

## Editorial

This issue of *SAJCE* focused on numeracy follows the 2012 Early Childhood Education Research and Development conference, with the theme 'Numeracy in Early Learning', hosted by Rhodes University. The conference was funded by the DHET/EU partnership Primary Education Sector Policy Support programme. As the two SA Numeracy Chairs, leading longitudinal linked research and development projects, we were approached to organise the conference, and to put together this follow-up issue of the journal.

Our commitment to this work rests on evidence, national and international, pointing to a paucity of attention in the early childhood and primary years, across the research and development communities, to numeracy and mathematics (Mulligan, 2011). In South Africa, these gaps on the research and development side continue in the context of widespread evidence of poor attainment in mathematics for the majority of the nation's learners (DBE, 2012). Additionally, the terrain is characterised by evidence of significant gaps in primary mathematics teacher content knowledge (Taylor, 2011) and pedagogic content knowledge (Carnoy et al., 2008) – which is coming to be associated with increasingly shrill calls in the public domain for teacher testing. Such discourses have consequences for the ways in which teachers and teaching are viewed. In this terrain of mistrust, it becomes important to support and study the role of both early years mathematics teaching within learning, and teacher education, and early years numeracy and mathematics research that can feed into pre- and in-service teacher education. This issue, following from the conference theme, includes eight research-based papers, offering evidence and insights into a range of issues associated with the nature of early years mathematics teaching and learning.

The Numeracy in Early Learning conference included four plenary presentations, all from national and international contributors with expertise in the field. Each of these presenters has a paper in this issue. Four further papers complete the issue, dealing with a range of aspects related to early mathematics learning and teaching. Mike Askew discusses differences in views of early mathematical learning, contrasting the 'progression view' – which begins with counting strategies and grows into retrieval of number facts, with the 'number sense view' – which focuses on supporting learners' competence with selecting the most efficient strategy in different situations, using combinations of reasoning, counting and retrieval at any stage. Arguing for the treatment of number bonds (and mathematics more broadly) as 'scientific concepts' in a Vygotskian sense, Askew analyses data that shows what mediation of learning from the perspective of number bonds as scientific concepts might look like.

Bob Wright describes his comprehensive and novel approach to assessment in early numeracy which includes the development of useful nomenclature for early numeracy. He emphasises the importance of numerals and numeral sequences in early numeracy, the significance of counting and its distinction from saying a number word sequence, the important topics of structuring numbers in the range 1 to 20 and conceptual place value, and the usefulness of the Learning Framework in Number

developed with colleagues in terms of profiling and understanding children's early numeracy knowledge. He explains how interviewing learners using this framework can be a powerful basis for teacher development.

Marjorie Henningsen illuminates the power and value of opening up space for authentic inquiry in preschool through sharing exciting examples of learners' work and play. She illustrates how such inquiry supports learners to use their growing mathematical and linguistic understandings to make sense of themselves and the world. Her three authentic examples, illustrate how the two domains of mathematics and linguistic development must be viewed as intertwined at the preschool level. Important reflections are provided on the key roles of the learning environment, the curriculum and teachers and other adults in organising and enabling authentic learning processes.

Elizabeth Henning presents a conceptual paper arguing the need for broadening the theoretical fields within which analyses of learning and teaching are located. She argues, in particular, for the inclusion of cognitive psychology and neuroscience, alongside the more widely used emphases on pedagogical and sociocultural theories. Drawing from the ideas of key writers in the two 'newer' theoretical fields, she points to the insights they offer relating to the ways in which language figures within verbal, symbolic and spatial systems, and within conceptual development. She concludes by arguing that diagnostic testing tools based on these two theories may offer insights that are particularly useful for thinking about conceptual development in the Foundation Phase.

Four further papers are included in this issue. Cally Kühne, Ana-Paula Lombard and Trevor Moodley describe the outcomes of using a framework detailing progressions in early number – the learning pathway for whole number – as a teacher development tool for building understandings of concept progression. Working with three groups of teachers (a project group, a reference group, and a pre-service teacher group), they highlight both the gains and some of the unexpected difficulties encountered within the process of this work.

Samantha Morrison and Kaylian Aploon-Zafuka both present comparative studies examining pedagogy. In Morrison's case, the comparison is on the basis of evidence of differences in content knowledge. Through detailed analysis of number-related lessons taught by two teachers in one school with differing levels of content knowledge based on a course assessment, she notes that higher content knowledge was associated with the incorporation of a broader range of examples, and more coherent connections between different mathematical representations. Studies such as this add important detail to the nature of connections between content knowledge and classroom practice.

Kaylian Aploon-Zafuka compares groups of schools on the basis of their being higher performing or lower performing at the learner level within disadvantaged school settings. Her analyses of teaching across these settings leads to a caution against homogenising pedagogy in poorer schools. Drawing on literature based

indicators related to pacing, sequencing, cognitive demand and the presence of explicit criteria, pedagogy within classrooms is characterised as 'strong', 'moderate' or 'weak'. Whilst weak pedagogy predominates in lower-performing schools, a mix of pedagogic strengths is seen in higher-performing schools. Aploon-Zafuka suggests here that the presence of some moderate and strong pedagogies appear to have a 'cumulative effect' and notes too, prevalence of collaborative models of planning in higher-performing schools that may also contribute to their higher attainment levels.

Mellony Graven, Hamsa Venkat, Lise Westaway and Herman Tshesane examine the extent of the focus on number sense, enabled and accompanied by the development of efficient strategies for mental maths, in the foundation and intermediate phase. They argue that number sense and mental agility are critical for the development and understanding of algorithmic and algebraic thinking introduced in the intermediate phase. Following documentary analysis however they note that while the CAPS curriculum emphasises the important role of mental computation within number sense, the ANAs do not. Additionally they note from their work with learners, and broader evidence in the South African landscape, that counting-based strategies in the foundation phase are replaced in the intermediate phase with traditional algorithms. They share illuminatory vignettes to illustrate concern and conclude with the suggestion that research be conducted into the viability/appropriateness of an orally administered mental mathematics assessment component in the ANAs.

We take this opportunity to thank Elizabeth Henning and the broader editorial team for their support with collating this issue, the contributors, and all the reviewers of papers who provided constructively critical feedback for the authors. As we noted at the start of this editorial, mathematically focused work in early years education is still at a fledgling stage. Our hope is that this issue of SAJCE contributes to insights for the field, and support for practitioners in education and teacher education working for the improvement of early mathematical learning.

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