

Latest international results from TIMSS show East Asian students continue to lead the way in mathematics

Achievement trends in mathematics and science are up, early learning has lasting effects, most students attend safe and orderly schools, and fourth grade students have positive attitudes towards mathematics and science, reports IEA's TIMSS & PIRLS International Study Center at Boston College

Chestnut Hill, Mass. (12/08/2020) — Led by Singapore, five East Asian countries also including Chinese Taipei, Korea, Japan, and Hong Kong SAR, continue to outperform all TIMSS countries in mathematics by a substantial margin at the fourth and eighth grades, according to results released today from TIMSS, the longest running, large scale international assessment of mathematics and science education in the world.

Between the top performing countries and the next highest performers there was a pronounced gap, of 26 points at the fourth grade and 35 points at the eighth grade, according to the quadrennial assessment directed by Drs. Ina V.S. Mullis and Michael O. Martin at IEA's TIMSS & PIRLS International Study Center at Boston College.

Those East Asian countries were strong in science as well, but the results were more varied. In fourth grade science, Singapore and Korea had the highest achievement, followed by a 21-point gap before the Russian Federation and Japan, with Chinese Taipei and Finland also performing well. In eighth grade science, Singapore was the top performer, scoring 34 points higher than Chinese Taipei, Japan, and Korea, with the Russian Federation and Finland also performing well.

More than 580,000 students in 64 countries and 8 benchmarking systems around the world participated in TIMSS 2019, with half of the countries transitioning to computer-based assessment. TIMSS 2019 is the seventh TIMSS assessment cycle, providing 24 years of trends since the first assessment in 1995. By reaching its 24-year milestone, TIMSS earns the distinction of establishing the longest trend line of any international education assessment. TIMSS is the flagship study of the IEA (International Association for the Evaluation of Educational Achievement).

Over the short term and the longer 24-year period, TIMSS 2019 shows achievement trends are up, with more countries registering increases than decreases, except in the short term in science at the fourth grade.

“The positive trends indicate education is improving worldwide, and it’s not at the expense of equity between high and low achieving students,” said Mullis. “Remarkably, most countries have been able to educate most of their fourth and eighth grade students to at least minimum proficiency.”

Other highlights include:

- **About half the countries showed gender equity in average mathematics and science achievement.** However, at the fourth grade, boys outperformed girls in mathematics in nearly half of the 58 countries and girls outperformed boys in science in 18 countries. Girls also outperformed boys in science in 15 of the 39 countries at the eighth grade.
- **An early start in education** has a lasting effect through the fourth grade. Fourth grade students had higher achievement, on average, when their parents had engaged them in literacy and numeracy activities at an early age in the home, when the students had attended preprimary education, or when they had literacy and numeracy skills upon entering primary school.
- **Many students are in supportive school environments.** More than half the students at both grades attended schools that emphasize academic success. Especially at the eighth grade, students attending schools with a greater emphasis had higher achievement. In both grades, students with a higher sense of school belonging had higher achievement. A high sense of belonging was reported by 58 percent of students in the fourth grade, but by fewer in the eighth grade (37%).
- **Most students were in safe school environments.** Most fourth and eighth grade students (about 90%) attended well-disciplined and safe schools. Higher average achievement was associated with attending schools with fewer school discipline problems and safer and more orderly school environments.
- **Most students were never or almost never bullied.** TIMSS asked students about how often they experienced various bullying behaviors by other students, including online cyberbullying, with more extreme behaviors included at the eighth grade. The 6-8 percent of students that reported being bullied weekly had considerably lower average achievement.
- **Students like learning mathematics and science.** At the fourth grade, 80 percent said they liked learning mathematics compared to 88 percent in science. At the eighth grade, the percentages were lower—59 percent liked learning mathematics and 79 percent science.
- **Students start out confident** at the fourth grade in both mathematics (76%) and science (81%). However, substantially smaller percentages of eighth grade students were confident in these subjects (57% in mathematics and 62% in science).
- **Teachers' reported a sizable gap between their professional development needs and opportunities.** Less than half the students had teachers with recent professional development in integrating technology in instruction and improving students' critical thinking skills, but about 70 percent had teachers needing more such professional development.
- **Greater clarity of instruction was associated with higher student achievement in both subjects and grades.** About three-quarters of fourth grade students reported that their teachers' instruction was clear, but less than half the eighth grade students did so.

TIMSS assessments result from close collaboration among the participating countries. “We have the common goal of improving education, and we don’t have any political agenda,” said Martin. “We also work to give people what they want — from designing the assessments and what they measure, to how to report the results.”

TIMSS data enable participating countries to make evidence-based changes in educational policy. Officials have used TIMSS to monitor education systems’ effectiveness in a global context, identify gaps in resources and opportunities, pinpoint areas of weakness, and measure the impact of new initiatives.

The TIMSS & PIRLS International Study Center is located in the Lynch School of Education and Human Development at Boston College. Researchers there coordinate thousands of international staff, contractors, and collaborators around the world — from government officials to researchers to teachers — to carry out an assessment that fairly and accurately measures educational outcomes across countries.

“Considering the vast linguistic, cultural, ethnic, and racial diversity of the world, as well as the wide range of available resources, TIMSS is an enormous undertaking,” said Boston College Provost David Quigley. “Boston College is proud to support this worldwide endeavor to improve mathematics and science education.”

The results of TIMSS 2019 will be available at: <http://timss2019.org/>

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