

PROBLEM: CONCEPTUAL INCOMPETENCE IN GRADE 7 GEOMETRY!
SOLUTION: TEACHER TRAINING?

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In South Africa consensus is growing among researchers, as well as teachers that mathematics teachers' preparation to fulfil their role as learning facilitators needs to be improved (Taylor & Vinjevold, 1999). The results of the TIMSS and other surveys indicate that a disturbing number of school teachers are incompetent, especially with respect to domain specific conceptual and pedagogical knowledge in critical areas of mathematics, like geometry (Howie, 1997; Strauss, 1999; Van der Kooy, 1996). Taylor and Vinjevold (1999) found that South African mathematics learners, as well as their teachers performed very poorly with regards to conceptual knowledge, while a substantial number of the teachers did not outperform their learners by much, if at all, when completing exactly the same test. As teaching behaviour is fundamentally influenced by teachers' domain-specific conceptual knowledge (Koehler & Grouws, 1992), Kennedy (1998) rightfully appeals for concrete evidence of what prospective and practising teachers do in fact know and understand about the content they learn or teach.

The current project primarily aims to reveal further evidence to this effect, and to explore some ways of tackling the problematic situation. The project, undertaken in the Northwest Province of South Africa, involves selected Grade 7 mathematics teachers, their learners and the final-year mathematics student teachers (primary school) at all training institutions. Teachers teaching at schools with supposedly good track records regarding mathematics performance were specifically selected for the purpose of the study. Initially five selected "good" teachers and their learners (n=142) were subjected to the same Mayberry-type Van Hiele Test, set on the topics in the Grade 7 geometry syllabus, as to determine and compare (relate) their conceptual competence. The teachers also participated in a survey about their beliefs, attitudes and practices regarding the teaching and learning of mathematics, particularly geometry. Afterwards an additional twenty "good" teachers and their learners were involved. Results suggest that even "good" teachers are not much, if at all, above the level of geometry acquisition of their learners. They also suggest the existence of a seemingly intricate relationship between teaching success, and teachers' beliefs, conceptual competence and relevant own school experiences.

The results of the student teachers (n=102) do not seem to reveal a clear pattern, suggesting that even "good" hands-on geometry training programmes are not yet specific or focused enough to make a marked difference. However, as with teachers, own school experiences, and positive beliefs and attitudes about teaching and learning seem to be significant factors to be accounted for in the relevant teacher training.