Insights for Malaysia from TIMSS

Educational Publishers Forum Malaysia 2023

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Researching education, improving learning

Introduction to IEA

- International Association for the Evaluation of Educational Achievement
- Non-governmental research organization, founded in 1958
- Independent, international cooperative of national research institutions and governmental research agencies
- Conducts large-scale comparative studies of educational achievement and other aspects of education
- More than 60 member country institutions; nearly 100 education systems participate in IEA studies

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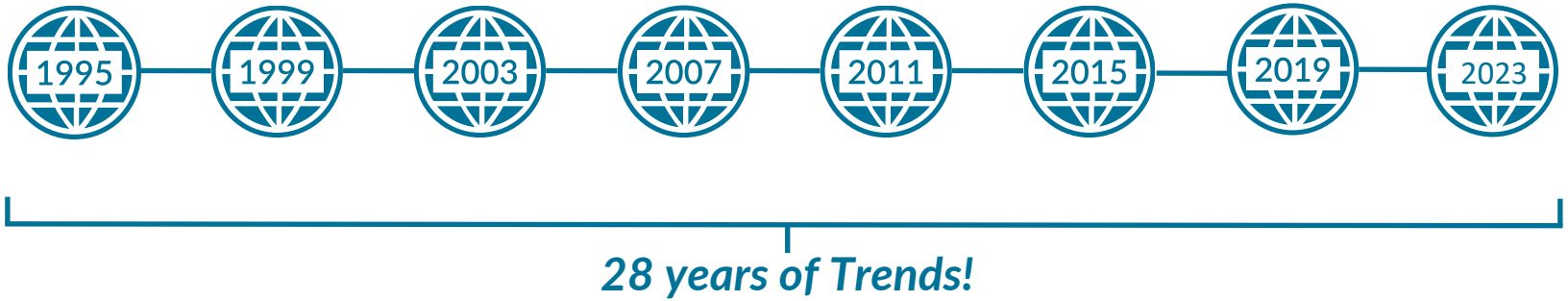
Background and Implementation of TIMSS

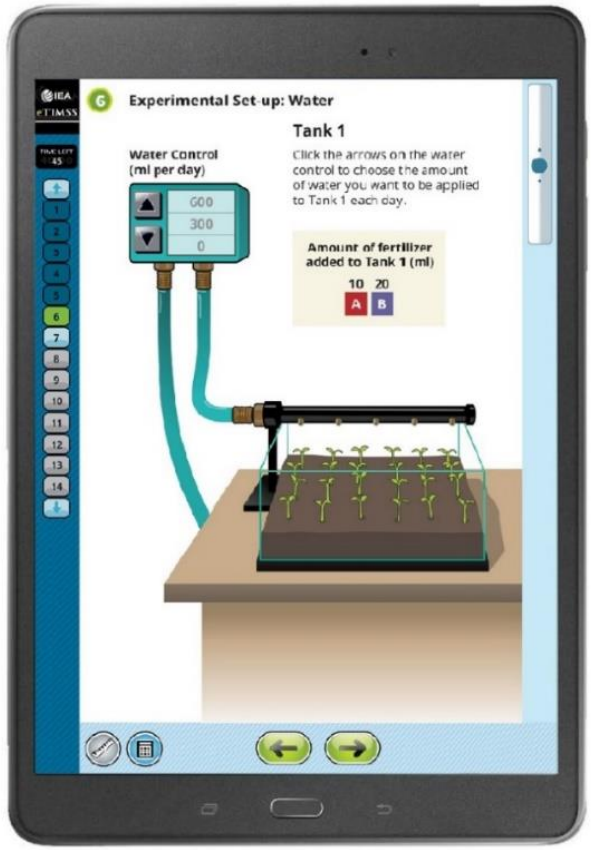
Trends in International Mathematics and Science Study

- Assessment of 4th and 8th grade students, conducted every 4 years since 1995
- Provides internationally comparative data on how well children achieve in mathematics and science
- Collects rich contextual data from students, teachers, grade 4 parents, and school principals on factors that effect learning
- Data from 64 countries and 8 benchmark systems – assessed 600.000 students worldwide



eTIMSS

- An electronic version of the TIMSS assessment
- Provides enhanced measurement and extended coverage of mathematics and science frameworks
- Includes additional innovative problem solving and inquiry tasks (PSIs)
- Results of TIMSS and eTIMSS are presented on the same scale
- Move to fully digital TIMSS for 2023 cycle



TIMSS 2019 grade 8 participants



Australia
Bahrain
Chile
Chinese Taipei
Cyprus
Egypt
England
Finland
France
Georgia
Hong Kong SAR
Hungary
Islamic Republic of Iran
Ireland
Israel
Italy
Japan
Jordan
Kazakhstan
Republic of Korea
Kuwait
Lebanon
Lithuania
Malaysia
Morocco
New Zealand
Norway
Oman
Portugal
Qatar
Romania
Russian Federation
Saudi Arabia
Singapore
South Africa
Sweden
Turkey
United Arab Emirates
United States

Benchmarking Participants:

Ontario, Canada
Quebec, Canada
Moscow City, Russian Federation
Gauteng, South Africa
Western Cape, South Africa
Abu Dhabi, UAE
Dubai, UAE

Education systems in **bold** participated in eTIMSS

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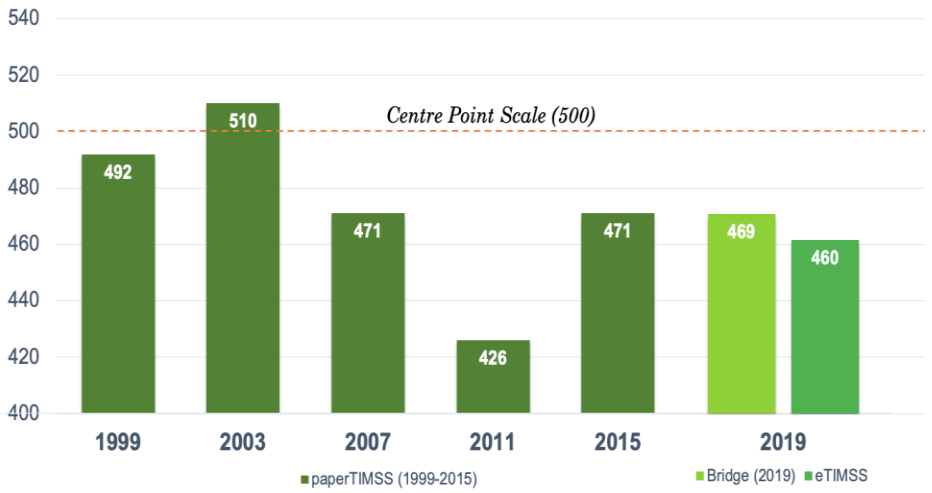
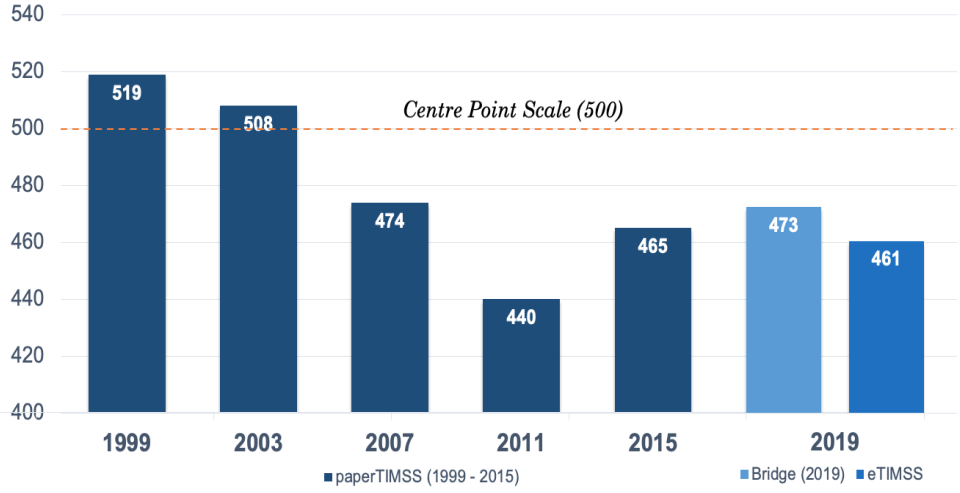
Malaysian Results from TIMSS 2019

Malaysia's achievement in mathematics

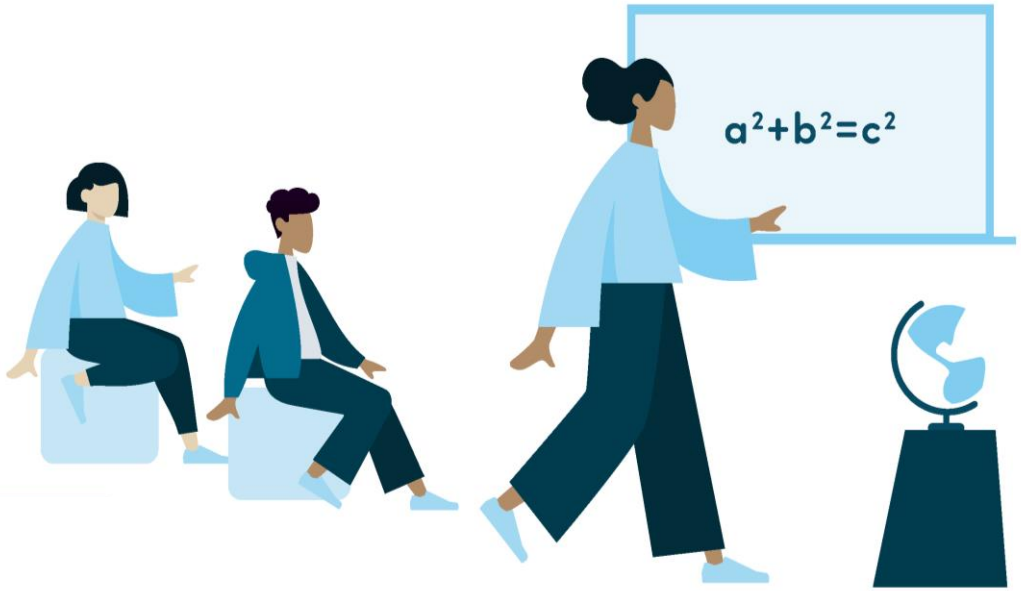


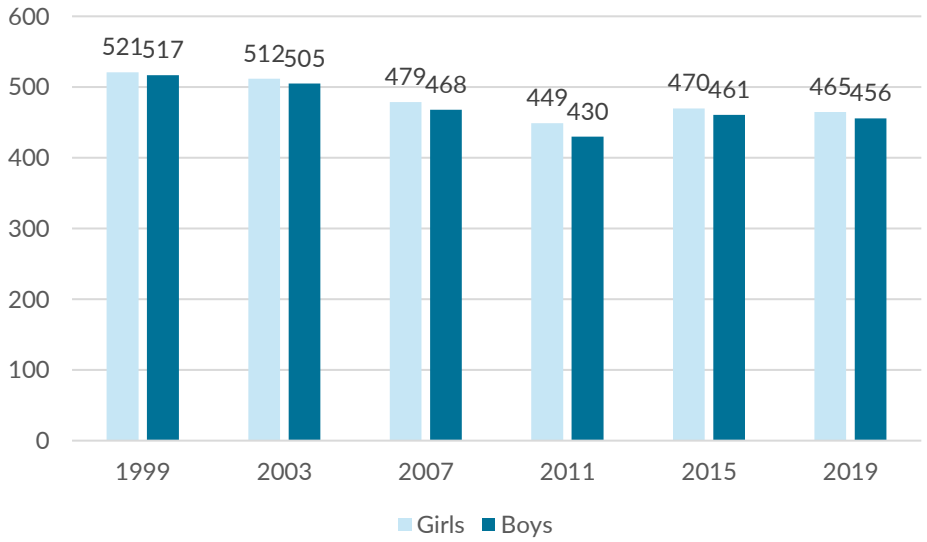


There was a period of a decreasing average mathematics achievement of grade 8 students from 1999 to 2011. Since then, the average mathematics achievement of grade 8 students improved in 2015 and remained at that level in 2019.

After an increase of the average science achievement of grade 8 students from 1999 to 2003, the average science achievement of grade 8 students decreased in 2007 and further in 2011. In 2015, the average science achievement again increased to the level of 2007 and remained stable since then.

Gender gap in mathematics achievement

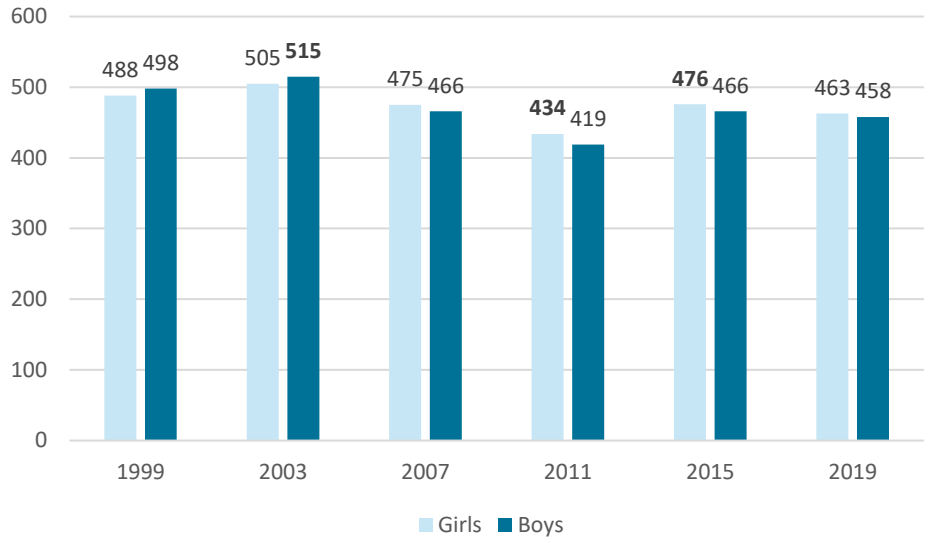




In mathematics, female students on average outperform their male peers in grade 8 since 2007. From 2011 to 2015, the gap reduced from 19 to 9 scale points, and remained stable in 2019.

Gender gap in science achievement

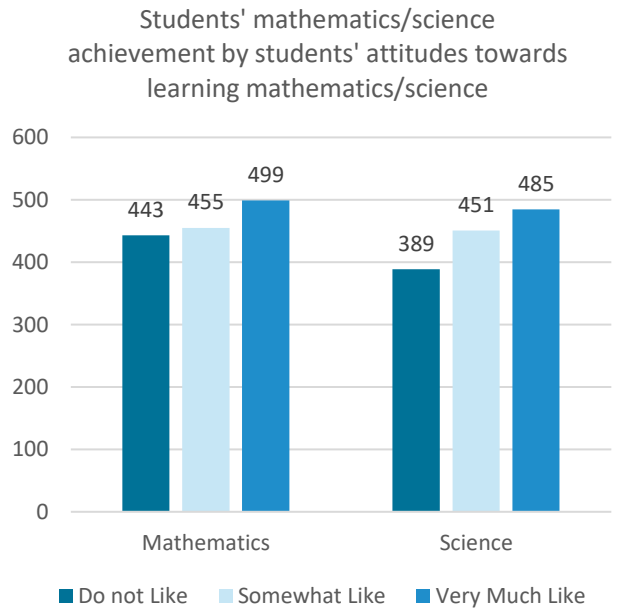




In 2003, grade 8 boys used to perform better on average in science than girls. There was a shift in the gap, resulting in girls outperforming boys in science in 2011 and 2015. The gap closed in 2019.

Students like learning mathematics and science

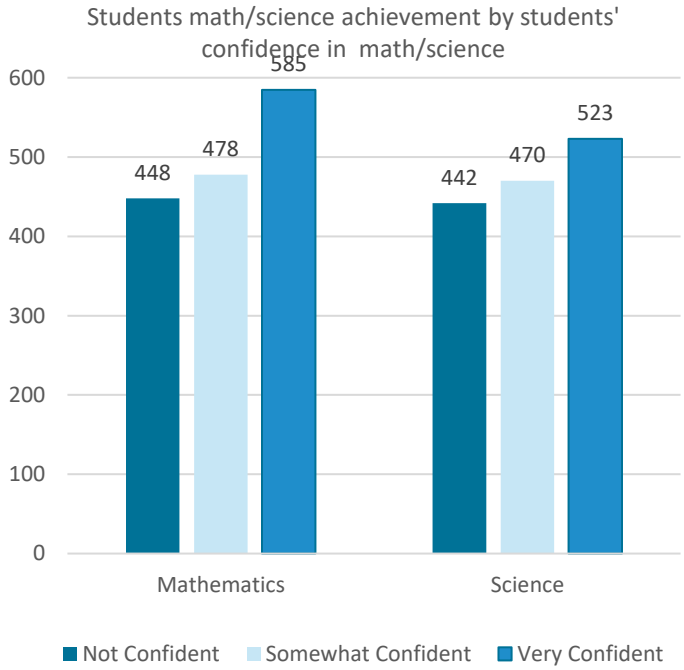




- Students who very much like learning mathematics score higher (+56 scale points) on the mathematics test than students who do not like mathematics.
- Students who like learning science score higher (+62 scale points) on the science test than students who do not like science. The difference in science achievement is even bigger (+96 scale points) between students who say they very much like learning science and those who do not like learning science.
- As such, positive attitudes towards learning mathematics are related with higher mathematics achievement. The same is true for science, even more pronounced.

Students' confidence in mathematics and science





- Students who are confident in mathematics score higher (+30 scale points) on the mathematics test than students who are not confident in mathematics. The difference is even bigger (+137 scale points) between students who say they are very confident in mathematics and those who are not.
- Students who are confident in science score higher (+28 scale points) on the science test than students who are not cofident science. The difference in science achievement is even bigger (+81 scale points) between students who say they are very confident in science and those who are not.
- Confidence in mathematics is related with higher mathematics achievement. The same is true for science.

Computer access for instruction



According to their teachers, about:

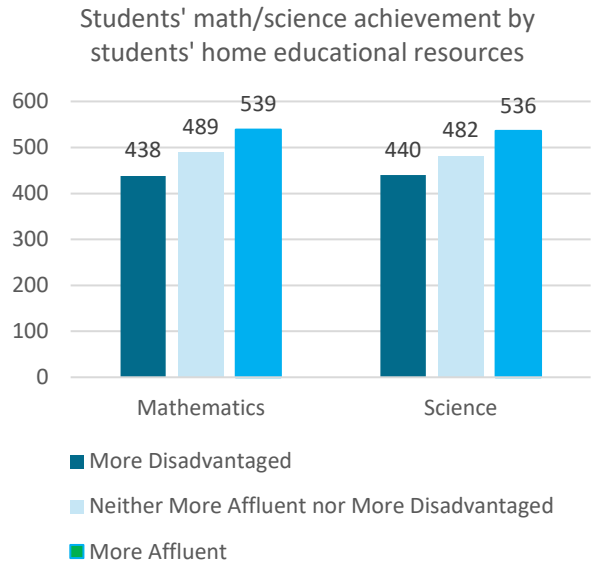
20%

of students have computers available during science lessons.

For mathematics lessons, even less students (13%) have computers available.

School composition by socioeconomic background of the student body





- In both, mathematics and science, the school composition by socioeconomic background of the student body is strongly related to achievement. Students at schools with the majority of students being from neither more affluent nor more disadvantaged homes score higher in mathematics and science than students at schools with more students from disadvantaged homes. Students at schools with more students from affluent homes score higher in mathematics and science than students at schools with students from neither more affluent nor more disadvantaged homes.
- In mathematics, students at schools with more affluent students on average score 101 points higher than students at schools with more disadvantaged students. In science, the difference is 96 score points.

Summary of the results

- There is certainly no one fits all solution to improve education in all countries.
- Education policy strategies need to be found for each country—in the best case based on solid data like TIMSS
- However, there are some factors that seem to be beneficial for many countries. Among them are:
  - Digitalization can help to engage students—but this requires more than just transferring paper materials into a digital format
  - A focus is needed on the most vulnerable student groups—helping them helps all students in the country
  - Mathematics and science are great subjects and educators and learning materials must transmit the excitement of the subject
  - Learning materials and the teaching must be engaging for boys and girls. Also, prerequisites—like mastering the language is important. And from PIRLS we increasingly observe boys with problems here.

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Thank you!
Terima kasih!

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