Mathematical conversations: teaching maths in kindergarten

Sue Southey

Sue is co-director at Springwood Community Kindergarten. She is a regular presenter at workshops and conferences throughout Queensland and Australia. In 2009 she was a State and Territory recipient of the ASG NEiTA award and in 2013 was awarded an Inspirational Teaching Award from the Down Syndrome Association. During 2013 Sue worked at Queensland Studies Authority in the K-12 Resources Team. Sue is Vice-president of Early Childhood Teachers' Association.

Kindergarten teachers are under increasing pressure to meet community expectations to prepare children for formal schooling by teaching numeracy (Department of Education and Training). The risk inherent in focusing on numeracy skills is that educators revert to 'skill and drill' practices rather than capitalising on play-based pedagogy to teach the language of maths. It is important for us as a community of educators to reflect on both the content and the pedagogy of how maths is taught in early childhood.

Numeracy and mathematical thinking are firmly on the agenda for children before school. However, it is not always clear which skills, knowledge and dispositions are necessary and appropriate for kindergarten children.

When numeracy is framed as competency around 'number', educators may limit the possibilities for children to make meaning about their world in a range of mathematical ways.

To enable us to think about what, why and how maths is taught in kindergarten we need to reflect on the content of the curriculum, the environments that we operate in and our pedagogies.

Mathematical content

The Early Years Learning Framework (EYLF) (Department of Education Employment and Workplace Relations, 2009) provides a very broad and open-ended description of mathematical content based on teaching children to understand how symbols and pattern systems work. The *Queensland kindergarten learning guideline* (QKLG) (Queensland Studies Authority, 2010) provides more guidance to teachers in terms of numeracy, problem-solving and mathematical language. In practice, it may be more helpful to consider mathematical thinking in terms of the skills, knowledge and dispositions around:

- shape and space
- number and set building
- measurement
- probability and data
- mathematical relationships (such as patterning, comparing, seriating, matching).

Pedagogy

The practices that educators use to teach maths may be influenced by the way in which they

think about numeracy and maths. When maths is framed as a discrete set of skills, such as counting, educators are more likely to use rote methods of teaching to ensure children master these skills.

In contrast, when maths is viewed as a language with particular ways of framing the world, educators are more likely to use child-centred practices.

These practices include responding to teachable moments in child-initiated play or providing open-ended play opportunities from which educators scaffold mathematical meanings for the child. In reality, both pedagogies will support children's learning of mathematical content; however, educators need to decide which pedagogy aligns more closely with their philosophy and to practices that align with EYLF.

As Pacey, below, problem-solves how to decorate her monster, she is engaging in problems of shape, size and spatial position. With an adult present to discuss her project she will be encouraged to use this mathematical language and consolidate her understanding of these concepts.

Differences may also occur within play-based pedagogies. Child-centred practices are likely to provide rich play opportunities in which educators can respond to teachable moments to begin shared mathematical conversations with children. A more group-focused approach might capitalise on games and group experiences in which every child participates. My own view is that both ways of working are necessary. Whilst the shared sustained thinking evolving from play events is likely to produce rich mathematical thinking that is highly relevant to that child, it is difficult to ensure that all children have this experience. A balance of group and individual activities will support all children and ensure that every child in the group receives some mathematical teaching.

A group approach does not require all children to participate in a learning experience at the same time.

Setting up open ended learning experiences with a focus on mathematical thinking allows teachers to engage each child over a period of time, but with the clear intention of involving the child in mathematical conversations. Everyday experiences, such as dough, printing or box collage, allow children to participate in projects that relate to their own ideas and interests but still provide opportunities for educators to engage in mathematical conversations. However, for this to be effective, educators need to be clear about the mathematical content inherent in these

activities and ways in which they can track each child's mathematical learning.

As Nick, on the previous page, engages in this printing activity, there is the potential for him to make discoveries about shape, size and position. With an adult present he may go on to count the 'squares' and 'rectangles', or to talk about the relationship between the three-dimensional printing object and the two-dimensional print shape.

In play-based pedagogy, educators have choices about the learning experiences they capitalise on. Mathematically rich opportunities occur in children's play events but equally valuable learning can occur from group activities such as stories, music or routines.

Open-ended creative activities, in which each child participates over time, also create a setting for mathematical conversations. Whether educators use group or individual play experiences, it is crucial for educators to be present in those experiences to mediate between mathematical concepts and the child's everyday knowledge (McLachlan, Fleer, & Edwards, 2010). Educators scaffold children's mathematical learning by opening up opportunities for conversations around spatial concepts, number, measurement, probability and mathematical relationships.

References

Department of Education and Training. (nd). *A Flying Start for Queensland Children: Educational Green Paper for Public Consultation* Brisbane Queensland Goverment Retrieved from http://deta.qld.gov.au/aflyingstart/pdfs/greenpaper.pdf.

Department of Education Employment and Workplace Relations. 2009. Belonging, being & becoming: *The early years learning framework for Australia.* Retrieved from http://www.deewr.gov.au/EarlyChildhood/Policy_Agenda/Quality/Pages/EarlyYearsLearningFramework.aspx

McLachlan, C., Fleer, M., & Edwards, S. 2010. *Early childhood curriculum: Planning, assessment and implementation* Cambridge: Cambridge University Press

Queensland Studies Authority. 2010. *Queensland kindergarten learning guideline*. Brisbane: Queensland Studies Authority