



Human Sciences Research Council

Department of Basic Education and HSRC release TIMSS 2019 Grade 9 Study

“The South African TIMSS 2019 Mathematics and Science achievement, at the secondary level, continues to increase, achievement gaps decreased slightly but are still significant, but the pace of achievement improvement must increase to meet the country’s social and economic challenges,” says Dr Vijay Reddy, Principal Investigator of TIMSS 2019 and Distinguished Research Specialist at the Human Sciences Research Council.

Pretoria, Tuesday 8 December 2020 – The Department of Basic Education and the Human Sciences Research Council earlier today released the results of South African participation in the Trends in International Mathematics and Science Study 2019, in the report TIMSS 2019: Highlights of South African Grade 9 Results in Mathematics and Science authored by Vijay Reddy, Lolita Winnaar, Andrea Juan, Fabian Arends, Jaqueline Harvey, Sylvia Hannan, Catherine Namome, Palesa Sekhejane, and Ncamisile Zulu. TIMSS is a project of the International Association for the Evaluation of Educational Achievement (IEA), which is headquartered in Amsterdam. The IEA, with the TIMSS and PIRLS International Study Centre, which is based at Boston College, released the international results of the study today.

The study at the Grade 8 and 9 level, was first conducted in South Africa in 1995, and every four years, except 2007, thereafter – 1999, 2003, 2011, 2015 and 2019. The 2019 study provides an opportunity for South Africa to, firstly, estimate its achievement in relation to other countries and, secondly to monitor changes in educational achievement from 2003.

Forty-six countries and entities participated at the grade 8 or 9 level in TIMSS 2019. The top five ranked countries were again from East Asia – Singapore, Chinese Taipei, Republic of Korea, Japan and Hong Kong SAR. The five lowest performing countries were Oman, Kuwait, Saudi Arabia, South Africa and Morocco - countries from Africa and the Middle East.

Reddy, explained that in the context of many forms of inequalities, and the importance of disciplinary knowledge and educational outcomes, the HSRC framed the TIMSS analysis in an Achievement and Achievement Gaps theme.

While South Africa continued to perform at the lower end of the rank order, the TIMSS 2019 mathematics achievement score of 389 and the science score of 370 is an increase of 17 points for mathematics and 12 points for science from the previous TIMSS 2015 cycle.

The TIMSS 2019 achievements mean that from 2003 to 2019 South Africa improved by 104 points for mathematics and 102 points for science i.e. one standard deviation. Mathematics and science ability levels increased from 11% of learners demonstrating that they had acquired basic mathematical and science knowledge in 2003, to 41% of mathematics learners and 36% of science learners demonstrating this ability in 2019.

Reddy cautions that while we applaud the improvement in educational achievement, the rate of achievement improvement is decreasing. She illustrates this by examining two eight year periods: In the 2003 to 2011 time period, the rate of mathematics improvement was 7.4 points a year, and for the 2011 to 2019 period these figures fall to 4.6 points a year. For South Africa to meet the TIMSS developmental objectives, set in the Medium Term Strategic Framework (2019– 2024), strategically targeted interventions and additional effort from all education role players is required to accelerate the pace of improvement.

South African achievement continues to be unequal and socially graded. Achievement gaps, though decreasing, continue to be linked to socio-economic background, spatial location, attending fee paying or no-fee schools, and the province of residence. This confirms the well-known narrative that advantage begets advantage, and home disadvantages continue to impede schooling.

Macro socio-economic conditions differ from province to province, and this influences educational outcomes. The top three performing provinces for both mathematics and science are the Western Cape, Gauteng and Free State, with their scores significantly different from each other and all other provinces. The achievement gap between the highest and lowest achieving provinces changes over time. In 2011, the achievement gap was 89 points for mathematics and 127 points for science. In 2019, this decreased to 77 and 108 points, respectively. The good news, is that the highest achievement increases are from the lowest performers, with the biggest improvements observed in the Eastern Cape, Limpopo and KwaZulu-Natal over the 2011 to 2019 period.

South African achievement continues to remain unequal. While achievements in both fee-paying and no-fee schools increased over time, the achievement gap between fee-paying and no-fee schools remains at 75 points for mathematics and a higher 107 points for science. In fee-paying schools two-thirds of learners, compared to close to a quarter in no-fee schools, demonstrated that they had acquired the basic mathematical and scientific knowledge.

The international evidence on the relationship between gender and achievement is mixed; not only across countries, but also within countries. The average achievement for girls is higher than for boys in both mathematics and science, but this difference is not statistically significant.

Science achievement is lower than mathematics achievement, and the wider science score distribution points to higher levels of science variance. The much lower minimum science scores suggest additional challenges having an impact on the teaching and learning of science (e.g. language of instruction, resources needed for science teaching and educator knowledge). In addition to mathematical improvement programmes, national and provincial authorities must focus on the science subjects.

Learners performed better in items that required them to select a response (multiple choice question) than in items where they had to write a response (constructed response). Learners were unable to coherently write a description or explanation. In order to encourage writing, the HSRC recommends that the national reading strategy be expanded to become a 'Reading and Writing Strategy'.

The changing South African economy has a higher demand for high-skilled tertiary education graduates, especially in Science, Engineering and Technology (SET) subjects. It is noteworthy that 13% of mathematics and 15% of science Grade 9 learners reached the international intermediate benchmark, demonstrating that learners have and can apply knowledge in a variety of situations. This group represents the pool of learners who most likely could proceed successfully to Grade 12 and enroll for tertiary level technical subjects. In order to meet the needs of our society and economy, we recommend that educational policy focus on the twin imperatives of striving for equity by decreasing the achievement gap, and striving for increased proportions of learners at higher performance levels by improving the achievement standard for all learners.

In addition to collecting achievement data, TIMSS also collected data about the home, school and classroom conditions and environments in order to understand the context in which learners live and learn. We found that home conditions continue to be unequal, and some households still lack basic amenities and are not conducive to learning activities. Mathematics and Science educators with a Bachelors qualification taught over 80% of learners. Learners who speak the language of the test at home will have better linguistic access to the TIMSS assessment and be able to respond more successfully. Half the learners in fee-paying schools, compared to 16% of learners in no-fee schools, reported that they frequently spoke the language of the test at home. An issue that bedevils South Africa is the school climate. Compared with other countries, South African schools experienced higher levels of disciplinary, safety and bullying problems. Improving the school climate will be dependent on both what happens within the school and the community surrounding the school.

Resources matter for educational success. Learners achieve higher results in schools with better resources. As a starting point, all learners must have their own mathematics and science workbook and textbook. As the world moves toward digital platforms for learning, South Africa falls short of adequate access to digital resources in both homes and schools. Half of South African homes and Grade 9 classes do not have access to a computer. This could further disadvantage South African learners.

Notes to the Editor

The TIMSS Grade 9 Highlights of Results Report is on the TIMSS-SA website (www.timss-sa.org.za)

About the Human Sciences Research Council (HSRC)

The HSRC was established in 1968 as South Africa's statutory research agency and has grown to become the largest dedicated research institute in the social sciences and humanities on the African continent, doing cutting-edge public research in areas that are crucial to development.

Our mandate is to inform the effective formulation and monitoring of government policy; to evaluate policy implementation; to stimulate public debate through the effective dissemination of research-based data and fact-based research results; to foster research collaboration; and to help build research capacity and infrastructure for the human sciences.

The Council conducts large-scale, policy-relevant, social-scientific research for public sector users, non-governmental organizations and international development agencies. Research activities and structures are closely aligned with South Africa's national development priorities.

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