Raising Teaching Quality Raises Learner Performance

The benefits of Mathematical Professional Development courses for teachers are not just limited to the teachers only, but also extend to the learners.

South Africa has over the years invested in Mathematical Professional Development Programmes for teachers in an attempt to redress the effects of apartheid schooling and apartheid teacher education. The impact of teachers’ participation in Mathematical Professional Development courses on learners’ attainment, is therefore an area worth investigating.

The Department of Science and Innovation (DSI), and the National Research Foundation (NRF) SARChI Chair in Mathematics Education, Prof Jill Adler and Prof Craig Pournara, hosted at the University of the Witwatersrand, conducted a quasi-experimental study to evaluate the impact of a one-year mathematics professional development course on teachers’ mathematical knowledge and their learners’ attainment for two cohorts of teachers (2016 and 2017).

The Wits Maths Connect Secondary (WMCS) Project Prof Jill Adler, the SARChI Chairholder in Mathematics Education, and director of the WMCS Project which is developing and researching models of professional development for secondary mathematics teachers that (may) ultimately lead to learning gains at all levels of secondary schooling.

The project developed the Transition Maths 1 (TM1) course with the assumption that focusing on teachers’ Mathematics for Teaching (MfT) leads to improved quality of teaching which will, in turn, translate into improved learner attainment.

As the major intervention of the project, the TM1 course is designed to support teachers currently teaching in Grades 8 and 9 to address the mathematical transitions from the Senior Phase (Grades 7–9) to the Further Education and Training (FET) phase (Grades 10–12).

It is offered over a ten-month period and deals with both mathematics content (75%) and mathematics teaching (25%). More than 150 teachers from over 80 Gauteng secondary schools have completed this course since 2012, with 40 teachers completing in 2016, and 39 teachers completing in 2017.

The Grade 9 & 10 Learning Gains Study Working in collaboration with the Gauteng Department of Education, a quasi-experimental study was conducted in 2018 to examine the Learning Gains of Grade 9 and 10 learners. These gains were simply defined as the changes in learners’ scores in a pre-test/post-test design over one academic year.

Over 1 500 learners were sampled from 24 secondary schools in the Johannesburg area taught by teachers who had completed the course in either 2016 or 2017, herein referred to as TM1 learners. These learners were compared with approximately 1 500 learners in 16 matched comparison schools taught by teachers who had not participated in the course, herein referred to as the comparison group learners.

The Findings

A report on the initial findings of data collected in 2018 compared the impact on learners of the TM1 course on teachers' mathematical knowledge for teaching (MfT) with teachers' average scores increasing more than 12 percentage points from the beginning to the end of the course. Moreover the study argues that these statistics under-report the impact of the course on teachers’ MfT because the final course test was substantially harder and covered more topics than the initial test.

- Pre and post-test scores for Total TM1 and comparison groups of learners found that the TM1 learners made greater gains than those in the comparison group. Although the gains were generally small, they were statistically significant.
- Disaggregated, the gains made by the TM1 learners taught by the TM1 2016 cohort of teachers were considerably larger than those taught by the TM1 2017 cohort of teachers. This finding is in line with researchers’ expectations that there is a delayed effect of professional development on learner attainment.
- Further disaggregation shows that the gain for the Grade 9 learners taught by the TM1 2016 teachers is equivalent to eight months additional progress while the gain for the Grade 10 group is equivalent to six months additional progress.

Way forward

Prof Adler and her team in the WMCS Project are also conducting related qualitative studies which investigate teachers’ take-up from the course in relation to the quality of their teaching practice. Other studies are investigating the nature of learners’ errors and the extent to which these errors change between pre- and post-tests.

Taken together, this suite of studies will provide deeper insight into the ways in which the professional development may (or may not) raise teaching quality and consequently lead to gains for learners.