

Editorial

Issues in the Professional Development of Mathematics Teachers

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The papers in this volume of the journal have an international flavour with authors from Australia, Israel, Spain, the United States of America and Zimbabwe. Each of the authors has addressed an issue that has relevance to their particular country and teacher education system yet, at the same time, also has relevance to the wider context of mathematics education.

The papers by Zevenbergen, Nyaumwe and Blanco all relate to preservice mathematics teacher education. In the first paper Zevenbergen explored the use of study groups with preservice primary students in two mathematics education subjects – one in first year and the other in third year of a teacher education course. In both subjects mathematics content knowledge and pedagogical content knowledge were integrated. She reported on how study groups supported the students' cognitive, social and affective learning outcomes. Survey data were collected on students' mathematical background and their affective characteristics at the commencement of the first subject. Further survey data were collected to identify students' reactions to the study group approach at the end of each semester. There were also three focus groups at the end of the second subject comprising some students who had participated in the study groups and some who chose not to. Student responses to a number of semi-structured questions were tape recorded for transcription. Students also completed individual responses to the questions.

Zevenbergen found that four main themes were evident in the way the dynamics operated within the study groups, namely, reliance on 'experts' within the group; use of multiple resources to obtain consensus for group answers; mutual support and encouragement by group members; and reliance on the teacher as the authority by some very insecure students. A number of factors were hypothesised to explain why younger students straight out of school chose minimal participation in the study groups whereas 95% of mature-aged students chose to be part of a study group.

Nyaumwe's paper explored the impact of a 12-week period of full-time practice teaching on preservice teachers' conception of mathematics teaching and learning. Data in the form of responses to eight open-ended questions were collected immediately prior to full-time teaching practice and during the twelfth week of the school placement. Case studies were conducted on four of the student teachers who were also interviewed immediately after the second administration of the open-ended questions. Responses from the four PSTs as to their conceptions of

teaching and learning were classified into three categories, namely, Platonism, Formalism and Constructivism. Changes in the PST's conceptions of learning mathematics were not as marked as those in the conceptions of teaching mathematics. Furthermore, the changes seemed to differ with the level of the classes taught by the PSTs.

In the third paper Blanco addressed primary preservice teachers' (PST) content knowledge and pedagogical content knowledge through a university subject that exposed these PSTs to a problem-solving environment that challenged their own conceptions of problem solving. Discussions of real or simulated classroom situations were used to develop pedagogical knowledge in preparation for teaching practice during which the students' lessons were videotaped. The tapes along with stimulated recall interview data and data from student logbooks and artifacts formed the basis for analyzing students' pedagogical knowledge growth and their development in practice teaching situations.

The paper by White, Mitchelmore, Branca and Maxon compares two approaches to professional development of mathematics teachers. They describe a pedagogy-based program that was part of the *Count Me In Too* (CMIT) professional development initiative in New South Wales and a mathematical knowledge-based program from California that was part of the summer institutes offered by San Diego State University. In both situations there were government funds available to conduct the programs, but in California, teachers also received a stipend for participating during their summer holidays and credit towards a masters degree. One general conclusion that applied to both programs was that a professional development model that included both mathematical knowledge and pedagogy would be more beneficial to teachers than either one on its own. However, the authors also acknowledge the cultural factors that operate in each country and highlight the need to consider issues relating to (i) career paths for teachers who undertake such professional development, (ii) accreditation for such courses, and (iii) funding priorities by government departments of education.

Chamberlin discusses a professional development initiative in which middle school teachers in a mid western USA city investigated their students' mathematical thinking using six design principles of model-eliciting activities (MEAs). After outlining the six principles, the paper shows how the teachers worked through the MEA as a group and then implemented it in their classrooms collecting evidence of their students' different mathematical approaches throughout. The teachers individually created a Student Thinking Sheet (STS) to assist them to explain their students' ways of thinking. In a subsequent teacher workshop individual STSs were shared and teachers created a consensus STS. Effects of the professional development are discussed and implications for teacher educators are raised.

Olson and Barrett report on a study designed to advance teachers' professional growth in implementing mathematics reform recommendations. The study was part of a systemic change initiative, *Primary Mathematics Education Project* (PRIME), involving a collaborative partnership between university lecturers, school administrators and 300+ primary teachers in a large school district in mid western USA. The paper focuses on the use of cognitive coaching by the authors as they

worked with three first-grade teachers. The authors document the problems encountered in changing the teachers' practice and suggest a new coaching approach based on teachers' curiosity about their students' responses when undertaking mathematical investigations.

This sixth volume of the journal is the last for each of the current editors. We wish to thank all those people who have submitted papers for review and for those from the editorial board and elsewhere for graciously reviewing papers for us. We wish the new editors well in their task of supporting this avenue of publication for mathematics educators from around the globe.