Cyril, J. (2014). Emergences and affordances as opportunities to develop teachers' mathematical content knowledge. International Journal of Mathematical Education in Science and Technology, 45 (3): 428-437
http://dx.doi.org/10.1080/0020739X.2013.851809

Emergences and affordances as opportunities to develop teachers' mathematical content knowledge

Cyril Julie

Abstract

Teachers' mathematical content knowledge has been under scrutiny for some time. This development is in the wake of learners' unsatisfactory performance in national examinations and international achievement tests. A widely held belief is that one, if not the most important, of the efforts to improve and enhance the performance and achievement in mathematics of learners is addressing teachers' mathematical content and pedagogical content knowledge through continuous professional development initiatives. The focus of this article is on the former. It describes how emergent and affording opportunities are brought to the fore from classroom observations and interactions in workshops and institutes with practising teachers. It concludes that this *in situ* dealing with mathematical content knowledge holds much promise for buy-in by teachers because it addresses an immediate need related to their practice.

Introduction

One of the reasons provided for schools graduating students with apparent insufficient command of mathematics to engage in mathematics at tertiary level is that the mathematical knowledge of their teachers is not strong. These sentiments are expressed in informal conversations I had with university lecturers of mathematics. More formally, this view is advanced during reviews of mathematics departments at higher education institutions in which I participated. Although not particularly targeted at the concerns of tertiary institutions, government departments also admit to the unsatisfactory achievement of learners in mathematics in national examinations. One of the first components in governments' strategies to address learners' unsatisfactory performance in high-stakes examinations is normally the enhancement of teachers' mathematical knowledge. For example, in their strategy for improving the quantity and quality of passes in mathematics in the final national examinations, one of the provincial departments of education in South Africa asserts that it will institute continuous professional development (CPD) initiatives focusing 'on subject content knowledge and skills as well as pedagogy'. [1,p.9] The expected approach to proposals such as this is that practising teachers will be offered mathematical topic-specific in-service courses. Such courses are based on the school mathematics curricula and the topics will normally be those which analysis of school examination results rendered learners experienced difficulty with. Another strategy used for the identification of topics to be dealt with in these in-service mathematics offerings is those which tertiary institutions deem important for studies in mathematics in such institutions. For example, to address the assumed procedural approach to differentiation that dominates in the teaching of introductory calculus in schools in South Africa, it is the view of some mathematics departments that in-service courses in calculus

 cjulie@uwc.ac.za

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