This cross ways or connection of spheres is applying the Stronger Smarter Approach.

Matthews offers an alternative model that learning numeracy concepts can be a creative process in which students express their own language and creativity in a similar way to other creative pursuits such as music, dance, language and visual arts. He also positions mathematics as having a particular lens on the world through the notion of quantification (measuring) and exploring how these quantities connect, relate and interact. These relationships form patterns and structures of mathematics that strongly reflect the patterns and structures in our reality whether rainfall patterns, kinship systems or distances between places.

All education workers must accept and understand their position within the nation's shared history of terra nullius, since this is the starting point of the relationship between Indigenous and non-Indigenous people. Non-Indigenous people need to unlearn what they learned. Early childhood educators share the responsibility for change – the acceptance that they have the personal agency to change the way they perceive Aboriginal and Torres Strait Islander Jarjums and their families and communities and how they interact with and relate to them.



Stronger Smarter Jarjums takes a strength-based approach to create a space where all Jarjums can be themselves, have a sense of belonging and have the strength to become the great learners they deserve to be.

The Stronger Smarter Jarjums program will support you to establish collaborative relationships with local Indigenous leaders to provide local input into programs that develop understanding of Aboriginal and Torres Strait Islander histories, cultures and languages.

Stronger Smarter Jarjums Program brochure.



Stronger Smarter & the Early Years Learning Framework

The processes of SSI/Jarjums Program aligns with *Belonging, Being, Becoming*. Can be seen and shows how to utilise that alignment as a strength to transform the early years learning for all Jarjums. A pillar of the Stronger Smarter Approach™, *Responsibility for Change*, asks all educators working with or for Aboriginal and Torres Strait Islander Jarjums to accept that they are individually in the position to be 'partners in change'. The activities designed, the way in which they are used, the way relationships and communication are developed with all stakeholders are in the reach of everyone to optimise.

The emphasis on the importance of 'Strong and Smart identities' that permeates all the work of the Stronger Smarter Institute is not confined to Aboriginal and Torres Strait Islander Jarjums. The Early Years Learning Framework (EYLF) positions children having a strong sense of identity as the number one outcome for children from birth to 5 years (DEEWR, 2009, p.3). The Stronger Smarter Approach™ demonstrates, practises and shows how to build sense of belonging which is part of defining identities (DEEWR, 2009, p.7).

The EYLF also positions educators in early childhood settings working in partnership with families 'to construct curriculum and learning experiences relevant to children in their local context' (DEEWR, 2009, p. 12). Stronger Smarter Jarjums™ shows how through a *Mesh of High Expectations in the Early Years* (Bobongie & Jackson, 2018), Culturally Responsive Pedagogies (CRP) and Culturally Responsive Curriculum (CRC) through a holistic Indigenous Lens can be built. This creates spaces of comfort for families and Jarjums coming from home and into educational spaces.

The Early Years pathway for any Jarjum is a series of adjustments: from home to playgroup, to Prep, to Kindy, and finally through to Years 1 and 2 at school. If this pathway through the Early Years is a series of discrete experiences in different settings, including the home setting, Jarjums find themselves having to continually navigate a different set of rules and expectations' (SSI, 2019, p.6).

Understanding the *Mesh of High Expectations Relationships in the Early Years* (Bobongie & Jackson, 2018) – discusses the layering approach of learnings – CRP across the early years with discussions occurring between and across the particular stages in the foundations of education to create smooth transitions.

Stronger Smarter Metastrategies align and entwine throughout EYLF Learning Outcomes, Principals and Practices and the Australian Teaching Standards. Creating spaces of comfort for families and Jarjums coming from home and into educational spaces comes from pursuit of deeper knowledge of the experiences of the Jarjums and their families.





*Fundamental to the Framework is a view of children's lives as characterised by **belonging, being and becoming**. From before birth children are connected to family, community, culture and place. Their earliest development and learning takes place through these relationships, particularly within families, who are children's first and most influential educators. As children participate in everyday life, they develop interests and construct their own identities and understandings of the world.*

(DEEWR, 2009, p. 7)



Creating educational spaces that reflect the cultures of the Jarjums and their cultural identities creates a sense of belonging. Knowing the languages, relationships and cultural knowledge of Jarjums is the *being*. Embracing and building on cultural knowledge contributes to the *becoming*.

As already described successful early learning programs come from a strength-based approach. The misconception that Aboriginal and Torres Strait Islander people do not have the necessary understanding of mathematical concepts to be successful in school maths needs to be abandoned. Culturally Responsive Pedagogy is described by Rigney et al (p.4) as working with both personal and cultural strengths, intellectual capability and prior achievements to develop culturally empowered learners. This is especially important when laying down the foundations for later learning.

The *Longitudinal Literacy and Numeracy Study for Indigenous Students* followed the progress of a number of Indigenous Jarjums from 2000 from their entry to the school system and through their early years to collect data related to educational opportunity. Based on the findings Purdie et al (p.11) discuss a range of experiences young children have in their home communities 'that foster the development of mathematical thinking'. An example given, from traditional communities, related to hunting and the need to have 'a sense of position and direction through the use of environmental markers. They further point to the practice of equitable sharing as promoting mathematical concepts.

Matthews (2019, p.3), writing about his work in Arnhem Land cites Yunupingu who 'Stated that the closest connection between Western and Yolŋu knowledge systems is mathematics. He also stated that Yolŋu mathematics is Gurrutu. The English translation of Gurrutu is kinship, but Gurrutu is much bigger than this.'

In a subsequent paper he describes a foundational concept in Gurrutu as 'moiety: Yirritja and Dhuwa, which is a binary relationship that maintains balance in the system. In mathematics, there are many binary relationships that also maintain balance, such as inverse operations, positive and negative numbers and so on' (Matthews, 2020, p.2). He goes on to state that both Gurrutu and mathematics contribute to making sense of the multiple connections in the world (Matthews, 2020, p.4).



Gurrutu is about understanding cycles and their connection to environmental cycles, which can be used to teach circles, rotation and recursion, to name a few. Gurrutu is also about systems of relationships, which is connected with concepts such as functions, graphs and networks.

(Matthews, 2020, p. 2)

Early childhood is "...a period of momentous significance for all people growing up in [our] culture... By the time this period is over, children will have formed conceptions of themselves as social beings, as thinkers, and as language users, and they will have reached certain important decisions about their own abilities and their own worth."

(Donaldson et al, 1983, p. 1)

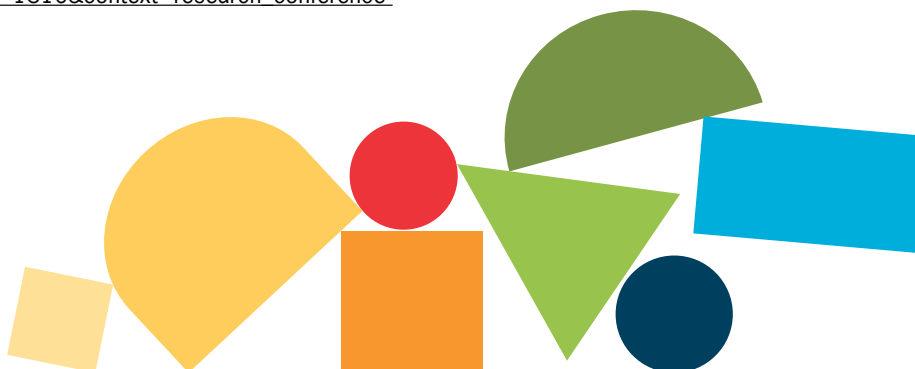


References for Elements of The Stronger Smarter Approach™

- Bhabha, H. (1994). *The Location of Culture*. Routledge. New York.
- Bobongie, F., & Jackson, C. (2019). Stronger Smarter – transformational change for Australian schools with rock-solid foundations in the Early Years. In J. Allan, V. Harwood, & C. Rubner Jorgensen (Eds.), *World yearbook of education 2020: Schooling, governance and inequalities*. Routledge: Taylor and Francis.
- Calma, T. (2008). 'Be Inspired': *Indigenous Education Reform*, Speech delivered to the Victorian Association of State Secondary Principals, Melbourne.
- Castagno, A.E., & Brayboy, B.M.J. (2008). Culturally responsive schooling for Indigenous youth: A review of the literature. *Review of Educational Research*, 78(4), 941–993.
- Chilisa, B. (2011). *Indigenous research methodologies*. Sage. Los Angeles.
- Craven, R. (Ed.). (2011) (2nd ed.). *Teaching Aboriginal studies: A practical resource for primary and secondary teaching*. Sydney: Allen & Unwin.
- Davis, J. (2017). *Durithunga – Growing, nurturing, challenging and supporting urban Indigenous leadership in education*. PhD thesis. Queensland University of Technology, Brisbane.
- Dei, G. (2008). Indigenous knowledge studies and the next generation: Pedagogical possibilities for anti-colonial education. *The Australian Journal of Indigenous Education*, 37, 5–23.
- Department of Education, Employment and Workplace Relations (DEEWR). (2009). *Belonging, Being & Becoming: The Early Years Learning Framework for Australia*. Canberra: DEEWR.
- Department of Education and Training (DET). (2011). *Embedding Aboriginal and Torres Strait Islander perspectives in schools: A guide for school learning communities*. Brisbane: Queensland Government.
- Donaldson, M., Grieve, R., & Pratt, C. (1983). *Early childhood development and education: Readings in psychology*. Oxford: Basil Blackwell.
- Griffiths, A. (2011). The components of best-practice Indigenous education: A comparative review. *The Australian Journal of Indigenous Education*, 40, 69–80.
- Gruenewald, D.A. (2008). Place-based education: Grounding culturally responsive teaching in geographical diversity. In D.A. Gruenewald & G.A. Smith (Eds.), *Place-based education in the global age: Local diversity* (pp. 137–153). New York: Lawrence Erlbaum Associates.
- Guenther, J., Disbray, S., & Osborne, S. (2016). Red dirt education: A compilation of learnings from the Remote Education Systems project. Alice Springs: Ninti One Limited. http://www.crc-rep.com.au/resource/RedDirtEducation_CompilationLearningsRES_EBook.pdf
- Johnson, J. (2012). Place-based learning and knowing: Critical pedagogies grounded in Indigeneity. *GeoJournal*, 77, 829–836.
- Karvelas, P. (2018). Prime Minister's chief Indigenous adviser Chris Sarra resigns from advisory council. *RN Drive*, 28 June 2018. <https://www.abc.net.au/news/2018-06-28/prime-minister-indigenous-adviser-chris-sarra-resigns/9919920>
- Lee, W., Carr, M., Soutar, B., & Mitchell, L. (2013). *Understanding the Te Whāriki approach: Early years education in practice*. Abingdon: Routledge.
- Lewthwaite, B. E., Osborne, B., Lloyd, N., Boon, H., Llewellyn, L., Webber, T., Laffin, G., Harrison, M., Day, C., Kemp, C., & Wills, J. (2015). Seeking a pedagogy of difference: What Aboriginal students and their parents in North Queensland say about teaching and their learning. *Australian Journal of Teacher Education*, 40(5). <http://dx.doi.org/10.14221/ajte.2015v40n5.8>
- Martin, K., & Mirraboopa, B. (2003). Ways of knowing, being and doing: A theoretical framework and methods for indigenous and indigenist research, *Journal of Australian Studies*, 27(76), 203–214.
- Matthews, C., Watego, L., Cooper, T.J., & Baturo, A.R. (2005). Does mathematics education in Australia devalue Indigenous culture? Indigenous perspectives and non-Indigenous reflections. In P. Clarkson, A. Downton, D. Gronn, M. Horne, A. McDonough, R. Pierce, & A. Roche (Eds.), *Building connections: Research, theory and Practice*. (Proceedings of the 28th annual conference of the Mathematics Education Research Group of Australasia, pp. 513-520). Melbourne: MERGA.
- Matthews, C. (2015). Maths as storytelling: Maths is beautiful. In K. Price (Ed.) *Aboriginal and Torres Strait Islander education: An introduction for the teaching profession* (2nd ed.) (pp. 102-120). Melbourne: Cambridge University Press.
- Matthews, C. (2019). Indigenous perspectives in mathematics education. *Teacher Magazine*. <https://www.teachermagazine.com.au/articles/indigenous-perspectives-in-mathematics-education>



- Matthews, C. (2020). Mathematics education in North East Arnhem Land. *Teacher Magazine* <https://www.teachermagazine.com.au/articles/mathematics-education-in-north-east-arnhem-land>
- Ministry of Education (NZ). (1996). *Te Whāriki mātauranga mō ngā mokopuna o Aotearoa: Early childhood curriculum*. Wellington: Learning Media.
- Morrison, A., Rigney, L-I., Hattam, R., & Diplock, A. (2019). *Toward an Australian culturally responsive pedagogy: A narrative review of the literature*. Adelaide: University of South Australia. <https://apo.org.au/sites/default/files/resource-files/2019-08/apo-nid262951.pdf>
- Nakata, M. (1997). *The cultural interface: an exploration of the intersection of Western knowledge systems and Torres Strait Islander positions and experiences*. Doctoral thesis. James Cook University, Townsville.
- Nakata, M. (2007). The cultural interface. *The Australian Journal of Indigenous Education*, 36(S1), 7-14. <https://doi.org/10.1017/S1326011100004646>
- Purdie, N., Reid, K., Frigo, T., Stone, A., & Kleinhenz, E. (2011). Literacy and numeracy learning: Lessons from the Longitudinal Literacy and Numeracy Study for Indigenous Students. https://research.acer.edu.au/acer_monographs/7
- Rigney, L., Garrett, R., Curry, M., & MacGill, B. (2019). Culturally responsive pedagogy and mathematics through creative and body-based learning: Urban Aboriginal schooling. *Education and Urban Society, online*, 1-22. <https://doi.org/10.1177/0013124519896861>
- Sarra, C. (2005). *Strong and smart: Reinforcing Aboriginal perceptions of being Aboriginal at Cherbourg State School*. PhD thesis. Queensland University of Technology, Brisbane.
- Sarra, C. (2011). *Stronger Smarter approaches to Indigenous leadership in Australia*. Melbourne: Monash University Publishing.
- Sarra, C. (2017). Stronger Smarter: A sustained and enduring approach to Indigenous education (whether education researchers know it or not!). [Paper presentation]. ACER Research Conference. https://research.acer.edu.au/cgi/viewcontent.cgi?article=1310&context=research_conference
- Scheurich, J., & Young, M. (1997). Coloring epistemologies: Are our research epistemologies racially based? *Educational Researcher*, 26, 4–16.
- Stronger Smarter Institute Limited. (2014). *High expectations relationships: A foundation for quality learning environments in all Australian schools*. Stronger Smarter Limited Position Paper. Brisbane: Author.
- Stronger Smarter Institute. (2017). *Implementing the Stronger Smarter Approach*. Stronger Smarter Institute Position Paper. Brisbane: Author. Stronger Smarter Institute Limited (2019a). *A mesh of high-expectations relationships across transitions in the early years?* Stronger Smarter Institute Limited Position Paper. Brisbane: Author.
- Stronger Smarter Institute. (2019b). *Stronger Smarter: A strength-based approach to Aboriginal and Torres Strait Islander education*. Stronger Smarter Institute Position Paper. Brisbane: Author.
- NITV (2019). *The imagination declaration of the youth forum read at Garma 2019*. <https://www.sbs.com.au/nitv/nitv-news/article/2019/08/05/imagination-declaration-youth-forum-read-garma-2019>
- Ungunmerr, M.R. (1988). Dadirri: Inner deep listening and quiet still awareness. <http://www.miriamrosefoundation.org.au/images/Dadirri>
- Walter, M., Martin, K., & Bodkin-Andrews, G. (2017). *Indigenous children growing up strong: A Longitudinal Study of Aboriginal and Torres Strait Islander families*. Palgrave Macmillan. UK.
- United Nations. (2007). *Declaration of the rights of Indigenous peoples*. <https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html>
- Yunkaporta, T., & McGinty, S. (2009). Reclaiming Aboriginal knowledge at the cultural interface. *The Australian Educational Researcher*, 36(2), 55–72.
- Yunupingu, M. (1993). Two-way schooling: Garma theory. In Craven, R. (Ed.). (2011), *Teaching Aboriginal studies: A practical resource for primary and secondary teaching* (2nd ed.), p. 146. Sydney: Allen & Unwin.
- Yunupingu, M. et al. (1994). *Voices from the land*. Sydney: ABC Books.



APPENDIX 3 OVERVIEW OF BELONGING, BEING & BECOMING: THE EARLY YEARS LEARNING FRAMEWORK FOR AUSTRALIA

Belonging, Being & Becoming: The Early Years Learning Framework for Australia (EYLF) (DEEWR, 2009) was released following a period of consultation, development, trial and review (Sumsion et al., 2009).

The EYLF constituted a major plank in the agreed reform directions outlined by the Council of Australian Governments (2009). It formed part of the National Quality Framework, sitting alongside regulatory and accreditation processes that apply across Australia's early childhood education settings (Australian Children's Education and Care Quality Authority (ACECQA, 2020). Together with *My Time, Our Place: Framework for School Age Care in Australia* (DEEWR, 2011), it is the nationally approved learning framework for Australian early childhood education.

The EYLF's title outlines three organising concepts: belonging, being and becoming. It describes these as:

Belonging – Experiencing belonging – knowing where and with whom you belong – is integral to human existence.

Being – Being recognises the significance of the here and now in children's lives.

Becoming – Becoming reflects [the] process of rapid and significant change that occurs in the early years as children learn and grow. (DEEWR, 2009, p. 7)

While the EYLF makes only general references to these concepts (Sumsion, Harrison, & Bradley, 2018), they are supported by existing and developing research (see, for example, Giugni, 2011; Knaus, 2015; Peers, 2018; Sumsion & Wong, 2011).

The EYLF outlines the principles and practices that contribute to children's learning outcomes in early childhood education settings. The five principles are:

- *secure, respectful and reciprocal relationships*
- *partnerships*
- *high expectations and equity*
- *respect for diversity*
- *ongoing learning and reflective practice.*

The eight pedagogical practices are:

- *holistic approaches*
- *responsiveness to children*
- *learning through play*
- *intentional teaching*
- *learning environments*
- *cultural competence*
- *continuity of learning and transitions*
- *assessment for learning.*

The principles and practices are positioned as the basis for effective pedagogies. Together, they support children as they move towards the EYLF learning outcomes:

1. Children have a strong sense of identity.
2. Children are connected with and contribute to their world.
3. Children have a strong sense of wellbeing.
4. Children are confident and involved learners.
5. Children are effective communicators.

The learning outcomes are framed from strengths-based perspectives, focusing on what children can do – rather than what they cannot do – and the ways in which educators can connect with this to extend learning.

The EYLF is a curriculum framework. It “provides general goals or outcomes for children's learning and how they might be attained” as well as a “scaffold to assist early childhood settings to develop their own, more detailed curriculum” (DEEWR, 2009, p. 46). This is in contrast to the Australian Curriculum (ACARA, n.d), which “is presented as a continuum that makes clear what is to be taught across the years of schooling. It makes clear to students what they should learn, and the quality of learning expected of them as they progress through school” (ACARA, 2012, p. 10).

This difference highlights the way in which the term curriculum is understood and enacted in early childhood education settings. Rather than a prescribed sequence of subject-based content, the EYLF draws on the definition highlighted in *Te Whāriki* (Ministry of Education New Zealand, 1996) that curriculum refers to “all the interactions, experiences, activities, routines and events, planned and unplanned, that occur in an environment designed to foster children's learning and development” (DEEWR, 2009, p. 45).

References for *Belonging, Being & Becoming: The Early Years Learning Framework for Australia*

- Australian Curriculum, Assessment and Reporting Authority (ACARA). (n.d). *F-10 curriculum*. <https://www.australiancurriculum.edu.au/f-10-curriculum/>
- ACARA. (2012). *The shape of the Australian Curriculum, Version 4*. http://www.acara.edu.au/verve/resources/the_shape_of_the_australian_curriculum_v4.pdf
- Australian Children's Education and Care Quality Authority (ACECQA). (2020). *Guide to the National Quality Framework*. https://www.acecqa.gov.au/sites/default/files/2020-01/Guide-to-the-NQF_2.pdf
- Council of Australian Governments (COAG). (2009). *National Early Childhood Development Strategy: Investing in the early years*. Canberra: Commonwealth of Australia. https://www.startingblocks.gov.au/media/1104/national_ecd_strategy.pdf
- Department of Education, Employment and Workplace Relations (DEEWR). (2009). *Belonging, being and becoming: The early years learning framework for Australia*. Canberra: Council of Australian Governments, Commonwealth of Australia. https://www.acecqa.gov.au/sites/default/files/2018-02/belonging_being_and_becoming_the_early_years_learning_framework_for_australia.pdf
- DEEWR. (2011). *My time, our place – Framework for school-age care in Australia*. <https://docs.education.gov.au/node/3388>
- Giugni, M. (2011). 'Becoming worldly with': An encounter with the early years learning framework. *Contemporary Issues in Early Childhood*, 12(1), 11–27. <https://doi.org/10.2304/ciec.2011.12.1.11>
- Knaus, M. (2015). 'Time for being': Why the Australian early years learning framework opens up new possibilities. *Journal of Early Childhood Research*, 13(3), 221–235. <https://doi.org/10.1177/1476718X14538601>
- Ministry of Education New Zealand. (1996). *Te Whāriki*. <https://www.education.govt.nz/assets/Documents/Early-Childhood/Te-Whariki-1996.pdf>
- Peers, C. (2018). The meanings of belonging: Revisiting the theory of 'belonging, being and becoming' in the Australian early years learning framework. *Contemporary Issues in Early Childhood*, 19(4), 356–366. <https://doi.org/10.1177/1463949118779398>
- Sumsion, J., Cheeseman, S., Kennedy, A., Barnes, S., Harrison, L., & Stonehouse, A. (2009). Insider perspectives on developing Belonging, Being and Becoming: The Early Years Learning Framework for Australia. *Australasian Journal of Early Childhood*, 34(4), 4–13.
- Sumsion, J., Harrison, L., & Bradley, B. (2018). Building a knowledge base about the impact of early learning frameworks for infants and toddlers. *Early Child Development and Care*, 188(6), 651–664. <https://doi.org/10.1080/03004430.2016.1226294>
- Sumsion, J., & Wong, S. (2011). Interrogating 'belonging' in Belonging, Being and Becoming: The Early Years Learning Framework for Australia. *Contemporary Issues in Early Childhood*, 12(1), 28–45.



Please address any inquires relating to this literature review to
letscountprogram@thesmithfamily.com.au



GPO Box 10500
Sydney NSW 2001

T Freecall: 1800 024 069
E tsfmktg@thesmithfamily.com.au

thesmithfamily.com.au



everyone's family