

“Does This Mean That Kindergarten Will Be a Remedial Year?”

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At MERGA1, I presented a paper entitled *Mathematics in the Pre-School*, which was a summary of tentative ventures into this emerging field. The role of the prior-to-school years in children’s mathematics learning was not yet under serious consideration but an understanding of the importance of play in children’s experiences was building. Forty years on, early childhood mathematics education is perceived as a critical frontier for mathematics education and other (e.g., psychology, sociology, childhood and family studies) research. Early intervention is seen as the Holy Grail. In this brief paper, I identify some of the achievements and some of the side effects of this changing context.

My first MERGA paper (Perry, 1977) was also my first paper at a “research” conference. It was a description of a project, Early Mathematical Experiences (EME Project, 1991), on which I had worked during my first sabbatical leave in 1976. This was also the year I graduated PhD in Pure Mathematics, with a thesis entitled Analytic Functions over Banach Algebras. Many people, including myself, have seen both the irony and the complementarity of these two fields of endeavour.

The key messages from my 1977 paper were:

1. there was a need for materials and activities to assist pre-school children and their educators to develop mathematical concepts;
2. these materials and activities should be drawn from children’s everyday activities, including their play and interests; and
3. pre-school children and educators should have a major role in the development of the materials and activities.

Even in this early paper, I sounded a warning that the introduction of mathematical activities and concepts into the pre-school might have some damaging side effects.

These [materials] are meant to be used as reference material for the teacher – to make her aware of possibilities in the pre-school, so that her ability to introduce a mathematical slant to everyday activities becomes second nature. Of course, there is a danger that this ‘mathematisation’ will become an obsession. To counter this, the project materials stress the notion of ‘intervention without interference’. Hopefully then, the sensitive teacher, while planning some activities with a definite bias towards mathematics, will be careful not to spoil imaginative and creative play by intruding at an inappropriate time or trying to coerce children, who are not ready, into mathematical games. (Perry, 1977, p. 267)

Early childhood mathematics education research within MERGA has extended well beyond these tentative beginnings. MERGA members are influential international leaders in the field. Some of the most recent books (English & Mulligan, 2013; Perry, MacDonald, & Gervasoni, 2016; Phillipson, Gervasoni, & Sullivan, 2017) and papers and book chapters too numerous to mention show the impact Australasian early childhood mathematics education researchers have had on the field internationally. Within Australia, two key STEM projects funded by the Australian government – *Let’s Count* (The Smith Family, 2017) and *Early Learning STEM Australia* (ELSA; University of Canberra, 2017) - continue the emphasis on prior-to-school mathematics. The field has developed greatly since 1977, and MERGA is to be congratulated on its support and encouragement.

The Role of MERGA in Early Mathematics Education Research

MERGA has and continues to provide support through its conferences and publications – journals, conference papers, and books, including the four-yearly reviews of research. There has been a special issue of MERJ on early childhood mathematics. Notable themes were highlighted in the Editorial (Perry & Diezmann, 2005).

Australasian early childhood mathematics educators and researchers have adapted much of the recent general early childhood research involving early brain development, play, argumentation and investigation, reflection and recording to demonstrate the power of young children's mathematical thinking and how this thinking affects children's learning in the early years. (p. 1)

... what is common in all of the papers [in this special issue] is a celebration of the mathematical potential in young children. (p. 3)

.. we hope that it [the special issue] helps to recognise and celebrate the strength of early childhood mathematics education research in Australasia and beyond and provides an ongoing stimulus to researchers to continue to develop the mathematical power of our young children and their educators and to share these experiences with others. (p. 4)

In preparing this paper, I chose to focus on the four-yearly MERGA reviews of mathematics education research with their themes of synthesis, critique, and celebration. There have been nine such reviews, beginning with one in 1984 written specifically to highlight Australian research to the International Congress on Mathematical Education (ICME-5). Although the first two of these reviews did not include chapters specifically directed to early childhood mathematics education research, each of the remaining seven reviews has featured such a chapter. Reading these chapters again has been not only a trip through history but also a recognition of how much impetus so many members of MERGA have provided in order to build the field of early childhood mathematics education research. Not surprisingly, in the 1980s and 1990s, the bulk of the research undertaken in the field in Australasia concentrated on challenges of learning and teaching about number in the post-Piagetian world (McIntosh & Dole, 2000; Perry, Mulligan, & Wright, 1992; Wright, Mulligan, Stewart, & Bobis, 1996). Other areas of early childhood mathematics learning were also covered, but they were much less well represented in the available Australasian research.

Later four-yearly reviews have shown a gradual diversification of the areas of early childhood mathematics education being researched, with strong representation in areas such as patterning and structure, data, measurement, dispositions, and social and cultural contexts.

The focus on the social and cultural contexts of children highlights a growing awareness of the impact of these areas not only on what children learn, but also on how it is learned and how it is taught. (Perry & Dockett, 2004, p. 103)

Another aspect of the broadening of impetus and focus has been the increased diversity of early childhood mathematics education fields in which Australasian researchers are working. While the influence of systemic numeracy programs in the early years of school can still be seen in the directions of this research, changes in emphasis towards, for example, early algebra development, assessment and mathematics learning in the years prior-to-school have been added to the collective repertoire of Australasian early childhood mathematics education researchers. (Perry, Young-Loveridge, Dockett, & Doig, 2008, pp.17-18)

While MERGA has nurtured early childhood mathematics education research and development throughout its history, it was also influential in Australia among other professional associations. In 2006, the Australian Association of Mathematics Teachers (AAMT), not until then known for its promotion of the early childhood field, and Early

Childhood Australia (ECA), not until then known for its promotion of mathematics education, combined to produce their *Position Statement on Early Childhood Mathematics* (AAMT & ECA, 2006). Many MERGA members were involved in the development of this statement. The position espoused clearly shows movement towards a dual purpose for mathematics in the early childhood years and the diversity of settings in which children learn this mathematics.

The Australian Association of Mathematics Teachers and Early Childhood Australia believe 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 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. (p. 1)

Another influence in Australia on the direction of early childhood mathematics education research and practice has been the introduction of national curricula documents in both the prior-to-school and school years (Australian Curriculum, Assessment and Reporting Authority, 2016; Department of Education, Employment and Workplace Relations, 2009). Many MERGA members were actively involved in the development of these documents. The title of the prior-to-school document, *Belonging, Being & Becoming*, clearly places prior-to-school education as needing to be relevant both to children's present as well as their future lives, just as the AAMT/ECA (2006) statement does for mathematics education.

The introduction to the latest MERGA review chapter (Macdonald, Goff, Dockett, & Perry, 2016) and Phillipson et al. (2017) continue the theme of diverse contexts and diverse people, particularly highlighting the contributions of children and families.

The research presented in this chapter takes into consideration a range of early childhood contexts, including home, school, and early childhood education services. Similarly, the chapter considers research which has been undertaken with a range of stakeholders in early childhood mathematics education, including early childhood and school educators, families and the children themselves. Indeed, the views of children and families in early mathematics education are well-represented in the Australasian research, and this is to be celebrated. (MacDonald et al., 2016, p. 166)

Conclusion

So, early childhood mathematics education research needs to consider diversity in context, people, pedagogy, and purpose in order to bring its insights to bear on practice. All of this has to be achieved in an educational atmosphere of systemic, national and international accountability. There are expectations that children will leave prior-to-school settings 'ready' for the school mathematics mandated in the Foundation year of the Australian Curriculum. These expectations place demands on early childhood educators, families and children. Most states and territories in Australia have entry testing in numeracy as children start school. Nominally, these are to allow for the development of appropriate programs of learning, although one may question their validity as the first experience of a child in a new situation and with a new adult. One thing that is obvious is the impact these tests can have on prior-to-school programs. Another is that, while some starting school children may be deemed "not ready" for the mathematics they will meet in the Foundation year, many of their peers will far exceed these "readiness" expectations as they start school (Gould, 2012).

In 1977, during the discussion following the presentation of my first MERGA paper, I was asked by a prominent mathematics educator "Does this mean that Kindergarten will be a remedial year?" (In this question, "Kindergarten" means the first year of school.) I

scoffed at the suggestion, believing that first year of school teachers did and should welcome children to active, creative, and play-based learning contexts in which they could build on the children's knowledge and dispositions established in the prior-to-school years. In spite of the laudatory research that has been conducted by many MERGA colleagues, I now think that this question was quite perspicacious, and that disappoints me a great deal.

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