Editorial

Communication and language(s) in teaching and learning mathematics is the theme for this Special Issue. In the past decades, communication and language issues have been increasingly brought up by several works in the field of mathematics education research. Both communication and language are considered influential interrelated processes not only in mathematics teaching and learning but in many other domains as well. The scientific attention to these processes in relation to mathematics education have involved the interest in diverse topics: resources for instruction, students' languages, communication of school content, classroom interaction and practices, mathematical talk, and/or Open Distance Learning (ODL) environments, among others. Various strategies and exemplary practices oriented to effective communication in the mathematics classroom have been documented. In this respect, the use of the indigenous materials has been recommended by a number of educators as a way to bridge the gap between what is taught in school and what happens in the environments in which the learners live (see Mosimenge 2004; Gerdes and Ahmed 2007; Kaino 2013; Kara et al. 2015; Furuta et al. 2015). It is plausible that with current technologies these materials can be renovated and supplemented through additional tools for the effective teaching and learning of mathematics (see Keong et al. 2005; Sutherland et al. 2004; Law and Chow 2008).

Despite the successful design and implementation of material resources, there is still a need to further elaborate on one of the major resources for the purpose of communication, teaching and learning in the mathematics classroom: language. From the practical perspective of language as a resource (see Setati 2008; Planas and Setati 2009; Bruun et al. 2015), being it made up of text, structure and context, language has long been viewed as psychological, social and cultural (Vygotsky 1978). Language as a necessary tool for communication has been used for the construction and negotiation of shared meanings that lead to mathematical knowledge (see Adler 2001; Moschkovich 2007; Planas and Civil 2009; Guleca and Temel 2015).

This Special Edition contains articles written by mathematics educators reflecting on their experiences, observations and interactions with learners and teachers oncommunication and the use of indigenous materials in teaching and learning mathematics. Luneta presents the findings of a study that analysed the strategies and the teaching skills possessed by mathematics teachers in South Africanrural schools and how they communicated these skills mathematically in the classroom. He found out that most of the mathematics content was communicated in vernacular, teachers had difficulties in providing correct definitions of mathematical concepts in vernacular and the communication was predominantly teacher-centred. Looking further at the nature of the tasks that were given to students in class, Luneta observed that such communication did not engage learnersin higher order and critical thinking.

Phoshoko and Planas report on data collected from African language-speakers in South Africa whose experience of mathematics teaching takes place in a language that is not their own. The authors look into the role and structure of language in the teaching and learning of multiplication to African speaking learners in the multilingual classroom. They underscore the importance of paying attention to the difference that different language speakers attach meaning to multiplied numbers in order to ensure that their representation in not lost in the translation. The authors suggest alternative ways of expressing multiplied numbers in African languages that do not compromise their understanding of the products particularly those involving algebraic terms.

Webb describes the intervention that was introduced in the in-service teachers to the practice of dialogic teaching using exploratory talk in the pupils' main language in the Eastern Cape, South Africa. The teachers were tasked with translating their experiences into classroom practice and were engaged experientially with triggers consisting of *Raven's Standard Progressive Matrices* and mathematical reasoning cartoons that were written in an unfamiliar language. The findings of the study indicated that through teacher reflections, the use of the pupils' main language as a resource in the mathematics classroom could develop rich mathematical cognition and understanding.

Makonye explores mathematics student teachers' perceptions on the use of learners' home languages in mathematics instruction at one university in Gauteng Province, South Africa and diverse views emerged from his study. While some argued that the use of home languages supported mathematics epistemic access and promoted cultural identity and lifted home languages to a position of prominence and prestige, others argued that the use of home languages was meant for disadvantaged learners with inferior education in the country and promoted tribalism. The author recommends the increase of resources to promote the teaching and learning of mathematics in home languages and to provide outreach programmes to educate the community on the advantages of using home languages. The later, on advantages of home languages, has previously been debated whereby many parents and students view English as a window to the outside world and that it is a common language in higher education and business in particular for graduates seeking employment on the African continent and beyond (Ngara 1982; Mutasa 2006; Ndamba 2008).

Bansilal explores the challenges involved in changing a symbolic statement into a verbal written statement among pre-service mathematics teachers on a *Real Analysis for Teachers course*in South Africa. While most students recognised and decoded the different parts of the symbolic statement correctly, problems were noted at the syntax level where many students failed to arrange the words and phrases to create well-formed sentences. The author advises Instructors to provide opportunities for students to interrogate the meaning and implications of statements provided in symbolic form before progressing to more complex proofs which utilise complex symbolisation.

Jojo reports on the exploration of grade nine learners' experiences in the design and construction of double-storey artefacts project at a secondary school in KwaZulu Natal, South Africa. She found out how the processes of drawing and construction of the artefacts enhanced the teaching of geometry. She further revealed that geometry taught in a free environment allowed learners to reflect and share their experiences for better understanding of mathematics concepts. Mosimege also brings learners' variety of experiences and knowledge to mathematics classrooms that learners know and experience through their socio-cultural environments in which they live and interact with members of the community. The experiences reflected on an indigenous game called *Malepa* (String Figure Gates) reveal various mathematical concepts embedded in it. *Malepa* is a popular game with children in many parts of South Africa. The demonstrations in the game show how this knowledge can be used to enhance the teaching and learning of mathematical concepts.

Kaino and Kasanda explore the use of indigenous materials that promote better communication and understanding of mathematical concepts among learners in classroom teaching. The authors refer to the South African mathematics syllabus for Grades 6 to10 and illustrate how the use of local materials can be used in the construction of parallelograms and proof of theorems involving rectangles and squares. They also make illustrations using the Sketchpad program to explore how such technology can be applied to renovate traditional artefacts in teaching and learning mathematics. The authors argue that such an approach, of using local materials to teach mathematics content by relating what is taught in the classroom to the environment where the learners live, can be an effective way of communication in mathematics teaching.

Azevedo analyses the Communication Tools for Maths (CTM) and Get Real Maths (GRM) and how the Functional Scientific Methodologies (FSM) were used to provide teachers and learners with didactic approaches that facilitated the integration of STEM/STEAM Education materials into the classroom in Zimbabwe schools. She found out that the use of CTM and GRM improved communication in maths classes, engaged learners, increased attention, participation, performance and understanding of topics taught.

Though the articles in this special edition reflect on the South African region experience, the observations made could also be of value elsewhere to improve communication in teaching and learning mathematics. This edition is quite useful to mathematics educators and researchers for exploration of best ways to communicate in classusing appropriate materials and language(s) in teaching and learning of mathematics.

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