
*Editorial***Mathematics teacher education: A broad field****Robin Averill, Fiona Ell & Jodie Hunter***Victoria University of Wellington, The University of Auckland, Massey University*

We are delighted to bring you the first issue of the year. In these eight articles, you will find many ideas useful for informing initial and professional development of teachers of mathematics. The issue brings together a diverse collection of articles from a range of countries using a variety of methodologies to explore ways of addressing areas of challenge. We trust you will find much in this issue to inform thinking and practice. The first article describes international perspectives on primary and secondary initial teacher education. The next four focus on primary mathematics teaching, the first of these centred on teachers in schools and the following three on aspects of initial teacher education. The next two articles consider issues related to using school student work samples with secondary student teachers, the first for informing their planning, the next for giving feedback. The final article of the issue focusses on professional development of early childhood teachers. Welcome to this exciting and varied issue.

In the first article Murray and team describe their findings from the data from primary and secondary student teachers across 17 countries in relation to links between content knowledge and pedagogical content knowledge. Correlations between these types of knowledge were generally found to be weak, suggesting that relationships between content knowledge and pedagogical knowledge are complex and that assuming that sound content knowledge will lead to the development of strong pedagogical content knowledge may be problematic. The reported results help to indicate the complexities in how the knowledges required for effective teaching develop and can be developed.

Batthey and Neal's study into the relational interactions between teachers and African American and Latino students across seven 4th and 5th grade United States classrooms provides a useful glimpse into the ways in which teachers interact with their students. Relational interactions from the data are discussed across five dimensions, including focus on whether the interactions were positively or negatively framed. Dimensions from the most to the least frequently observed were: acknowledging student contributions, addressing behaviour, framing mathematics ability, attending to language and culture, and setting the emotional tone.

In the third article of the issue, Gomez describes using an argumentation perspective to explore the development of one prospective teacher's mathematics teacher identity. Analysis is based on an interview conducted with the prospective teacher early in her study program.

Questions focussed on the student teacher's beliefs about mathematics teaching and learning and her reflection on how her own experiences of school and working with children had influenced her ideas of mathematics. Gomez calls for teacher educators to consider identity development as an important part of initial teacher education and offers argumentation as a useful method for exploring prospective teachers' developing mathematics teacher identity.

Schwartz and team investigated the nature of written feedback given to student teachers based on observation of their mathematics teaching. Drawing data from five large universities in the United States, analysis showed wide variation across institutions in relation to the nature and quantity of feedback comments and that roughly one third of the feedback forms did not include any mathematics-specific feedback. The authors noted variation in teacher educator preparation for observing and writing feedback and in observer involvement in the program of study, and they call for greater specificity in feedback.

Using a lesson experiment in the topic of area and volume with student teachers, Chamberlin and Candelaria explored how their teaching affected student teachers' conceptual understanding in relation both to the mathematical understandings developed and how these were developed, or hindered, by their teaching. Findings included that teacher educator knowledge can be enhanced through using lesson experiments in initial teacher education through teacher educators encountering unexpected thinking in responses, considering emerging potential refinements to the lesson, and reflection.

Lee and team explored ways to help student teachers move from being doers of mathematics to teachers of mathematics. They used a five-step model that engaged students' mathematical knowledge for teaching using tasks that involved analysing student work, developing associated pedagogical approaches, reflecting, and collaborating. Some student teachers used their learning from these tasks to inform their approaches to planning for other teaching situations while for others there were inconsistencies between what they noticed in student work and their subsequent planning.

In the second article on secondary initial teacher education, Casey and team describe their study into how student teachers responded to student work on solving equations. Findings included that student teacher responses varied depending on the type of student error, but that in general student teachers were more consistent in their ability to 'leave space for future thinking' than in other characteristics of good responses, such as working towards a learning objective or drawing on student thinking or research.

Hassidov and Ilany discuss the perspectives of facilitators and early childhood educators involved in the "Senso-math" program, finding that as the program progressed positive relationships developed between facilitators and educators and both groups believed that the facilitators' work contributed to the children's mathematics learning. The program and facilitator training are described and results are presented to illustrate the positive impact of the program on teachers, facilitators, and students.

This issue encompasses explorations into student teacher learning, teacher learning, and teacher educator learning. Feedback to students and to student teachers is a second theme, with the types of knowledge student teachers and teachers need to teach effectively and how to develop these knowledges being underlying themes across the issue. We have much yet to

understand about these areas, but the articles individually and collectively contribute positively to our understanding about effective mathematics education.

We would like to thank all of our authors for their strong contributions to this issue and our reviewers, who have assisted greatly in providing insightful, detailed, and very useful feedback on earlier drafts of the articles. Thank you very much for sharing your work and for your care, time, and expertise.

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