OECD

PISA IN FOCUS 54

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Is spending more hours in class better for learning?

- Regardless of the type of school attended (public or private, advantaged or disadvantaged), 15-year-old students spent more time in mathematics lessons in 2012 than in 2003.
- The average amount of time spent in mathematics classes varies by more than a factor of two across countries and economies.
- The more time spent in mathematics classes, the better students perform, on average; but giving students more work in class is often not enough to improve learning outcomes.

There is no real consensus on how much class time is enough when it comes to learning mathematics, science and reading. But educators and policy makers generally agree that while it's important for students to spend considerable time in school lessons to acquire new skills, spending more hours and minutes in class is not enough to ensure that students succeed in school.

There are large differences across countries in the time students spend in mathematics lessons…

Based on students' self-reports in PISA 2012, the average 15-year-old student in an OECD country spends 3 hours and 38 minutes per week in mathematics lessons. This is similar to the amount of time spent in other core subjects: 3 hours and 35 minutes per week in language-of-instruction classes, and 3 hours and 20 minutes in science classes.

However, behind these averages lie great variations among school systems. While students in Chile spend around 6 hours and 40 minutes per week in mathematics lessons, students in Bulgaria, Croatia, Hungary and Montenegro spend less than 2 hours and 30 minutes per week. Similar variations are observed concerning science and language-of-instruction classes.

The considerable variation among countries is not always due to trade-offs in the time allocated among the three core subjects. In fact, students who spend an above-average amount of learning time in mathematics classes tend to spend above-average amounts of time in language-of-instruction and science classes too. Students in Canada and Chile, for example, spend above-average amounts of time in all three subjects. The time spent in mathematics and language-of-instruction lessons are particularly highly correlated, while the time spent in science and mathematics lessons are correlated to a lesser extent. In Bulgaria and Lithuania, for example, students spend less time than average in mathematics lessons but more time than average in science classes.

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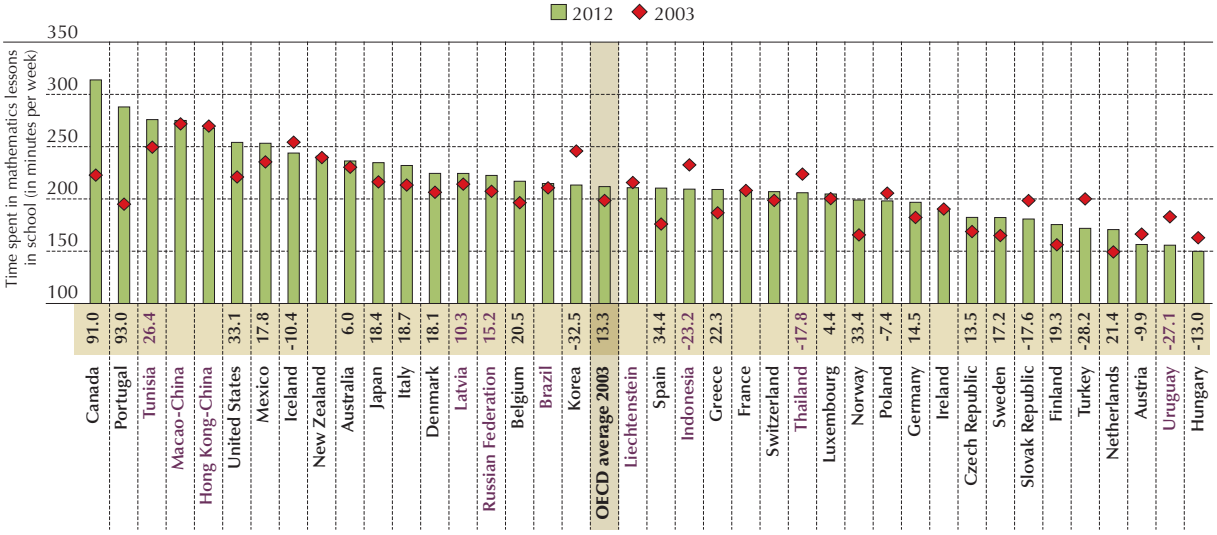
Learning time also varies within school systems, particularly when it comes to science lessons. On average across OECD countries, students in socio-economically disadvantaged schools spend 36 minutes less in science lessons than their advantaged peers. Differences within school systems are also observed for mathematics lessons. In Argentina, Japan and Chinese Taipei, students in advantaged schools spend at least 76 minutes more in mathematics lessons than students in disadvantaged schools, on average.

...and that time has increased over the past decade.

Across OECD countries, students in 2012 spent an average of 13 minutes per week more in mathematics classes than they did in 2003. In some countries, average time spent in regular mathematics classes increased much more than that. In Canada and Portugal, for example, students in 2012 spent 1.5 hours more in mathematics classes than their counterparts in 2003 did, while students in Norway, Spain and the United States spent at least 30 minutes more. As a result, average mathematics instruction for 15-year-olds in Canada increased from around 3 hours and 45 minutes per week to around 5 hours and 15 minutes per week. In Portugal, average mathematics instruction time increased from 3 hours and 15 minutes per week to almost 4 hours and 50 minutes per week. The amount of time students spend in mathematics lessons increased by more than 15 minutes in another 14 countries and economies, but shrank by up to 30 minutes in 8 countries and economies. Only in Korea, which had the fifth longest mathematics class time in 2003, did that class time shrink by more than 30 minutes.

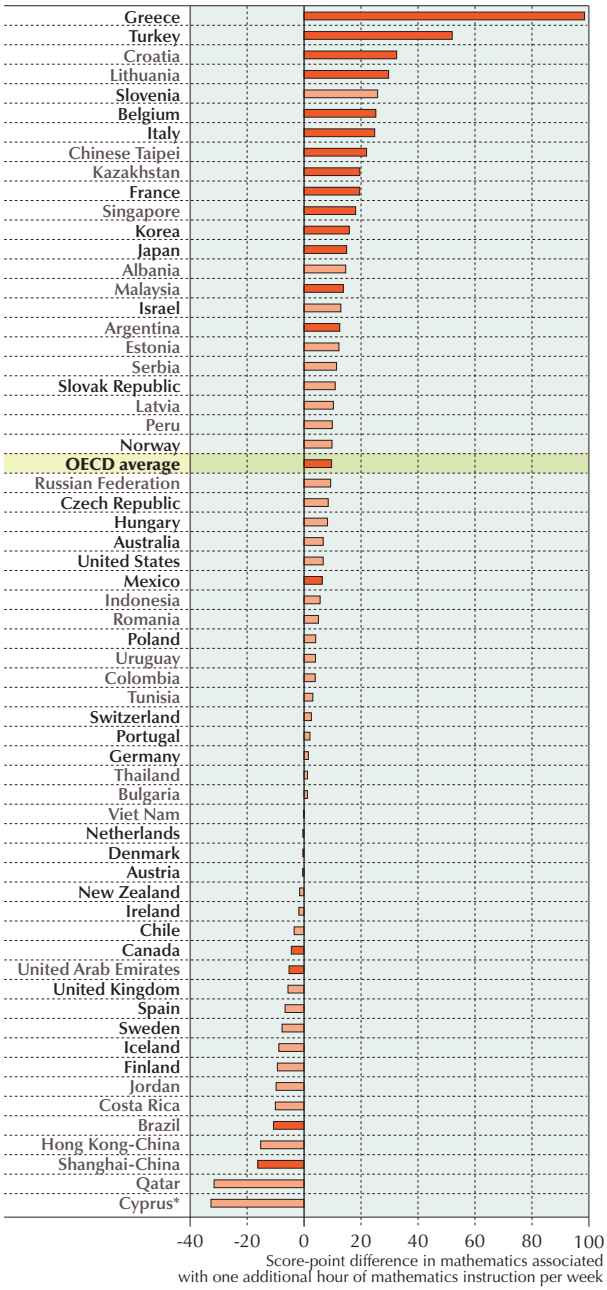
Change between 2003 and 2012 in the average time spent in mathematics lessons in school



Notes: Only countries and economies with comparable data from PISA 2003 and PISA 2012 are shown.
The change in learning time (2012 – 2003) is shown above the country/economy name. Only statistically significant differences are shown.
OECD average 2003 compares only OECD countries with comparable results in 2012 and 2003.
Countries and economies are ranked in descending order of the average minutes per week students spent in school mathematics lessons in 2012.
Source: OECD, PISA 2012 Database, Table IV.3.46.
StatLink http://dx.doi.org/10.1787/888932957327

The trend of longer mathematics classes observed across OECD countries is seen across all school types – advantaged and disadvantaged, private and public, lower and upper secondary programmes, and urban and rural schools. Interestingly, this trend is not observed in language-of-instruction and science classes. This difference might be a result of changing patterns in how school systems use instruction time, reflecting the growing importance of mathematics in national and local curricula, and in students' future lives.

Relationship between student learning time in school and mathematics performance



* See notes at the bottom of page 4.

Notes: Multilevel regression model (student and school levels): Mathematics performance regressed on school average of students' learning time per week in regular school mathematics lessons (minutes) and on the school's learning environment, resources, policies and practices, and other student and school characteristics.

Statistically significant regression coefficients at the 5% level ($p<0.05$) are marked in a darker tone.

Only countries and economies with a sufficient number of observations are shown; Luxembourg, Macao-China and Montenegro are therefore not included.

Countries and economies are ranked in descending order of the score-point difference in learning time spent in school mathematics lessons.

Source: OECD 2013, *PISA 2012 Results: What Makes a School Successful? (Volume IV) Resources, Policies and Practices*, Table IV.1.12c, pg. 245.

StatLink http://dx.doi.org/10.1787/888932957384

Students who spend more time in mathematics classes perform better, on average…

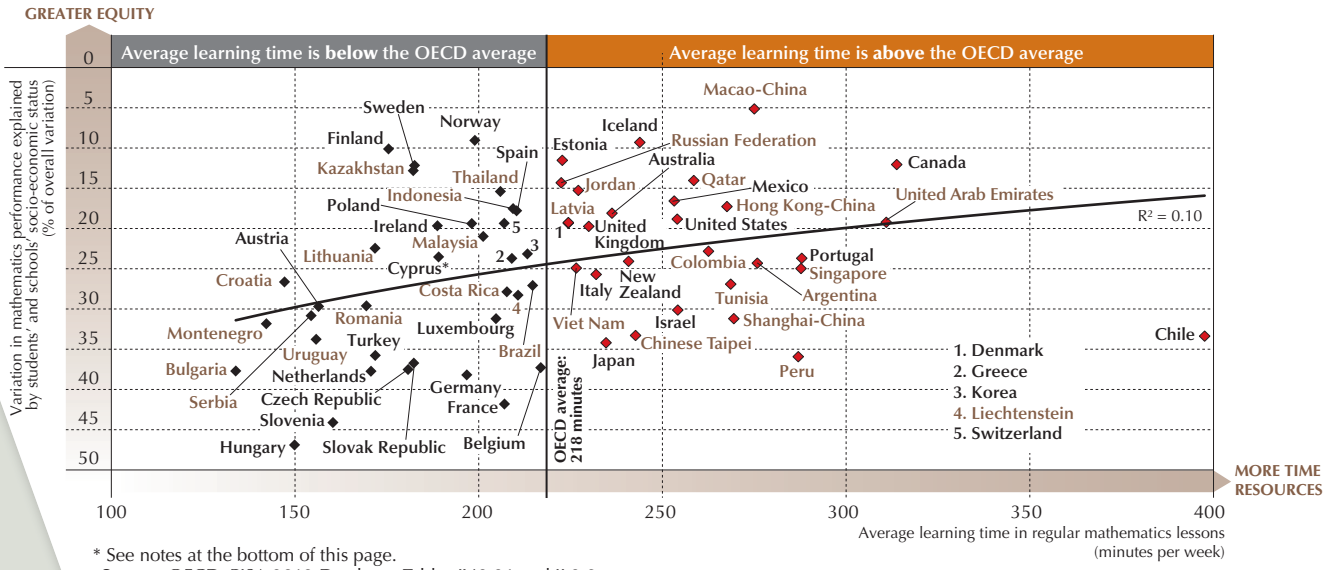
The amount of time students spend in mathematics class is positively correlated with mathematics performance at the school level. Students in schools where more time is spent teaching mathematics tend to perform better in PISA. This remains true in 15 countries and economies and, on average across OECD countries, when comparing students of similar socio-economic status who attend similarly resourced schools. Across OECD countries, the net pay-off in mathematics performance from attending a school with longer learning time in mathematics is an average of 12 score points per extra hour of mathematics instruction per week. In some countries, the net pay-off is even larger, most notably in Greece, where one hour more of learning time in mathematics corresponds to a 96-point increase in a school's PISA mathematics scores.

…but what really matters is how effectively that time is used.

However, in several countries there is no significant correlation between learning time and mathematics performance. Moreover, the average time students spend in mathematics lessons tends to be unrelated to the overall performance when comparing different school systems. These results can be explained by differences in how much students learn within a given amount of time. Both the quantity and the quality of learning opportunities are important factors in determining the performance of school systems as a whole.

The level of equity in a school system is another measure of a school system's success. Students' socio-economic status tends to have less impact on student performance in school systems where students spend a relatively long time in mathematics lessons. The positive relationship between learning time and equity is most apparent in countries with below-average instruction time.

Students' learning time at school and equity in education



* See notes at the bottom of this page.
Source: OECD, PISA 2012 Database, Tables IV.3.21 and II.2.9a.

The bottom line: An important decision within any school system is how much time to allocate to lessons in core subjects. While a substantial amount of lesson time is a prerequisite for learning and equity in education, simply increasing the number of hours students spend in class will not automatically help to improve students' performance. Schools and school systems need to ensure that an adequate amount of time in class is combined with the right curricular choices, high-quality teachers and positive learning environments.

For more information

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See Lavy, V. (2010), "Do Differences in School's Instruction Time Explain International Achievement Gaps in Math, Science, and Reading? Evidence from Developed and Developing Countries", working paper no. 16227, National Bureau of Economic Research, Cambridge, Massachusetts.
OECD (2013), *PISA 2012 Results: What Makes Schools Successful? (Volume IV) Resources, Policies and Practices*, PISA, OECD Publishing, Paris.
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Note by Turkey: The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Turkey recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Turkey shall preserve its position concerning the "Cyprus issue".

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