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UCT researcher demonstrates better formula for maths education

University of Cape Town doctoral student Margaret Long's thesis, *Mathematical, cognitive and didactic elements of the multiplicative conceptual field investigated within a Rasch assessment and measurement framework*, shows how mathematics teachers can instantly improve the performance of their learners by clustering them according to test performance. She demonstrates the usefulness of such methods for Grades 7 to 9, but shows that the framework can extend in principle to all school grade levels.

Her work extensively explores the conditions under which such new methods might contribute to the current overwhelming need for effective mathematics classrooms in South African schools.

Extending the theory of Vergnaud (looking at how knowledge is acquired), and aligning it with Rasch models (which are used for analysing data from assessments to measure variables such as abilities, attitudes, and personality traits) for test development and analysis, Long shows that tests can be constructed in ways that recorded scores are simultaneously measurements of learner ability and of the difficulty of test items. Such tests give rise to a proper statistical analysis of individual performances that is impossible with the usual well-intentioned test structures.

She shows that teachers who use these tests are able to locate and cluster learners who are at similar levels of test performance, and also to identify precisely which steps teachers can take immediately to improve performance. She documents methods that guide the teacher in developing test material to find interventions that will plausibly bring most benefit to the teaching effort.

Long grew up in Limpopo and East Griqualand. She studied at the University of Natal, and later became a teacher, mother, remedial teacher, postgraduate student and educational consultant. She is currently affiliated with the Centre for Evaluation

and Assessment at the University of Pretoria. Her PhD in Education was supervised by Professor Timothy Dunne of the Department of Statistical Sciences.

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Please note: Information in this release is based on the supervisor's citation for the PhD thesis. UCT advises journalists to obtain a copy of the thesis and/or interview the PhD graduate to verify and expand on this information.

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