Chapter 12
Bringing Families and Preschool Educators Together to Support Young Children's Learning Through Noticing, Exploring and Talking About Mathematics

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Abstract This chapter draws on findings from the longitudinal evaluation of the Australian initiative *Let's Count* (Perry and Gervasoni 2012) to consider how the process of bringing families and pre-school educators together, with a focus on mathematics, enhanced young children's mathematics learning. The data examined is parent and educator interview data that explores the effectiveness of the *Let's Count* approach. The findings, sustained over two separate data collection periods over 2 years, provide clear evidence that *Let's Count* is at least as successful as other mathematics learning programs in terms of children's mathematical knowledge and skills outcomes, and suggest in respect to some mathematical concepts that *Let's Count* may be a superior approach. Themes emerging from interviews with parents highlight that the parents valued the educators talking to them about ideas and suggestions regarding the type of activities that are rich sources of mathematics learning. It many ways these discussions provided parents with prompts, inspiration, encouragement and confidence. The interview data also highlight that sustaining communication between the parents and educators across the year was challenging for some. Recommendations arising from the *Let's Count Longitudinal Evaluation* for future initiatives include: encouraging parents to support their children to notice, explore and discuss the mathematics that is part of everyday experiences; enabling sustained communication opportunities for parents to discuss the mathematics they notice their child using and exploring; and providing suggestions about how to extend this learning.

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Young children's mathematics knowledge and dispositions vary considerably when they begin school, and this suggests that some children are less favourably positioned than others to profit from mathematics teaching at school. This is likely due to their differing experiences and opportunities to engage with mathematical ideas prior to school. While pre-school and other early learning settings contribute to young children's mathematics learning, the most significant influences are children's family interactions and contexts. This raises questions about how families, educators and communities can best approach mathematics learning in the early years so that all children thrive; and also about how best to support children who are less favourably positioned than others when they begin school. This chapter draws on findings from the longitudinal evaluation of the Australian initiative *Let's Count* (Perry and Gervasoni 2012) to consider how the process of bringing families and pre-school educators together, with a focus on mathematics, influences young children's mathematics learning. The implications of the findings for future initiatives and research will also be discussed.

Young Children's Mathematics Learning

Young children are accepted as capable mathematical thinkers and learners (see Balfanz et al. 2003; Clements and Sarama 2002, 2014; Lee and Ginsburg 2007; Sarama and Clements 2002). Previously there was reluctance amongst educators to include mathematics as part of the early childhood curriculum (Perry and Dockett 2008; Sarama and Clements 2002). This meant that often there was insufficient focus on mathematics learning in early years' education, particularly in Western cultures. Lee and Ginsburg (2007) proposed that this lack of attention to young children's mathematics learning "may lead to later school failure, especially for children from poor and minority families, who are less likely to have a home environment in which their academic learning is facilitated" (p. 3). This conclusion is reinforced by early studies that found that children's experiences from conception to age six have the most important influence of any time in the life cycle on brain development, subsequent learning, behaviour and health (e.g., McCain and Mustard 1999), and underpin the interest in governments investing in the early childhood years in order to improve the health, educational achievement, and the social-emotional development of children. Early intervention approaches aimed at the needs of the child and the family can produce improved outcomes for those at greatest risk (Gervasoni 2015; Peter-Koop and Kollhoff 2015; Sarama and Clements 2015; Shonkoff and Phillips 2000).

The recognition that young children benefit from opportunities to explore mathematical ideas through high quality child-centred activities in their homes,

communities, and prior-to-school settings is supported by many studies (Anthony and Walshaw 2007; Balfanz et al. 2003; Faragher et al. 2008; Duncan et al. 2007; Gervasoni 2003; Lee and Ginsburg 2007; Perry and Dockett 2005, 2008; Sarama and Clements 2002). For example, Duncan et al. (2007) performed a coordinated analysis of six longitudinal data sets relating changes in early skills to later teacher ratings and test scores of school reading and mathematics achievement. They found that school-entry mathematics, reading, and attention skills were associated with later achievement, but noted that the predictive power of early mathematics skills was particularly impressive. Notably, Duncan et al. cautioned that their findings did not support the adoption of 'drill-and-practice' curricula in early years settings. In contrast, they argued that play-based curricula designed with the developmental needs of children in mind can easily foster the development of academic and attention skills in ways that are engaging and fun. These perspectives are now reflected in national statements on mathematics learning in early childhood (e.g., Australian Association of Mathematics Teachers and Early Childhood Australia 2006; National Association for the Education of Young Children and National Council for Teachers of Mathematics 2002). For example, the Australian Association of Mathematics Teachers and Early Childhood Australia (2006) state that

> 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 to 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 and ECA 2006, p. 1).

Educative Justice and Mathematics Learning

Children living in communities that are described as 'experiencing multiple disadvantages' by governments are not expected, on average, to perform as well academically as children from more 'advantaged' communities (Caro 2009). This expectation extends to pre-school children (Carmichael et al. 2013; Rimm-Kaufman et al. 2003). Carmichael et al. (2013) concluded that "the socio-economic status of the community in which the family resides was the strongest home microsystem predictor of numeracy performance, explaining 10.5 % of the variance in the home-community microsystem model" (p. 16).

In contrast, there is evidence that many young children, including those living in communities experiencing multiple disadvantages, begin school as capable mathematicians who already exceed many of the first year expectations of mandated mathematics curricula or textbooks (Bobis 2002; Clarke et al. 2006; Ginsburg and Seo 2000; Gervasoni and Perry 2013; Gould 2012; Hunting et al. 2012). For example, Gould (2012) concluded from his study of the results of the mandated *Best Start* assessment in New South Wales (NSW Department of Education and Communities 2013) that the expectation in the Australian Curriculum—Mathematics (Australian Curriculum, Assessment and Reporting Authority 2013) that students can make connections between the number names, numerals and

quantities up to 10 by the end of the first year at school "would be a low expectation for at least half of the students in NSW public schools" (p. 109). Gervasoni and Perry (2015) found that this was also true for children living in financially disadvantaged communities who participated in the *Let's Count* initiative commissioned by The Smith family, an Australian children's charity.

There have been many interventions aimed at improving the educational fortunes of children living in communities experiencing multiple disadvantages. There is also considerable debate about whether early intervention programs are able to overcome any educational disadvantage associated with young children living in financial and social disadvantage. Sarama and Clements (2015), who have designed and researched many educational interventions, now question the longer-term efficacy of such interventions and "hypothesise that most present educational contexts are unintentionally and perversely aligned against early interventions" (p. 153). Thus while it appears that early interventions in mathematics can be highly successful in promoting the mathematics learning of young children, systems of schooling can mitigate against the positive effects. Sarama and Clements (2015) argue that schools need to be aligned with the approaches of early interventions in order for their impact to be maintained.

Let's Count

Let's Count is an early mathematics initiative commissioned by The Smith Family (an Australian children's charity) to assist early childhood educators to work in partnership with families living in financially disadvantaged communities to promote positive mathematical experiences for young children (3–5 years). The Smith Family is a children's charity "helping disadvantaged Australian children to get the most out of their education, so they can create better futures for themselves" (The Smith Family 2013). The *Let's Count* approach aims to foster opportunities for children to engage with the mathematics encountered as part of their everyday lives, and talk about it, and explore it in ways that are appealing and relevant to them, and that enable them to learn mathematical ideas in ways that develop positive dispositions to learning and mathematical knowledge and skills (Gervasoni and Perry 2015). The simple mantra of *Let's Count* is *notice, talk about and explore mathematics in everyday activities*. *Let's Count* was piloted by The Smith Family in 2011 in five sites across Australia whose communities were identified as experiencing social and economic disadvantage. In 2012/2013 The Smith Family delivered a revised *Let's Count* program in four additional sites that were also part of a longitudinal evaluation of the program (Gervasoni and Perry 2015).

The *Let's Count* approach initially focused on early childhood educators who participated in two professional learning modules. The theme of Module 1 was noticing, discussing and exploring everyday opportunities for mathematics and opportunities for educators to consider ways in which they might engage with parents to support children's mathematics learning. Module 2 focused on

celebrating and extending the mathematics that educators observe children using and learning. Between modules, the educators connected with families to consider ways that together they could encourage children to notice, explore and discuss the mathematics encountered in everyday situations, including through games, stories and songs. The educators used a range of strategies for connecting with parents, depending on which approaches were deemed most effective for their community. Typically, educators either met informally with individual parents to discuss the *Let's Count* ideas or they organised group meetings to initiate the program in their community.

The Let's Count Longitudinal Evaluation

The *Let's Count* Longitudinal Evaluation from 2012 to 2014 took place in two regional Australian cities in 2012 and 2013 and in two additional cities in 2014. In total, parents, children and educators from 21 early years centres took part. The findings of the evaluation provide some important insights about the impact of educators and families coming together around mathematics. One aspect of the evaluation was measuring participating children's mathematical growth across their preschool year and also comparing their knowledge, just prior to beginning school, with a comparison group of 125 children from the same communities whose families had not participated in *Let's Count*. The findings suggest that a family's participation in *Let's Count* was associated with significant progress in their children's mathematical knowledge (Gervasoni and Perry 2015). However, the focus of this chapter is the analysis of interviews with educators and parents about the impact of *Let's Count* for themselves and their children. In 2013, a small number of parents was interviewed by phone about the impact of *Let's Count*, once at the beginning of their involvement in *Let's Count* and again towards the end of the year. On the first occasion, four parents were interviewed from each of the two evaluation sites and centres. At the end of 2013, these parents plus another from each site were interviewed. In 2014, a much larger number of parents were interviewed on three different occasions: the first shortly after they had begun the program (38 parents); the second around July 2014 (36 parents) and the third at the end of 2014 (33 parents). These parents were from centres spread over only three of the four evaluation sites as educators in the fourth site were unable to nominate potential parent interviewees. Again, all interviews were conducted over the telephone by trained interviewers.

Educators at the evaluation sites and centres were also invited to participate in a series of three interviews. Across all sites and centres, there were 41 educators who agreed to be interviewed within 3 weeks of the first workshop. Of these, 35 were interviewed for a second time within 3 weeks of the second workshop. As well, 35 educators were interviewed close to the end of the calendar year in which they were involved with *Let's Count*. These interviews were also undertaken by telephone and then transcribed. All transcripts were analysed and coded to establish the key

themes to emerge. Six themes emerged through the analysis of parent interviews and seven themes emerged from the educator interviews. Several of these themes provide particular insight about the impact of parents and educators coming together to promote children's mathematics learning. These themes will be examined in the following section as a means of describing how the process of parents and educators coming together assisted children's learning.

Insights from the Interviews with Educators

The aim of *Let's Count* was for educators to assist parents to help their children learn mathematics in everyday situations through noticing the mathematics that was part of the family's activities, exploring this mathematics and talking about it. Seven themes emerged from the analysis of the educator interview transcripts. Six themes had been noted in the first year of the evaluation while the seventh only arose substantially during the second year. The themes were:

1. Engaging families with mathematical learning and Let's Count;
2. Continuity of mathematical learning between early childhood setting and home;
3. Impact of Let's Count on educator confidence, professional identity and pedagogical practice;
4. Awareness of the potential of everyday tasks for prompting mathematics discussion;
5. Sustainability of *Let's Count* over time;
6. Children's engagement with mathematical learning and mathematical concepts;
7. Importance of mathematical language.

Each theme suggests that *Let's Count* had an impact of educators' pedagogical practice, while also highlighting the challenges educators faced as they navigated how the program might work in their individual settings. The first two themes relate directly to the impact of the educators and parents coming together to focus on children's mathematics learning. These data are discussed in the next section.

Engaging Families with Mathematical Learning and *Let's Count*

The educators who implemented *Let's Count* used a range of strategies to involve families and build their awareness of ways they might engage with their children around mathematics. These ranged from one-off events and sending home maths resources, to more day-to-day strategies incorporating mathematical learning into their everyday dialogue with families. Some illustrative excerpts follow.

> The families who are part of the Let's Count program, which is probably about a third of our families I suppose, everybody, every child gets a chance to take this bag home. So it's got so much stuff in it, and play the games with their families and really having the conversations with the families and getting them more confident in the fact that they can help their children with their maths.
>
> Interviewer: How have the families responded to the bags?
>
> Oh they've loved it. Loved it. Yeah, no we've had some fantastic comments. In the back of … I've done up a little book to go home and in the front it has like an introductory letter and then it's got instructions to all the games and then at the back it's got parent comments. And we've had some fantastic comments through there about what the children have learned, what the children have been doing. One little girl went home and measured absolutely everything in the house, including the dog. [Educator A]
>
> It's been really nice to hear parents saying that it's been beautiful to spend that sort of quality family time together and they'd forgotten how much fun it was to play games, board games and things with the children. How they'd gotten out in the environment and looked for things. Like, there was a lot more around to do with maths than what they'd realised. And so it's been really nice. [Educator B]
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> When they come to the information session, we were going to set up a few things that we might do with the children here and get them to participate in that. One of our educators is actually going to read a book that isn't about maths to the families but showing them how she draws the maths out of it even though it's not a counting or number book. And then we were just going to have some discussions and we was going to talk to them about how things can be done in a play based, fun way, when you're already doing them. Letting them know they don't have to sit down and do maths activities as such to get them ready for school.
>
> I think the main difference that it made was the way we engaged the parents in it and we didn't do a lot, it was just little things like putting notices out, putting little newsletters out about it and also we had a board out the front where we just put a little maths problem on there and the parents could sort of get involved. It was just something they could do on the way home or something they could do on the way in. Like counting buses or plan your trip somewhere, things like that. It was just little problems that we posed on the board. And that sort of got the parents really interested and talking about maths a lot more. And so I think that was probably the main thing but it made us more aware within the centre, even though we do integrate it quite well I think it was being conscious of using the language, the maths language with the children because we do play the games and we do do all the mathematical concepts but we weren't using the language, so I guess that's what we seem to be a bit more aware of. [Educator C]

These excerpts highlight the range of ways in which educators engaged with parents and the reported positive impact for building parents awareness of how they might support their children. It was clear that these strategies focused communication between educators and parents.

Continuity of Mathematical Learning Between Early Childhood Setting and Home

The interviews with educators also highlighted the ways in which *Let's Count* promoted continuity in the mathematics learning between the early childhood settings and the home. Also evident was the importance of established communication strategies among educators and parents. Several excerpts illustrate this theme.

> Oh just one little boy came in today and said 'I really want to measure my bed'. So we made a measuring tape for him. I said 'You could use your hands' and he said 'No, I want a measuring tape'. So we made a measuring tape. … the information came from his mother first and then we discussed it with the child. The mother came in and said 'Oh he really wants to measure his bed' and I went Ok, we can do that, we can work out a way to do that for you. So sometimes … It depends on developing a rapport between the educator and the parent. [Educator D]Well we've sent out emails on a regular basis with our parents. And so they've been emailing things that have been happening in their home. We also have a feedback journal-type thing that parents can write things up in, in the mornings or and we pose questions to the parents relating to maths. You know, we might just pop on a question, you know, what did you do over the weekend that involved mathematics or that kind of thing. … So they're able to see what the children are interested in doing here and then maybe continue that on. So I think that's been a good way of doing it. Rather than having portfolios that go home at the end of the year and they go, 'Oh I didn't realise you liked that'. [Educator D]We had one little girl who went into Coles and her mum asked for … No, she got her daughter to ask for a kilo of bacon. And so the lady in Coles actually counted how many pieces of bacon made a kilo of bacon. And there's like a photo on the [Facebook] page of the little girl and the lady from Coles counting the bacon. So the parents have actually given photo records as well of catching their children doing everyday maths as well. [Educator E]I just think it has been a good thing for us to do and particularly I like the way the parents are really involved and it's more about them, because that will hopefully continue on for the rest of their child's schooling and for other children that they may have in their family as well. [Educator F]

These data illustrate the importance of educators using a range of strategies for sustaining engagement with parents about children's mathematics learning, and the importance of established communication to enhance continuity between learning mathematics at home and in more formal learning settings.

Insights from the Interviews with Parents

Six themes emerged from analysis of the parent interviews. Each theme highlights the positive impact of educators working with parents as part of *Let's Count* but the final theme acknowledges the challenge of sustaining the program across a year and beyond. The six themes were:

1. Noticing children's mathematical learning and facilitating that learning in the everyday;
2. Parent–educator communication about mathematics and Let's Count, with an emphasis on strengths of all involved;
3. Children's growing confidence, knowledge and enjoyment of/engagement with mathematics;
4. Importance of mathematical language;
5. Positive impacts within families, extending to older and younger siblings' inclusion in mathematical activities at home; and
6. Sustainability of *Let's Count* over time.

Four themes address the impact of the educators and parents coming together through *Let's Count.* These themes are explored below.

Noticing Children's Mathematical Learning and Facilitating that Learning in the Everyday

One important finding from the research was that every parent interviewed talked about how their ability to 'notice' mathematical concepts as part of their everyday interactions with their children had increased, along with their abilities to extend those concepts when children showed interest. This is an important outcome of educators and parents interacting through *Let's Count.* Many parents suggested that there was mathematics in everything and that they now appreciated that their role in their child's mathematics learning was to notice, explore and talk about this mathematics. While this noticing of mathematics was not always attributed to their family's involvement in *Let's Count*, in many cases, parents explicitly indicated that this was an influential aspect of the program. The excerpt below shows the impact of noticing the mathematics and opportunities to explore and discuss for one family.

> The major difference I think has been I'm much more aware of how she can learn from everyday things. An example of that was yesterday. My husband brought home a little thermometer, he works in refrigeration, and she wanted to know how it worked. And I was just trying to explain and I couldn't be bothered, and then I thought, 'Oh put it in the fridge'. And then she put it in the fridge and we looked at the degrees and she wanted to put it in the freezer and look at the differences in temperature. Yeah, from that it kind of snowballed into looking at why were there different numbers, what's Fahrenheit, what's Celsius, all that kind of stuff. So I think it was good. At the start of the year I wouldn't have bothered, I wouldn't have even thought about it but it just occurred to me like, this is a good moment for her to explore it. Whereas before I wouldn't have done that and I would have just said, 'I don't know, I can't be bothered teaching you that.' [Parent A]

This example shows that noticing the mathematics, recognising an opportunity to explore, and also a child's curiosity and desire to learn is significant for parents. Parents also noted that they had become for intentional in their mathematical interactions with their children.

> Probably one category would be more intentional so whether it'd be sitting down and playing a game of Uno or a game of dominos where we're focusing on that maths. And he has also developed an interest in dot to dots and stuff like that. So that was what I'd say, more intentional, whilst other opportunities just sort of are spontaneous. So whether it's like he's helping me set the table, well "how many forks are we going to need for our family?" or just things that coincidentally pop up in our everyday lives. Like swimming group this week. He noticed that there was numbers on the side of the pool so he wanted to know what it meant, so we talked about depth and then he went on his own tangent of measuring the depth of the pool in different areas, on his own body. So how high the water would reach. So yeah, I guess it's a whole range of experiences, some are planned for and others have just cropped up coincidentally throughout each day, everyday living really. [Parent B]

Another parent explained the spontaneous mathematics that occurred for her family.

> I guess looking at it, he will say 'What do these two numbers make mummy'. So he's looking at double digit numbers, so say the numbers on our letterbox. He'll say, 'there's a 7 and a 3', although it's 3 and a 7. He just wants to know, 'what do those two numbers make mummy?' and so for him to actually ask me that, I think that's pretty good. And then I'll say 'it doesn't really make 37' but that's what he's asking, is what number is it joined together so I'll say, '37' and he's like 'Oh Ok'. So to be interested and eager to know, that's what surprised me at the moment. [Parent C]

Another outcome for many parents was realising the learning impact of involving their children in everyday activities, rather than 'doing it myself' because it's quicker and easier, or automatic.

> It's made me be more active, to make sure that I keep reminding him about mathematics in everyday stuff. … doing the shopping, making sure I keep them active in it, not just doing it. It's easier to just grab three containers of milk instead of saying to him, 'We need three containers, we've got one, how many should we get'. You know, we're doing that a lot more now instead of just doing it and it's really shown through with him as well. And he's actually showing his brother. [Parent D]

Many parents expressed surprise at the mathematics that their children spontaneously used. Often children knew more mathematics than the parents had noticed previously. It seems in some cases that *Let's Count* heightened parents noticing and awareness of the mathematics that their children knew and used.

> The other night we were having beans for dinner and both the girls, Chiara and Lisa (pseudonyms) sat up in their PJs on the counter and they had to cut … They each had their own board and they had their own little knife and they were asked to cut up beans. So they started to cut. Chiara started to cut the beans up and then she was like 'Oh mum, I'm going to make two piles' and she put all of the medium beans, she called them, in one pile and the small ones in the other. And then she counted there was thirty-five small beans ready for the pot and only five medium ready for the pot. Yeah, and I didn't actually say it. She actually came out with it. She was like, 'These are the medium and this is the small' and I was like, Ok cool! [Parent E]

The process of noticing children's use of mathematics also built some parents confidence about their child's transition to school. Children's successful transition to school and learning school mathematics was a concern for some parents.

> So having that program there has just boosted my confidence enough to say Ok well Lily (pseudonym) is catching on to this very quickly, she's doing all the right things, she's talking about it at home, just in general conversation, not even … Even if I bring it up like … I'm not bringing up 'So how did you do with your mathematics today?'. Like, she's just coming up and saying, 'I did this and this today'. Like it's just a bit of a confidence boost and saying, "Ok maybe she is a bit ready. Maybe she is going to be Ok to go to school." [Parent F]

These illustrations of parents noticing their children's use of mathematics and noticing the opportunities for extending their children's mathematics learning are powerful examples of the role parents play in their children's mathematics learning. The examples highlight children exploring and learning about numbers, shapes and

measurement. An important implication for young children's mathematics learning is parents' sense of wonder and surprise at the mathematics their children know and use. It is likely that *Let's Count* tuned parents to noticing their children's mathematics activity and learning when previously this had happened without parents' awareness. The process of noticing the mathematics brings this to the forefront of adults' awareness so that they can discuss and explore the mathematics in everyday situations with their children.

Parent–Educator Communication About Mathematics and Let's Count*, with an Emphasis on Strengths*

One central principle of *Let's Count* is for educators and parents/family members to talk about the mathematics in which the children are involved both at home and in the pre-school or early years centre. Correspondingly, Parent-Educator communication about mathematics and *Let's Count*, with an emphasis on strengths, was a key theme to emerge from the parent interview data. The effectiveness of parent-educator communication, both about children's mathematical knowledge and activities and about *Let's Count*, varied across the interviews. For most parents, the level and intensity of this communication increased across the year in which *Let's Count* was implemented, as did the parents' satisfaction with this communication. In some cases, poorer levels of communication around the mathematics children were doing and *Let's Count* itself, were attributed to parents' own acknowledgement of being time poor or their child not attending the centre regularly. Educators set up various means of communication between themselves and parents, including Facebook pages through which parents could communicate about the mathematics their children were exploring. Some illustrative examples follow.

> If something pertinent to the Let's Count thing crops up then they (educators) will mention it. Probably like on the Facebook page they're seeing what we're doing at home so I guess they're learning more about us as well, through a different way than just chatting. Because I mean, pick ups and drop offs are always so busy, you don't always have that opportunity, so I think that it is giving them a little bit more insight into each child. It's probably giving them a greater awareness of each child's strengths and needs as well because maybe they're getting surprised by some of the stuff that the kids do know, or seeing areas where they could focus on more. [Parent G]

In some cases the busyness of life and work reduced parent's opportunities to talk with the educators about children's mathematics learning. However, despite this busyness, communication strategies such as Look Books were important for building awareness of children's mathematics learning, as was parents' daily 'walk through' of the spaces at the centre.

> Look there has [been some communication] but it was quite a while ago and there hasn't been follow up since. … she gave us all the information and she gave us a little talk about it and then yeah, that was sort of all we knew. There's always so much going on. [Parent H]

> Like, we haven't had another meeting to be updated on what they're doing but they have a look book which is really good. It shows what they've demonstrated … What they've been doing and how they've enhanced it. And even we've just had sort of like parent/teacher chats so yeah, they explained what we've been doing and they've really noticed the difference in how inquisitive Kingston is, so that's really good. [Parent I]

Many parents recognised the importance of *Let's Count* materials and information sessions provided by the educators for building communication and awareness. Parents' recall of these sessions varied, as demonstrated in the excerpts below, but the sessions were clearly important for some parents.

> We had a parent information night earlier in the year and she talked about maths in everyday situations and real life and how you can integrate it at home as well as in the classroom and at kinder. What to look for and things like that. Like, I don't know, like lots of different everyday activities I suppose, is the main thing I got out of it. [Parent J]

> I guess there was a concentrated effort when the program was introduced at kinder and certainly as I said, with some of the things that came home there was that focus. The kinder teacher then provided an information night for families and that's when some of those products were distributed to families and she discussed each item in the bag and how they could work in your everyday life with your child and how you could try different activities, some with family members, children as well as the mums and dads being involved. [Parent K]

> Oh I think it's fabulous, that's exactly how I think kids should learn most things, particularly when it can start at home from such a young age and not just at school in a formal setting. And I think sometimes you don't realise as a parent that you're actually doing it, quite often, much more than you probably think. And I think it's great that education and programs are going in this direction and trying to educate parents too, on how to teach maths and use it every day in a much more holistic approach rather than just 'Let's Count to 10'. [Parent L]

Parents also noticed and valued the time educators were spending on mathematics explorations with their children. One parent explained that she learnt about mathematics learning by observing interactions between the educators and children. This modelling is helpful for some parents.

> The three girls [educators] that I usually spend most of my time with and talking to them and they're all for it. I mean, this is one of those kindergartens that I've come into and had a delight in actually learning myself better ways how to educate kids in learning maths, just by looking around how they make that classroom look like a play area for kids. It's wonderful. And just even them sitting down with the kids and going through it and making it fun and seeing that they're enjoying it too it makes a big thing for kids to learn, if you're happy learning too. [Parent M]

Finally, *Let's Count* has been a catalyst for building communication between educators and parents and also between parents. This is illustrated below.

> Well I definitely think that my relationship with Emma, who is the one who is heading the Let's Count with Jack, like I just talk to her so much more. Like we're engaging so much more. Even with other parents, you know. Because we have this Facebook page as well we're all communicating, we're all uplifting each other. Every day I come in and Emma actually has been amazing. Like, she has done so much in the room. They've got this little mathematics table where they're constantly changing things. They've got scales, they've got estimation, they've got all these types of things and she's so into it that it kind of is … What's the word I'm looking for? Like you take it on board. It's awesome. It's so much fun.

> And we talk so much more. Like on an every other day basis she's like 'Oh I did this with the kids' and I'm like 'Oh my gosh, it's awesome!' And she'll mention something that I've done on Facebook and she'll be like 'It was so cute'. The language is open. The communication is open. It's great. [Parent N]

Children's Growing Confidence, Knowledge and Enjoyment of/Engagement with Mathematics

Parents reported their genuine surprise at their children's increased mathematical capabilities and, particularly, their children's confidence in trying out new mathematical ideas. In some cases, this mathematical development exceeded parents' expectations of their children's capabilities at their age. Some parents commented that a child's increased mathematical knowledge and confidence was important for their transition to school. For the most part, the parents attributed these increases to the emphasis on mathematics in both the centre and the home, as a result of their participation in *Let's Count.* Some illustrative excerpts follow.

> He is more mathematically literate than he was, which is really good. In particular, when he did his primary school screener to see if he was school-ready, they commented on his mathematics understanding as a really positive thing that he was quite excelling in. … that was really good feedback for us too. And we knew as soon as we heard that we went, 'Oh we know why that's happened, because that's the Let's Count program'. [Parent P]

> I loved it after the first couple of months of it. They don't do any structured really teaching at kinder but stuff like this, just to get the kids interested and thinking about numbers is a really good way for them to get comfortable with it without being scared of it. Because sometimes numbers can really intimidate kids if they don't have any background of it when they get to the school level, so I think it's really … Because even just playing around with it is such a good way to get them comfortable with using numbers and the concept of maths. And even just hearing the language and stuff has to be positive for them getting a good head start at school. [Parent Q]

> And he'll come home and tell me about it and talk about it. Like, they had a rain gauge and it was measuring the water and he was telling me how many mLs were in the rain gauge. I'm like, 'Oh wow'. So they are interested in all the things that they've been doing at kinder. [Parent R]

> She comes out with things every day, basically. Something that really surprised me … Oh, [?] were talking about my birthday and that I'm turning 22 and she said 'Oh mummy, you're turning 22, isn't that two two', as in like 2-2' and I was like 'Yes, that's a number' and then she's just like 'So how do we add …' like 'What do we do to get to that number', like … You know. She was just trying to work out how to get to twenty two, like all different scenarios on how to get to the number 22. [Parent S]

> For me personally, with Naomi [pseudonym] things that I've noticed are things like she always says … For setting the dinner table, she's started to do that now and she's like 'How many forks do I need? I need two kids' spoons, two big spoons, that equals four spoons'. She says things like that. She says things like, her sister is there with her and she's like 'I've only got five clips and I need six to make it match together'. Things like the other day we were driving and she's like, 'What's the distance from Newcastle to home?' Just thinking of

> other examples, we also had this boomerang at home and she's asked me for a measuring tape so she could … .And she lined the tape up from one end to the other and she began to read the numbers. So she was like '5, 6, 7, 8, 9' and then she's like 'It's 300'. Which was a bit whacked but … Not obviously correct but it was about her using the lingo [language] and the skills and all of those things that she's obviously picking up from the program. [Parent T]

Overall these excerpts highlight children's increasing mathematical knowledge and confidence. Perhaps also noticeable is parents increasing confidence in their child's knowledge and the power of everyday experiences and preschool experiences for increasing their knowledge and confidence.

Sustainability of *Let's Count* Over Time

While many of the educators participating in *Let's Count* were quite positive about the steps that they were taking in their centres to maintain the program beyond the year of initial implementation, parents were not so forthcoming. For some parents, communication with educators about the mathematics children were engaging with at the centres and homes seemed to be maintained or even intensified over the year, but some parents felt that the communication faded away or that organisational information was lacking. Often, parents expressed that there was an initial flurry of information when the program commenced followed by a relative lack of input into what parents might do next. This situation, as demonstrated by the excerpts below, is likely to impact the sustainability of the *Let's Count* approach within families.

> They [educators] really follow up the kids' interest and let the parents know what's going on … That's one thing I've noticed different over the year. Much more feedback, specific feedback so that we can then follow that up at home and continue it. [Parent V]

> At the beginning they would talk about the Let's Count program to me, when the first initial stages, and they would tell me about how he was progressing but nothing since the beginning. [Parent W]

> So it's not always me who picks up, sometimes it's my husband, sometimes it's me, sometimes it's my sister-in-law, I think maybe the thing that's lacking is the take home part of it, for me. I don't really know the connection between home and what they're doing at the centre. So that's the thing that is confusing me. I do know they're doing a lot at the centre but as far as what I'm meant to be doing at home, if I'm meant to be doing something, I have no idea what that is. [Parent Y]

These data highlight the challenge of maintaining a focus on *Let's Count* across the year. It seems that some parents are less confident about initiating mathematics activities with their children and are keen for educators to provide suggestions, discussions and ideas. There were also more positive data to report about the sustained impact of *Let's Count.* Two parents, who had children involved in both the 2013 and 2014 *Let's Count* cohorts, spoke in positive terms about the 'start' that they believed *Let's Count* had given their children as they began school and how this start had endured across the first year of school.

The findings from the *Let's Count* Longitudinal Evaluation interview data with parents and educators illustrate the reported positive impact of *Let's Count* for supporting children's mathematics learning. This finding was supported by the assessment of the children's mathematical knowledge collected and analysed as part of *Let's Count.*

Conclusions and Implications for Future Programs that Focus on Young Children's Mathematics Learning at Home

Examination of the themes emerging from analysis of parent and educator interview transcripts and supported by the *Let's Count* longitudinal assessment data related to children's mathematical knowledge and skills (Gervasoni and Perry 2015), suggest that pre-school children learn effectively when their parents and educators notice, explore and talk about the mathematics that is part of their everyday activities.

The themes emerging from parent interview data highlight that parents value the educators talking to them about ideas and suggestions regarding the type of activities that are rich sources of everyday mathematical learning. It many ways these discussions provided parents with prompts, inspiration, encouragement and confidence. At the same time, the interviews also highlight that sustaining communication between the parents and educators across the year was challenging for some. It is evident that the resources and suggestions provided for educators during the *Let's Count* professional learning sessions were important, but also that expanding these resources and also communication strategies for both educators and parents may assist some educators to sustain the program across the year.

The following recommendations about ways in which early years initiatives can support children's mathematics learning emerge from the *Let's Count* Longitudinal evaluation findings.

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.

Two further issues arising from the *Let's Count* longitudinal assessment data warrant consideration. First, while the *Let's Count* approach provides a broad framework for educators and parents describing the powerful mathematical ideas that young children learn and explore, and while the assessment data highlight that overall, children participating in *Let's Count* made significant mathematical progress across their pre-school year through noticing, discussing and exploring the mathematics that arise in everyday situations, there were some children who did not demonstrate this same progress. It could be that if preschool teachers and parents more intentionally discussed and explored mathematics with the children who less often spontaneously notice, explore and talk about mathematics in everyday experiences, then these children's mathematics learning may be enhanced, and these intentional experiences might position these children to benefit more favourably from instruction when they begin school. This is a profitable area for further research. It is also possible that some parents, children and educators may benefit from a more explicit set of activity suggestions that prompt them to explore the mathematical ideas that they do not spontaneously notice during everyday activities.

The final issue refers to the debate about whether early intervention programs are able to overcome any educational disadvantage associated with young children living in financial and social disadvantage. *Let's Count* is associated with significant mathematics learning and confidence for most children who participate, but are the positive effects sustained when children begin school? Sarama and Clements (2015) hypothesise that most present educational contexts are unintentionally and perversely aligned against early interventions. However, interview data from two parents who had children participating in *Let's Count* in both the 2013 and 2014 cohorts suggest that *Let's Count* assisted their children's transition to school in 2014. Therefore, investigating the impact of *Let's Count* after children's transition to school is another valuable area for research.

Sarama and Clements (2015) argue that schools need to be aligned with an early intervention approach in order for its impact to be maintained. Perhaps an extension of *Let's Count* into the first years of primary school would be one way of better aligning the approach with families' experience of school curricula and thus strengthen the conditions necessary for the successful impacts of *Let's Count* to be maintained for all children.

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