

Chapter 13.

Innovation in teacher professional development and collaborative practices

This chapter presents the change in teacher professional development practices. They typically take two forms: formal training (in content knowledge or pedagogy) and peer learning through collaborative practices (for example collaboration in the preparation of lessons). The change within countries is presented as an increase or decrease in the share of students exposed to the practice. The percentage point change is also expressed as a standardised effect size in the final table.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

78. Teacher participation in professional development in mathematics and science content

Why it matters

Continued in-service teacher professional development can take different formats, including training related to content knowledge in their discipline. It is particularly important for primary education teachers to feel comfortable with science and mathematics content in countries where they primarily studied humanities. For secondary education teachers, who are usually more specialised, it can broaden their knowledge and allow them to master more approaches to teaching.

Mathematics

Primary education

Change at the OECD level: small

While on average positive and negative changes have cancelled each other across OECD countries, the absolute change in this practice amounted to 10 percentage points, corresponding to a small effect size of 0.2. At the OECD level, the share of 4th grade students with a maths teachers who recently had a training on maths content ranged from less than 5% in Turkey and the Slovak Republic to 85% in Poland in 2015.

Countries where there has been the most change

Albeit stable in most countries, innovation took the form of both expansion and contraction of the practice. While the share of students taught by a teacher who recently had a training decreased by over 20 percentage points in the Russian Federation, Hungary and Slovenia, it increased by over 20 percentage points in Quebec (Canada), Sweden and Poland.

Secondary education

Change at the OECD level: moderate-low

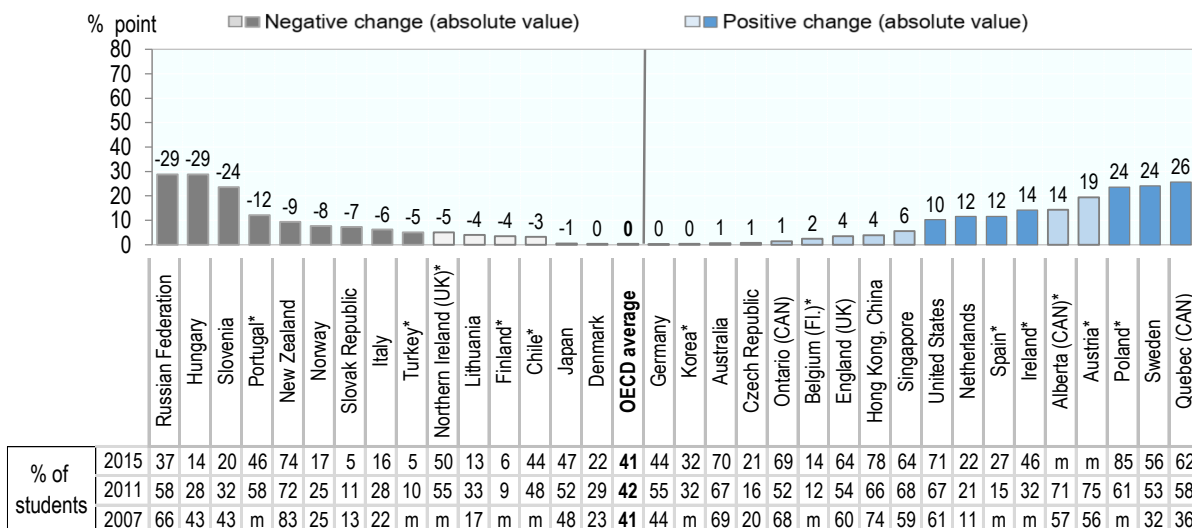
At the OECD level, negative changes overshadow positive ones, leading to an average decrease of 5 percentage points in the share of 8th grade students with maths teachers participating in content-related professional development. Increases and decreases together lead to an average absolute change of 11 percentage points, corresponding to a moderate-low effect size of 0.25. Across the OECD area in 2015, about half of the students were instructed by teachers who participated in this kind of professional development during the last two years.

Countries where there has been the most change

The share of students taught by a teacher who had content-related training in maths decreased by over 22 percentage points in Turkey, Lithuania, Hungary and Norway. Only a small number of countries experienced substantial increases between 2007 and 2015, for example Sweden (18 percentage points) and Israel (12 percentage points). Additionally, South Africa experienced a 12-percentage point increase between 2007 and 2011.

Figure 13.1. 4th grade teacher participation in mathematics content

Change in and share of students whose teachers participated in professional development by means of content in the last two years, 2007-2015, teachers report

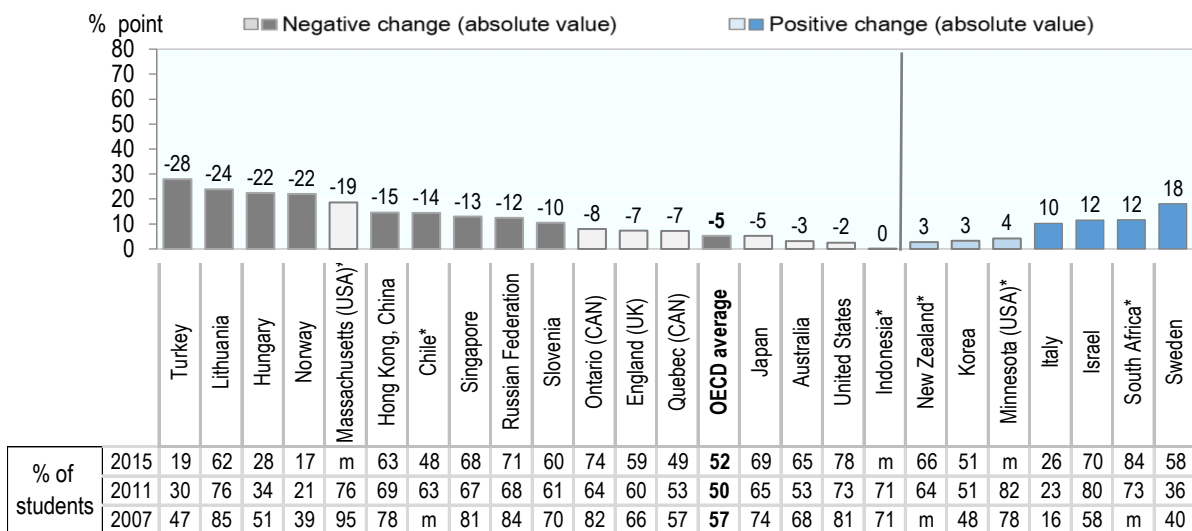


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905816>

Figure 13.2. 8th grade teacher participation in mathematics content

Change in and share of students whose teachers participated in professional development by means of content in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905835>

Science

Primary education

Change at the OECD level: small

Between 2007 and 2015, the share of 4th grade students taught by science teachers who took a training on science content decreased by 2 percentage points on average in OECD systems. Increases and reductions combined resulted in an absolute change of 8 percentage points, corresponding to a small effect size of 0.2. Within OECD countries, the percentage of 4th grade students whose teachers received training on science content in the last two years was 22%, ranging from 74% in Poland to 3% in Finland, Turkey and the Netherlands.

Countries where there has been the most change

Slovenia, the Russian Federation and Hungary witnessed noticeable decreases of over 20 percentage points in this kind of professional development. At the other end of the spectrum, Poland saw the largest increase in this practice between 2011 and 2015 (40 percentage points).

Secondary education

Change at the OECD level: moderate-low

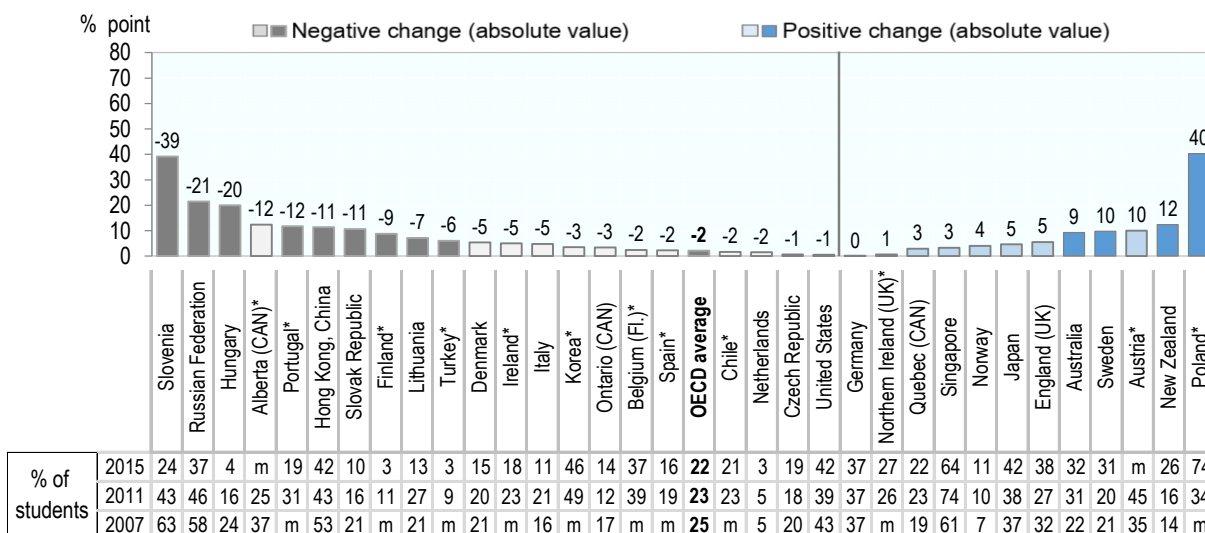
This practice has mainly decreased across the OECD area. The average net decrease amounted to 10 percentage points, with 49% of 8th grade science students instructed by teachers engaged in professional development about science content in 2015 against 59% in 2007. The absolute change amounted to 11 percentage, corresponding to a moderate effect size of 0.23. On average, in 2015, one student in two had a teacher who recently took a science content training, with a span ranging from 76% in the United States and Japan to 12% in Norway.

Countries where there has been the most change

Turkey is by far the country that experienced the largest decrease in this teacher professional development practice, with a contraction of 41 percentage points of students concerned. Ontario (Canada), Norway and Hungary show the same pattern with reductions between 17 and 20 percentage points. On the contrary, South Africa, Indonesia and the Russian Federation recorded relatively substantial increases in this teacher practice, but overall change in that direction was slight. Change in this practice is nonetheless an innovation in all these countries.

Figure 13.3. 4th grade teacher participation in science content

Change in and share of students whose teachers participated in professional development by means of content in the last two years, 2007-2015, teachers report

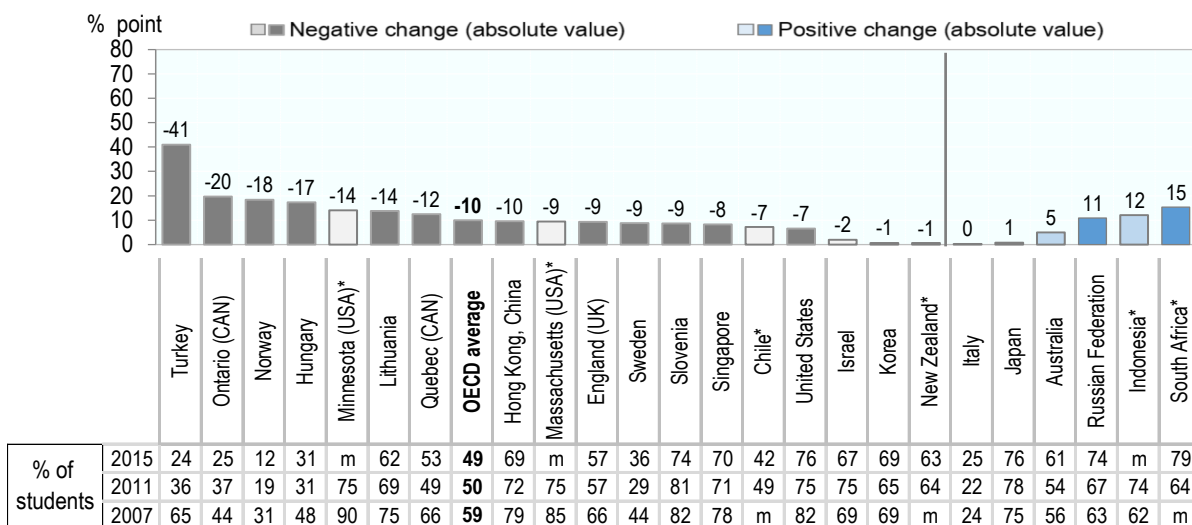


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905854>

Figure 13.4. 8th grade teacher participation in science content

Change in and share of students whose teachers participated in professional development by means of content in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905873>

79. Teacher participation in professional development on pedagogy or instruction

Why it matters

While good teachers must master the content that they teach, their effectiveness as teachers also comes from their pedagogical knowledge, and in particular the breadth of their pedagogical portfolio. This breadth allows them to personalise their instruction, and make teaching and learning more varied and interesting for students, and change strategy if one does not work with some student groups.

Mathematics

Primary education

Change at the OECD level: moderate-low

Negative changes marginally outweigh positive ones, leading to an average net decrease of 1 percentage point in this practice between 2007 and 2015. At the OECD level, the absolute change was 11 percentage points, corresponding to a moderate-low effect size of 0.25. The extent of teachers' participation in this varied a lot among OECD countries: in 2015, the proportion of students whose teachers had participated in recent times ranged from 6% in Turkey to 81% in Ontario (Canada), with an OECD mean at 43%.

Countries where there has been the most change

Innovation has materialised in both large increases and reductions in this professional development practice. It has been substantially increased in Poland (38 percentage points), Quebec (Canada) (24 percentage points) and Austria (23 percentage points), whereas it has decreased by more than 20 percentage points in the Slovak Republic, Hungary and the Russian Federation.

Secondary education

Change at the OECD level: moderate-low

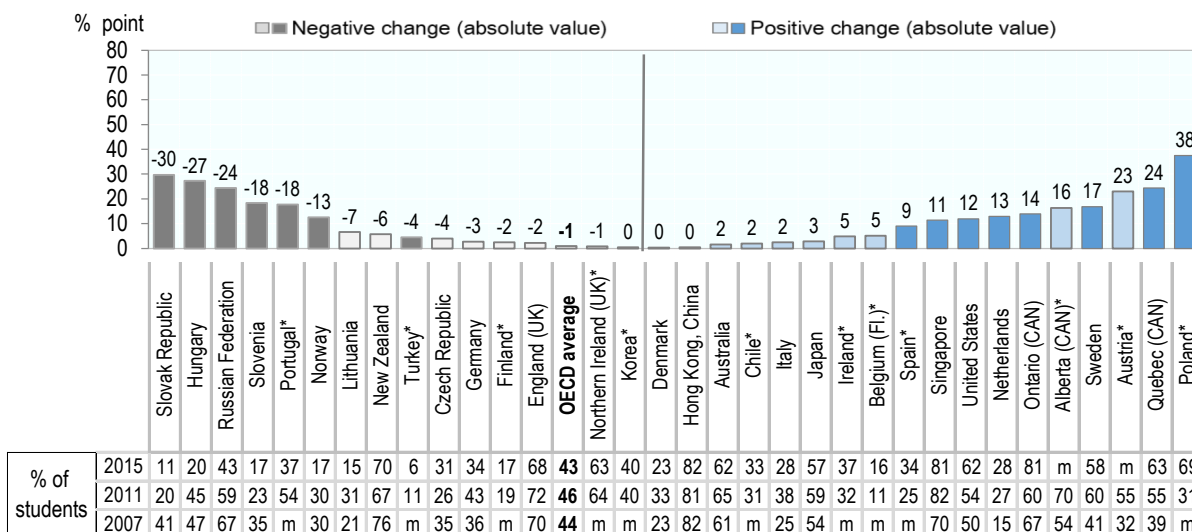
On average, this teacher practice saw a small net decline of 3 percentage points across the OECD area. Positive and negative changes together led to an absolute change of 12 percentage points, corresponding to a moderate-low effect size of 0.25. In 2015, slightly more than half of the 8th grade students in OECD countries were instructed by mathematics teachers having participated in this professional development in recent times, ranging from 79% in Ontario (Canada) to 24% in Norway.

Countries where there has been the most change

Turkey, Indonesia, Lithuania, Hungary, Quebec (Canada) and Norway experienced large reductions of over 15 percentage points in the share of students with teachers having recently participated in this pedagogy-focused professional development practice. Conversely, the practice has increased notably in Sweden and Korea (with a spread of students touched above 10 percentage points).

Figure 13.5. 4th grade maths teacher participation in programmes on pedagogy

Change in and share of students whose teachers have participated in professional development on pedagogy/instruction in the last two years, 2007-2015, teachers report

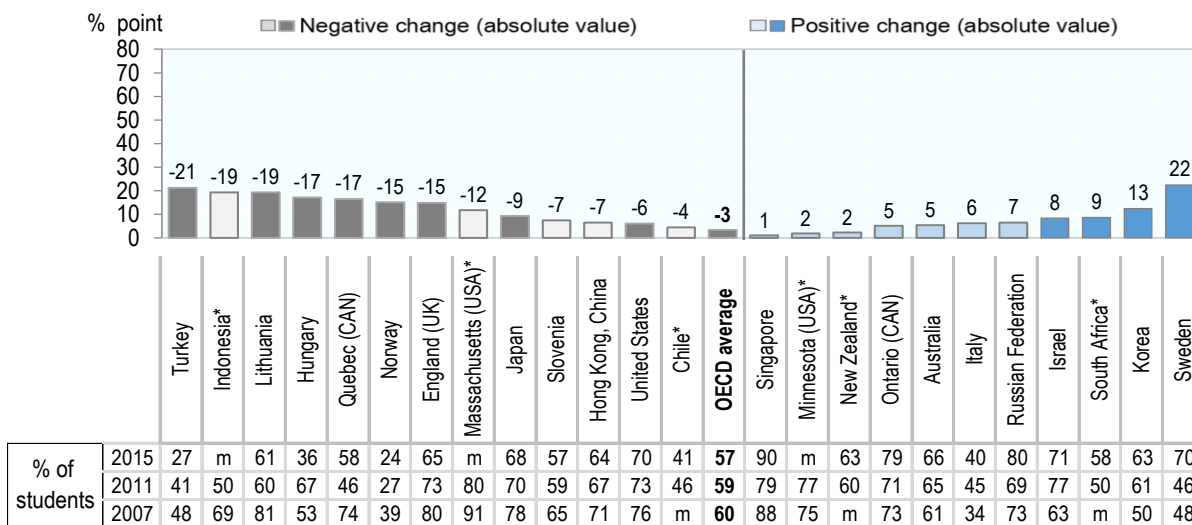


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905892>

Figure 13.6. 8th grade maths teacher participation in programmes on pedagogy

Change in and share of students whose teachers have participated in professional development on pedagogy/instruction in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905911>

Science

Primary education

Change at the OECD level: moderate

Across the OECD area, there was an average net decrease of 4 percentage points in the share of students instructed by teachers who were trained in science pedagogy. The absolute change amounted to 11 percentage points, corresponding to a moderate effect size of 0.26. In 2015, teachers who received training in science pedagogy across OECD education systems taught 20% of 4th grade students, with a span ranging from 49% in Poland to 3% in the Netherlands. (The share was 78% in Singapore).

Countries where there has been the most change

Between 2007 and 2015, the share of 4th grade students instructed by teachers recently trained in science pedagogy decreased by 42 percentage points in Slovenia. During the same period, the Slovak Republic also experienced a remarkable decrease of 35 percentage points. On the other hand, teachers recently trained in pedagogy in Poland taught 30 students more in hundred between 2011 and 2015.

Secondary education

Change at the OECD level: moderate-low

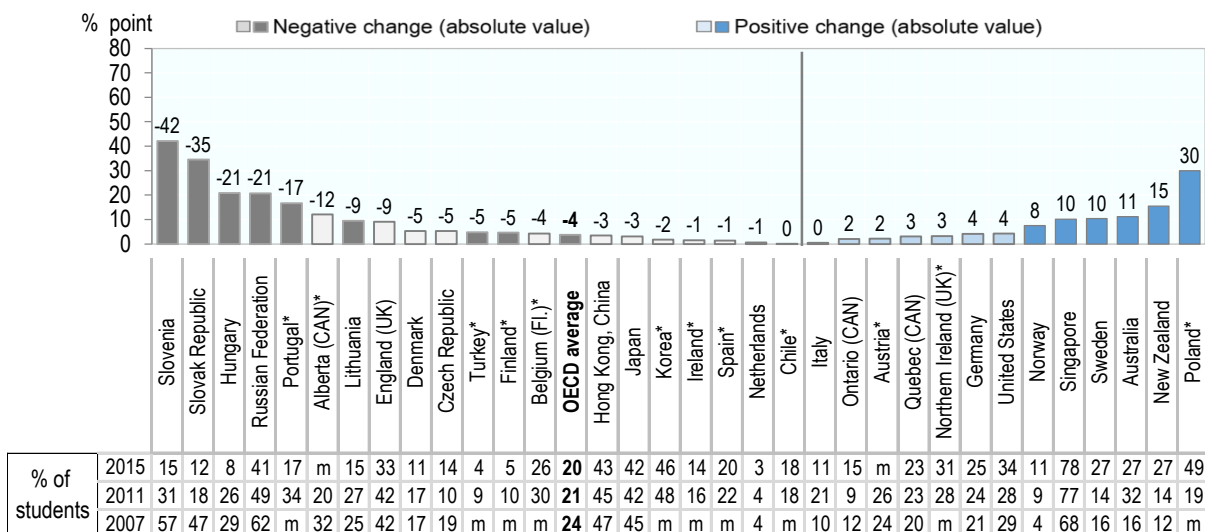
At the OECD level, increases and reductions in this teacher professional development practice led to a negative net average change of 3 percentage points. Counting changes in both directions, the absolute change amounted to 11 percentage points, corresponding to a moderate-low effect size of 0.24. While one in two secondary students is taught by a teacher that was recently trained in science pedagogy, this practice is disparate across OECD systems. In Japan, 75% of students have such teachers, against only 10% in Norway.

Countries where there has been the most change

Innovation more often took the form of less students taught by teachers trained in pedagogy than more. Turkey experienced the largest decrease with a drop of students taught by students with a formal training in science pedagogy by 42 percentage points between 2007 and 2015. Indonesia and Norway registered reductions of over 15 percentage points. On the contrary, a few countries experienced noticeable expansion of this teacher practice, especially Korea, Slovenia and South Africa, with increases above 15 percentage points.

Figure 13.7. 4th grade science teacher participation in programmes on pedagogy

Change in and share of students whose teachers have participated in professional development on pedagogy/instruction in the last two years, 2007-2015, teachers report

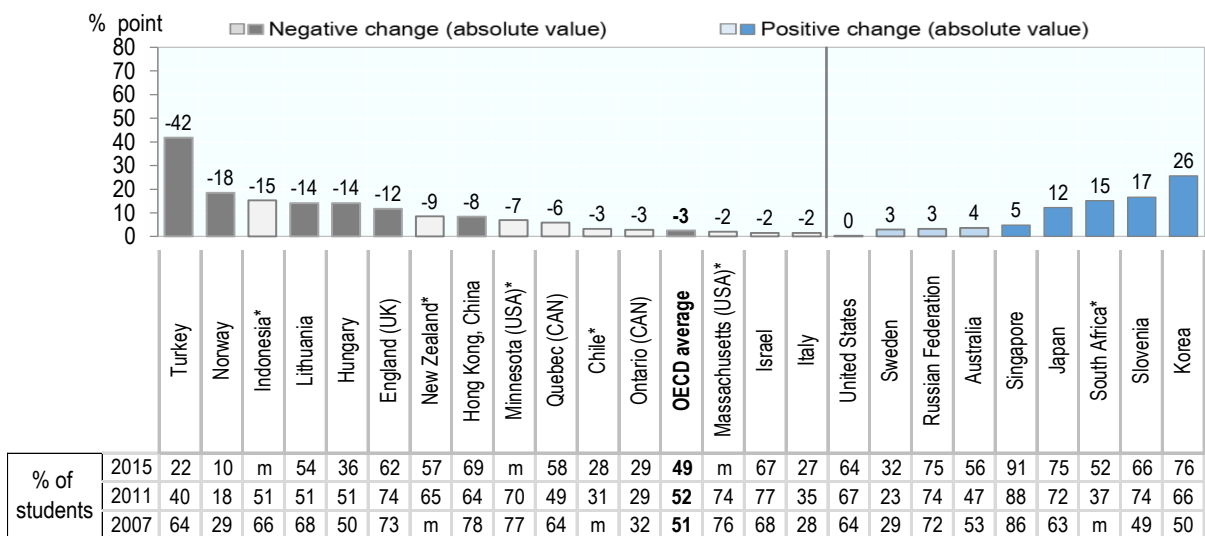


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905930>

Figure 13.8. 8th grade science teacher participation in programmes on pedagogy

Change in and share of students whose teachers have participated in professional development on pedagogy/instruction in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905949>

80. Teacher participation in professional development on curriculum

Why it matters

Depending on the countries, teachers contribute or not to their school curriculum. In most countries, and regardless of their involvement in school curriculum or not, they have a pre-set curriculum that they have to deliver and that change regularly. Professional development about curriculum helps them keep a good mastery of the curriculum content and of its evolutions.

Mathematics

Primary education

Change at the OECD level: moderate-low

Decreases in professional development on curriculum have prevailed over increases. Between 2007 and 2015, OECD systems experienced a net decline of the share of 4th grade students with teachers participating in maths curriculum professional development by 4 percentage points. Ignoring the direction of country-level variations, the absolute change amounted to 9 percentage points on average, corresponding to an effect size of 0.22. In 2015, teachers who had participated in training on maths curriculum during the last two years instructed 34% of 4th grade students on average.

Countries where there has been the most change

Poland and Austria saw noticeable increases in this teacher practice, above 20 percentage points (between 2011 and 2015, and 2007 and 2011, respectively). Conversely, this practice was significantly reduced in the Slovak Republic (20 percentage points), Ontario (Canada) (19 percentage points) and Hong Kong, China (17 percentage points) between 2007 and 2015.

Secondary education

Change at the OECD level: moderate

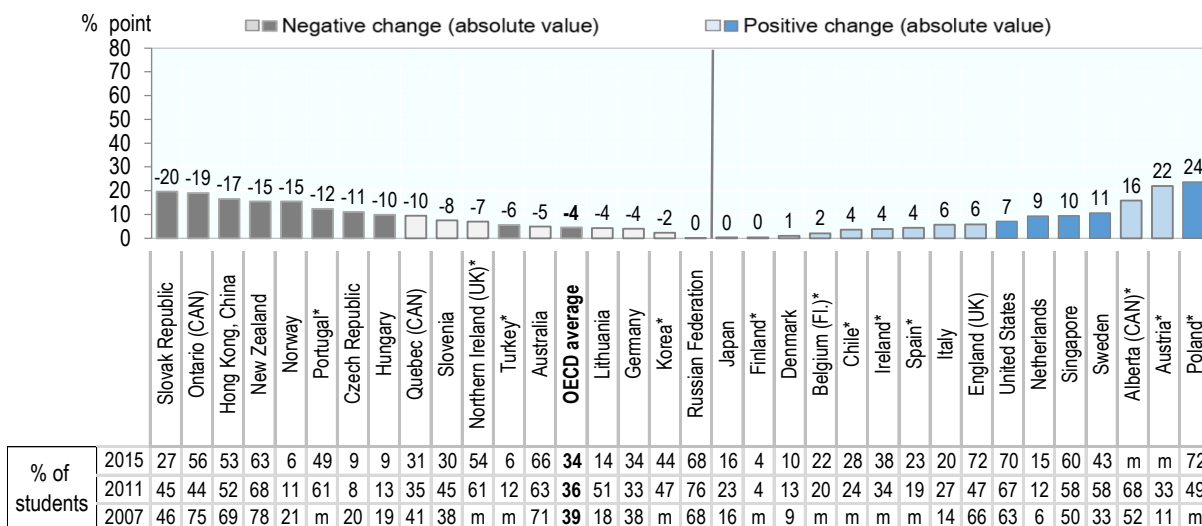
In most OECD countries, less 8th grade teachers have participated in training programmes on mathematics curriculum. On average, the percentage of 8th grade students taught by teachers who recently received science curriculum training decreased by 11 percentage points between 2007 and 2015. The absolute change amounted to 16 percentage points, corresponding to a moderate effect size of 0.35. Across the OECD area, on average 42% of 8th grade students had teachers who engaged in this practice in 2015, ranging from 84% in the United States to 11% in Norway.

Countries where there has been the most change

Quebec (Canada) recorded the largest innovation in this area, with the share of concerned students going down from 78% in 2007 to 26% in 2015. Decreases of 44 percentage and 32 percentage points in Turkey and Norway reveal similar declines.

Figure 13.9. 4th grade maths teacher participation in programmes on curriculum

Change in and share of students whose teachers have participated in professional development on curriculum in the last two years, 2007-2015, teachers report

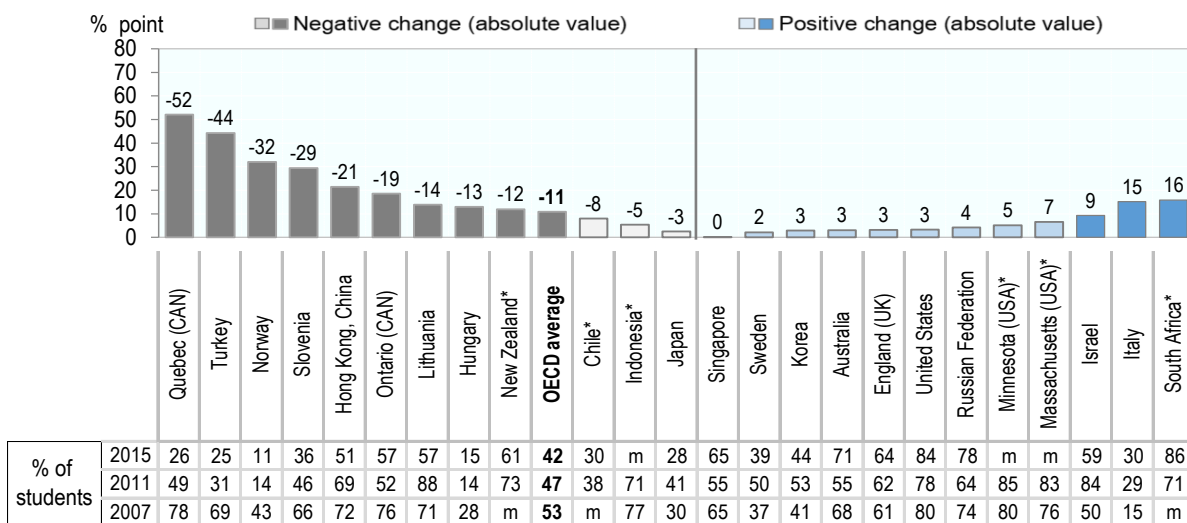


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905968>

Figure 13.10. 8th grade maths teacher participation in programmes on curriculum

Change in and share of students whose teachers have participated in professional development on curriculum in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933905987>

Science

Primary education

Change at the OECD level: small

OECD countries experienced both expansions and contractions in students being taught by teachers who received training in the science curriculum, with a slight net average decline of the practice (2 percentage points). In OECD systems, the absolute change was 9 percentage points, corresponding to a small effect size of 0.2. In the majority of OECD countries covered, only one in five 4th grade students get a teacher who recently received this kind of training. In 2015, almost no student had such a teacher in the Czech Republic (3%) against three in five in Poland.

Countries where there has been the most change

This was a bit innovation in Poland, where the practice spread to an additional 35 percentage students between 2011 and 2015, followed by Austria with an increase of 18 percentage points between 2007 and 2011. The Slovak Republic experienced a significant reduction by 18 percentage points between 2007 and 2015, and Portugal, a decrease by 16 percentage points between 2011 and 2015.

Secondary education

Change at the OECD level: moderate-high

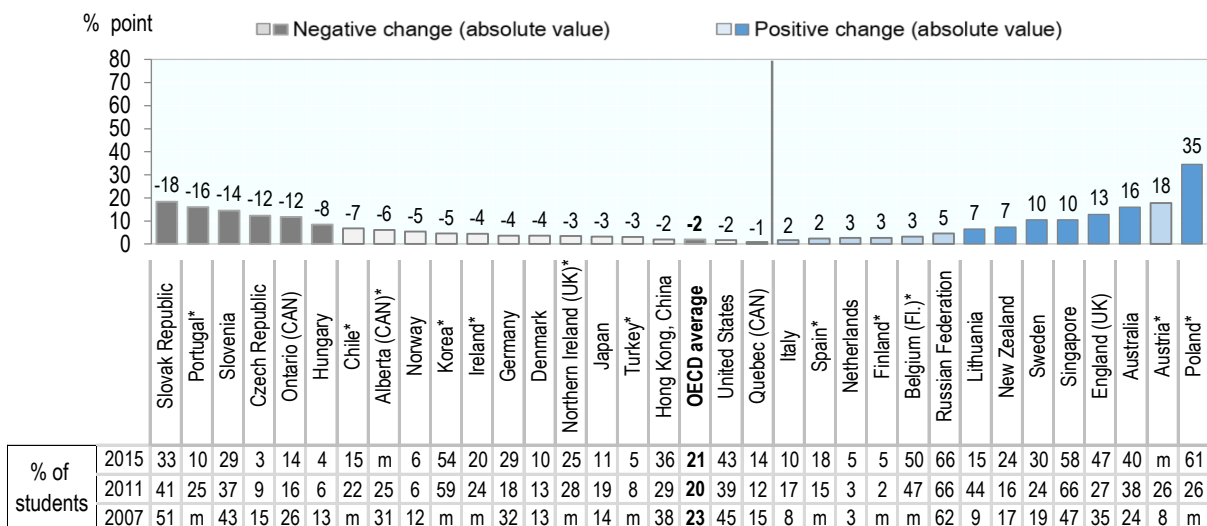
In most countries, 8th grade teacher participated less in science curriculum training than they used to. OECD systems experienced a decline by 9 percentage points on average between 2007 and 2015. The average absolute change of 16 percentage points corresponds to a moderate-high effect size of 0.36. In 2015, there were big variations around the 40% average of students concerned across the OECD area. In the United States, 76% of 8th grade students were instructed by science teachers having recently participated in science curriculum professional development, as opposed to only 5% in Norway.

Countries where there has been the most change

The most substantial innovation in this domain took the form of large contractions of this practice. The share of students whose teachers recently participated in training on curriculum decreased by 60 percentage points in Turkey, and by 34 and 23 percentage points respectively in Quebec (Canada) and Norway. At the other end of the spectrum, the practice increased by 23 percentage points in Korea.

Figure 13.11. 4th grade science teacher participation in programmes on curriculum

Change in and share of students whose teachers have participated in professional development on curriculum in the last two years, 2007-2015, teachers report.

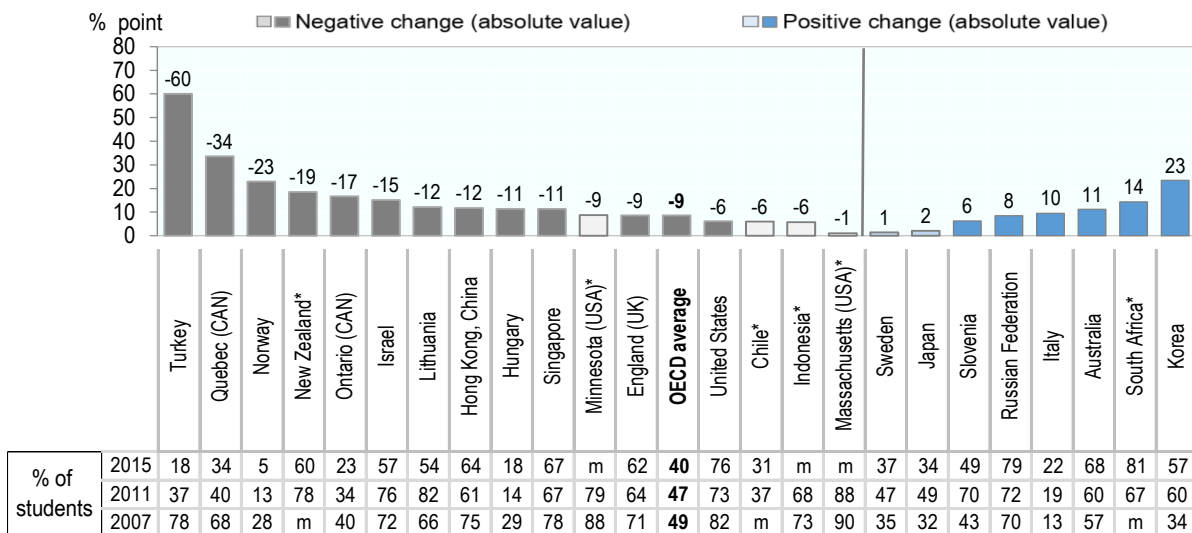


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906006>

Figure 13.12. 8th grade science teacher participation in programmes on curriculum

Change in and share of students whose teachers have participated in professional development on curriculum in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906025>

81. Teacher participation in a programme to integrate information technology into mathematics and science

Why it matters

The integration of information technology in pedagogy is still in its infancy, partly because information technology powers pedagogical approaches that can be challenging to teachers. Professional development programmes can help teachers to learn how to use information technology to support experiential learning, hands-on learning, problem-based learning, or just to practice procedural knowledge in mathematics and science – especially if they have a chance to apply this pedagogical knowledge in their classroom.

Mathematics

Primary education

Change at the OECD level: small

On average, OECD countries experienced a slight net increase of 2 percentage points in this practice. The absolute change amounted to 7 percentage points, corresponding to a small effect size of 0.17. There was thus little innovation overall in this professional development practice. OECD countries differ quite a lot in this domain: in 2015, the proportion of students instructed by maths teachers having recently participated in a training to integrate information technology into maths ranged from 68% in Poland to less than 2% in Germany, with an average at 27%.

Countries where there has been the most change

Poland experienced the largest innovation in this domain, with a 35-percentage point increase of the practice between 2011 and 2015. Teachers in Quebec (Canada) and Hong Kong, China also received more maths-related ICT training, with increases over 20 percentage points between 2007 and 2015. Conversely, the Slovak Republic and Northern Ireland experienced declines in this practice over 15 percentage points.

Secondary education

Change at the OECD level: moderate-low

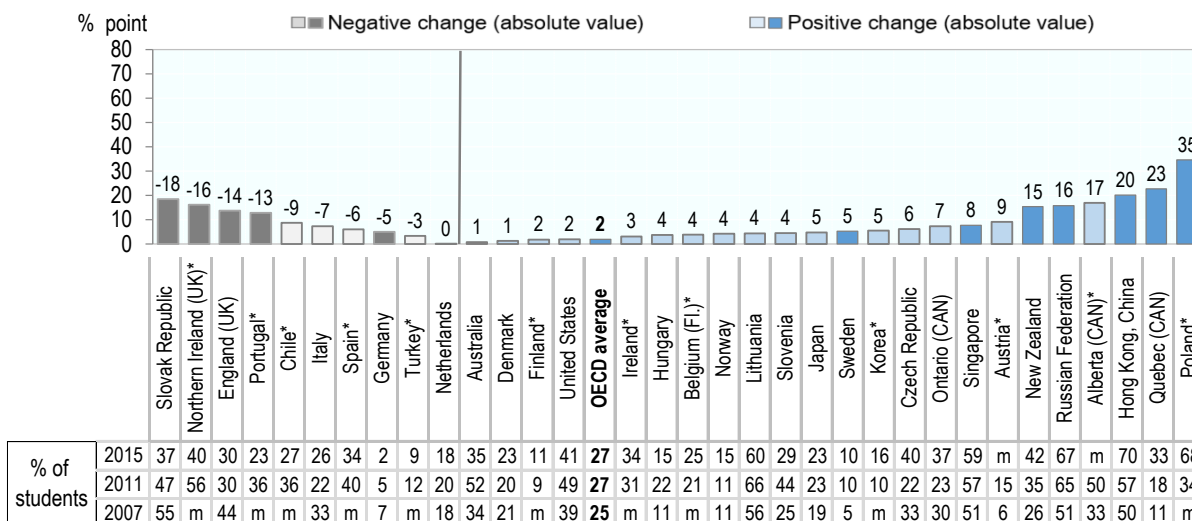
Between 2007 and 2015, the share of 8th grade students instructed by teachers having participated in a training to integrate ICT to their maths teaching increased by 7 percentage points on average in OECD countries. The absolute change was 11 percentage points, corresponding to a moderate effect size of 0.24. In 2015, this practice remained modest across OECD education systems covered, albeit more common than in primary education. In 2015, on average almost one in two students had a teacher that received such training, ranging from 18% in Sweden to 70% in Quebec (Canada).

Countries where there has been the most change

Quebec (Canada) and Israel saw a substantial spread of this practice. The share of secondary students taught by a maths teacher who got an ICT integration training increased by 43 and 32 percentage points respectively between 2007 and 2015. A very significant change. By contrast, England experienced a substantial decline by 21 percentage points between 2007 and 2015, as well as Chile between 2011 and 2015.

Figure 13.13. 4th grade teacher participation in programmes to integrate IT into maths

Change in and share of students whose teachers have participated in professional development aiming to integrate information technology into maths, in the last two years, 2007-2015, teachers report

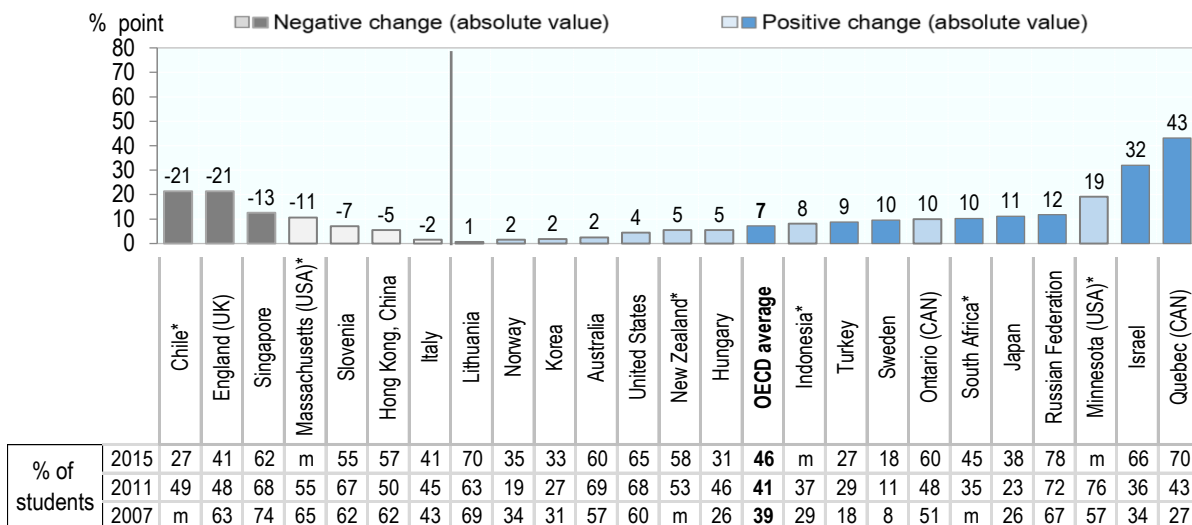


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906044>

Figure 13.14. 8th grade teacher participation in programmes to integrate IT into maths

Change in and share of students whose teachers have participated in professional development aiming to integrate information technology into maths, in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906063>

Science

Primary education

Change at the OECD level: small

Teachers in OECD countries have both increased and decreased their participation in science-related ICT training, leading to a slightly negative average net change (-1 percentage point) between 2007 and 2015. Increases and decreases combined lead to an absolute change of 4 percentage points, corresponding to a very small effect size of 0.1. This practice has remained very stable at a modest level. In 2015, primary teachers having received training on integrating information technology in their science instruction taught 17% of 4th grade students in OECD systems on average.

Countries where there has been the most change

Poland experienced the most innovation in this domain: between 2011 and 2015, the share of students taught by teachers who recently took a training in ICT integration increased by 42 percentage points. Increases in Lithuania, the Russian Federation, the Czech Republic and Quebec (Canada) were also significant. Only a small number of countries saw significant decreases in this domain, especially England with a decrease of 12 percentage points.

Secondary education

Change at the OECD level: moderate-low

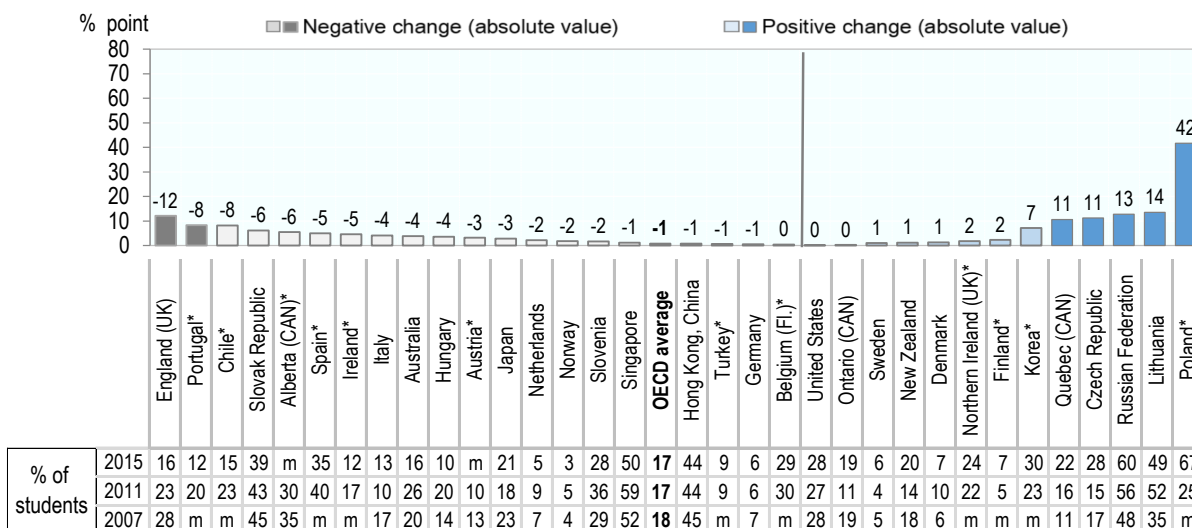
Both increases and reductions in this practice took place across OECD systems, leading to a positive net change of 4 percentage points. Regardless of the direction, the absolute change was 10 percentage points on average, corresponding to a moderate-low effect size of 0.23. In 2015, there were large differences in the use of this practice across the OECD area, although training on how to integrate ICT in science education is fairly common. Recently trained teachers on ICT integration taught on average 42% of secondary students in science, but with a range going from 65% in Slovenia to only 4% in Norway.

Countries where there has been the most change

Slovenia and Quebec (Canada) experienced the largest innovation in this teacher practice, with increases of 22 and 19 percentage points respectively. Increases also exceeded 15 percentage points in Indonesia, Sweden and Korea. Innovation in the other direction was notable in Chile, with a fall of the share of students taught by trained teachers by 18 percentage points between 2011 and 2015. Norway and England experienced decreases over 10 percentage points between 2007 and 2015.

Figure 13.15. 4th grade teacher participation in programmes to integrate IT into science

Change in and share of students whose teachers have participated in professional development aiming to integrate information technology into science, in the last two years, 2007-2015, teachers report

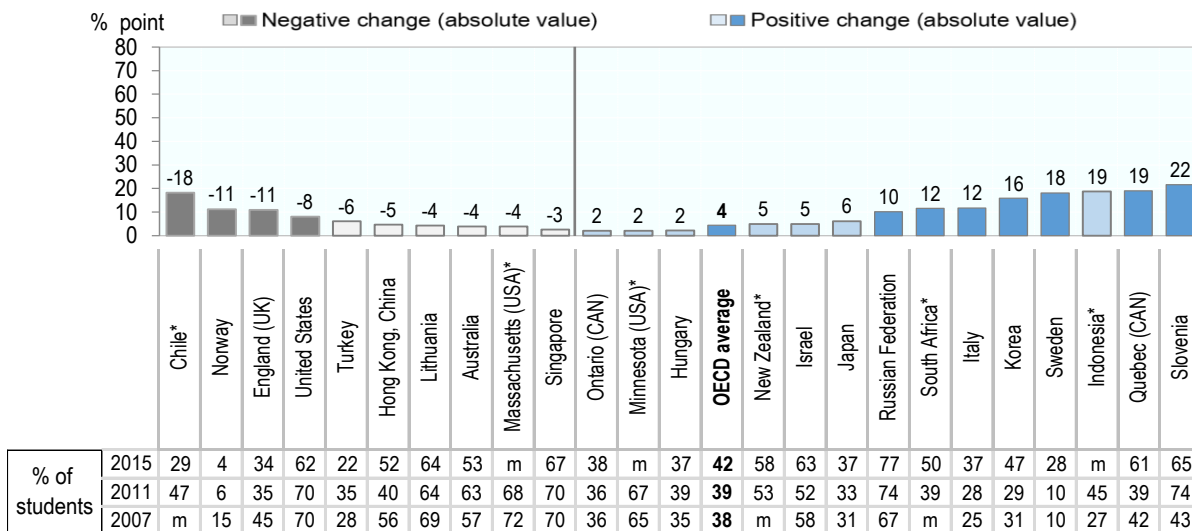


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906082>

Figure 13.16. 8th grade teacher participation in programmes to integrate IT into science

Change in and share of students whose teachers have participated in professional development aiming to integrate information technology into science, in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906101>

82. Teacher participation in a programme for improving students' critical thinking or problem-solving skills

Why it matters

Fostering students' critical thinking and problem-solving skills is one of the key education objectives of curricula in most OECD countries, and a key competency for students both for economic and social reasons. One condition for these innovation skills or "21st century" competencies to be taught and learnt is that teachers understand how they could adjust their practice to this effect. Professional development is one of the ways for them to learn this.

Mathematics

Primary education

Change at the OECD level: small

OECD countries experienced both expansions and contractions of this practice, although on average it has expanded by 4 percentage points. Positive and negative trends together resulted in an 8-percentage point absolute change, corresponding to a small effect size of 0.18. In Ontario (Canada), teacher training around critical thinking and problem solving were very common in 2015, with over 80% of 4th grade students being instructed by teachers having recently had training in developing students' critical thinking or problem solving skills. By contrast, such teachers taught only one in ten students in Denmark.

Countries where there has been the most change

Innovation in Sweden and Ontario (Canada) took the form of a scale up of this teacher practice with an increased coverage of concerned students in the system by 29 and 28 percentage points respectively. Similarly, Slovenia and the United States experiences increases of over 10 percentage points.

Secondary education

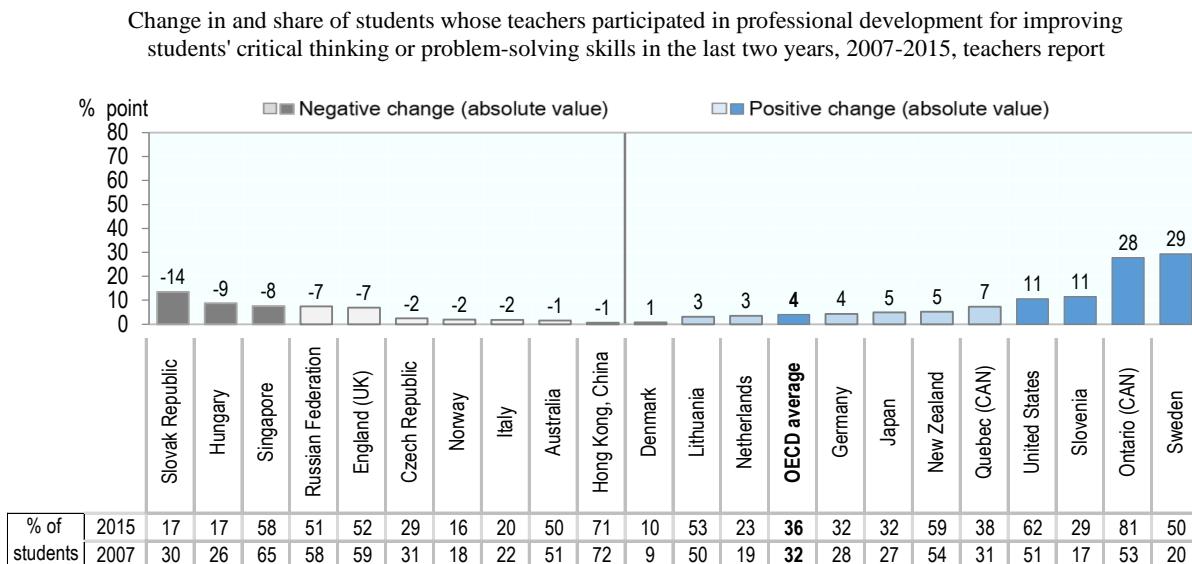
Change at the OECD level: small

OECD countries experienced both expansions and contractions in this practice, leading to a slightly positive average net change of 2 percentage points. The absolute change in this practice was 8 percentage points, corresponding to a small effect size of 0.19. Like in primary education, Ontario (Canada) stood out with 81% of 8th grade students with teachers recently trained on teaching critical thinking and problem solving in 2015. The scenario is quite different in other countries. In Norway for instance, teacher participation in this kind of professional development concerned only 12% of the students.

Countries where there has been the most change

Sweden experienced the most innovation with an increase by 24 percentage points of students taught by a teacher recently trained on fostering critical thinking and problem solving between 2007 and 2015. A similar trend is observed in Italy, Ontario (Canada) and Korea with increases above 10 percentage points. The Russian Federation, Hong Kong, China, Massachusetts (United States) and Hungary experienced significant contractions of the practice, exceeding 15 percentage points in all cases.

Figure 13.17. 4th grade maths teacher participation in programmes for improving students’ critical thinking or problem-solving skills

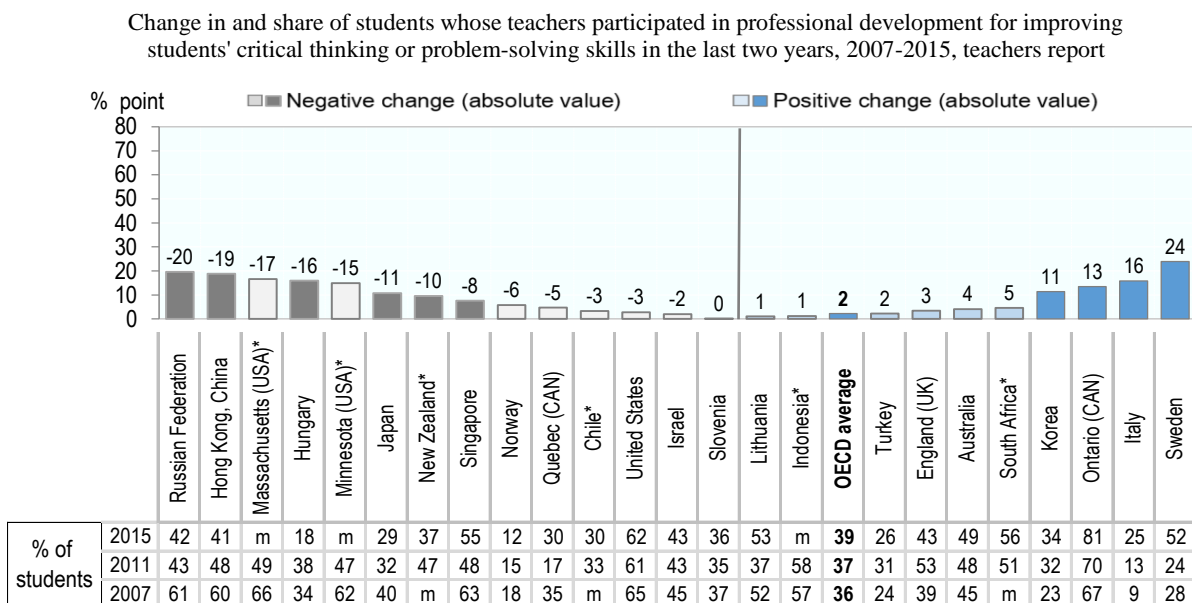


Note: Darker tones correspond to statistically significant values.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906120>

Figure 13.18. 8th grade maths teacher participation in programmes for improving students’ critical thinking or problem-solving skills



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906139>

Science

Primary education

Change at the OECD level: small

At the OECD level, the average net change was negative albeit very small (1 percentage point). With an absolute change of 4 percentage points and a small effect size of 0.11, this professional development practice experienced little change. We observe low to moderate levels of teacher participation across OECD countries: in 2015 levels ranged from 47% of the 4th grade students in Lithuania with science teachers having recently engaged in such a programme as opposed to 6% in Norway.

Countries where there has been the most change

Very few countries saw significant changes in this professional development practice. We can highlight decreases above 10 percentage points in Hungary and New Zealand. On the other hand, the only positive change above 10 percentage points was witnessed by Ontario (Canada).

Secondary education

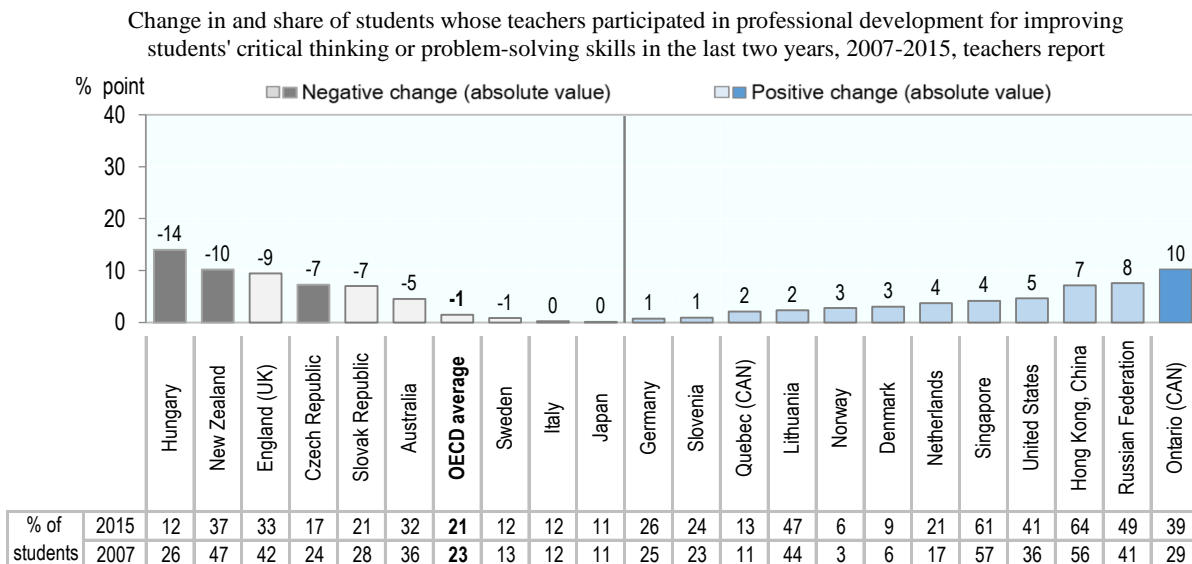
Change at the OECD level: small

While positive and negative changes have nullified each other across OECD countries surveyed, there has been an average absolute change of 7 percentage points in the share of 8th grade students with science teachers participating in this kind of professional development. This corresponds to an effect size of 0.16, which is quite small. At the OECD level, an average of 34% of the 8th grade students were instructed by science teachers having attended in recent times a programme aiming to develop students' creative and critical thinking skills.

Countries where there has been the most change

The biggest change was recorded in Hong Kong, China with a fall of 22 percentage points. Hungary also saw a notable negative change, of 16 percentage points. This is sharply contrasted by Slovenia which recorded an increase of 13 percentage points between 2007 and 2015.

Figure 13.19. 4th grade science teacher participation in programmes for improving students’ critical thinking or problem-solving skills

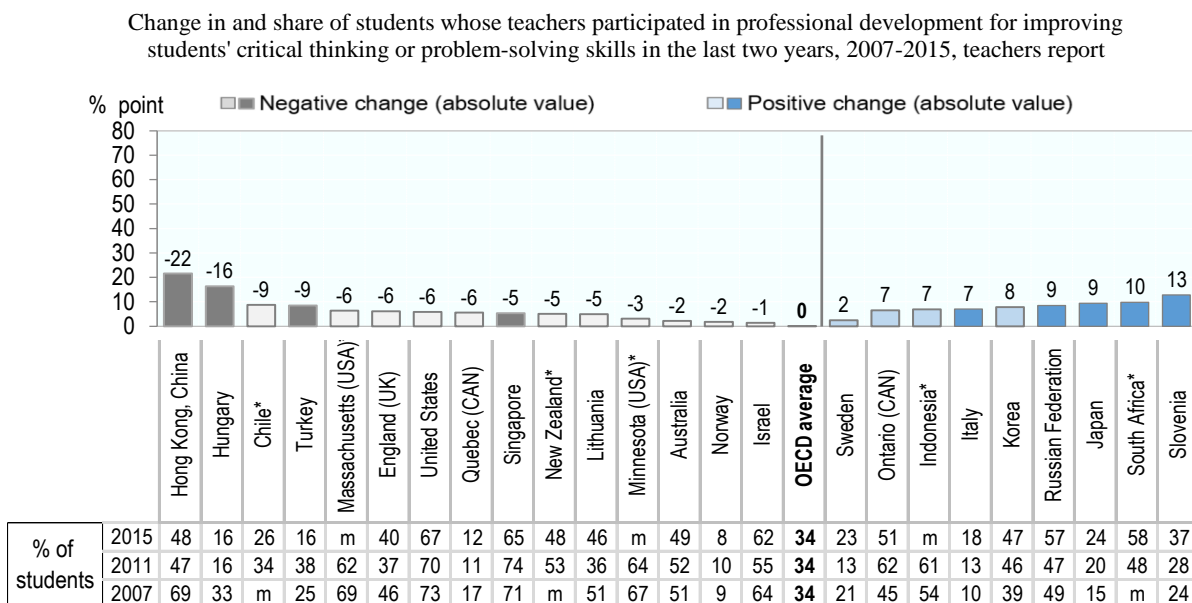


Note: Darker tones correspond to statistically significant values.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906158>

Figure 13.20. 8th grade science teacher participation in programmes for improving students’ critical thinking or problem-solving skills



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906177>

83. Teacher participation in professional development on mathematics and science assessments

Why it matters

Assessment is an integral part of pedagogy. It should give students feedback on their learning, on their knowledge and skill gaps, and encourage them to learn more. Too often, assessment is perceived as a mere sorting tool ascribing students to different ability groups. It can create anxiety and become unhelpful. Professional development on how to assess and use assessment is thus helpful to help teachers improve their assessment practices and develop a healthy assessment culture.

Mathematics

Primary education

Change at the OECD level: moderate-low

OECD countries have experienced both increases and decreases in their primary teachers' participation in training on maths assessment, leading to a slight average decrease of 1 percentage point of this practice between 2007 and 2015. Taking variations in all directions into account, the absolute change was 9 percentage points, corresponding to a moderate-low effect size of 0.22. In 2015, teachers having recently been trained on maths-related assessment taught 30% of 4th grade student on average in an OECD system.

Countries where there has been the most change

This was a big innovation Sweden where the practice spread by over 20 percentage points between 2007 and 2015, as well as in Austria and Alberta (Canada) between 2007 and 2011. At the other end of the spectrum, a substantial decrease of 25 percentage points was recorded in Slovenia between 2007 and 2015. Decreases of a similar magnitude were also registered in Finland and Belgium (Fl.) between 2011 and 2015.

Secondary education

Change at the OECD level: moderate

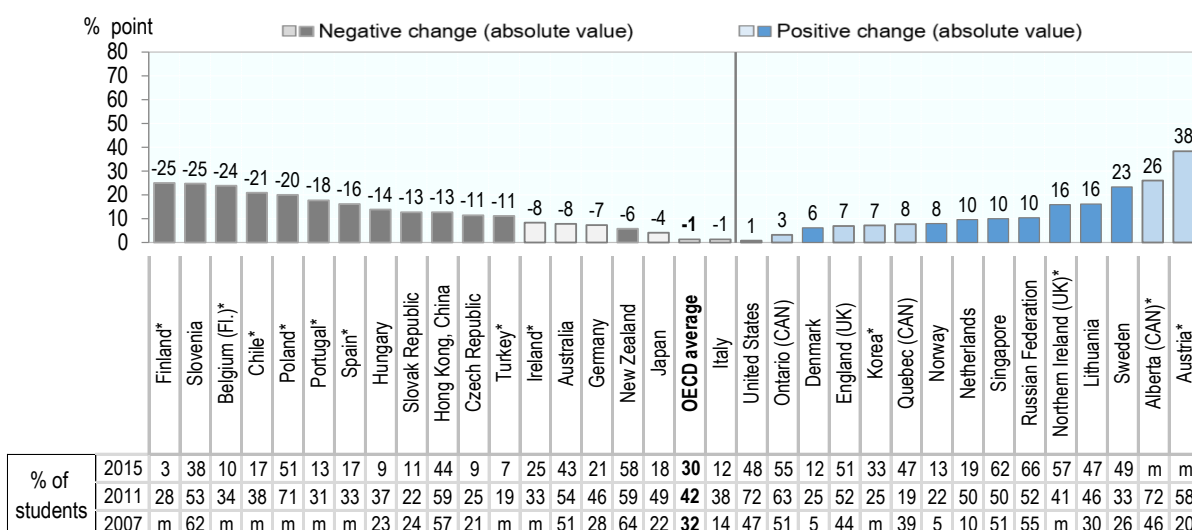
Mathematics teachers in the 8th grade across OECD education systems covered have more often reduced than increased their participation in assessment training, leading to an average net decrease of 8 percentage points. The absolute change accounted to 13 percentage points, with a moderate effect size of 0.26. In 2015, maths teachers having recently been trained on assessment taught 38% of 8th grade student on average in an OECD system.

Countries where there has been the most change

Innovation mostly took the shape of large reductions in assessment training. Quebec (Canada) experienced a substantial decline of 38 percentage points in the share of secondary students taught by teachers recently trained on assessment. In Slovenia, this share dropped by 32 percentage points. Japan, England and Hong Kong, China also experienced a scale down of this practice. Increases were generally of a small magnitude. Only Korea saw an increase above 10 percentage points.

Figure 13.21. 4th grade maths teacher participation in programmes on assessment

Change in and share of students whose teachers participated in professional development on assessment in the last two years, 2007-2015, teachers report

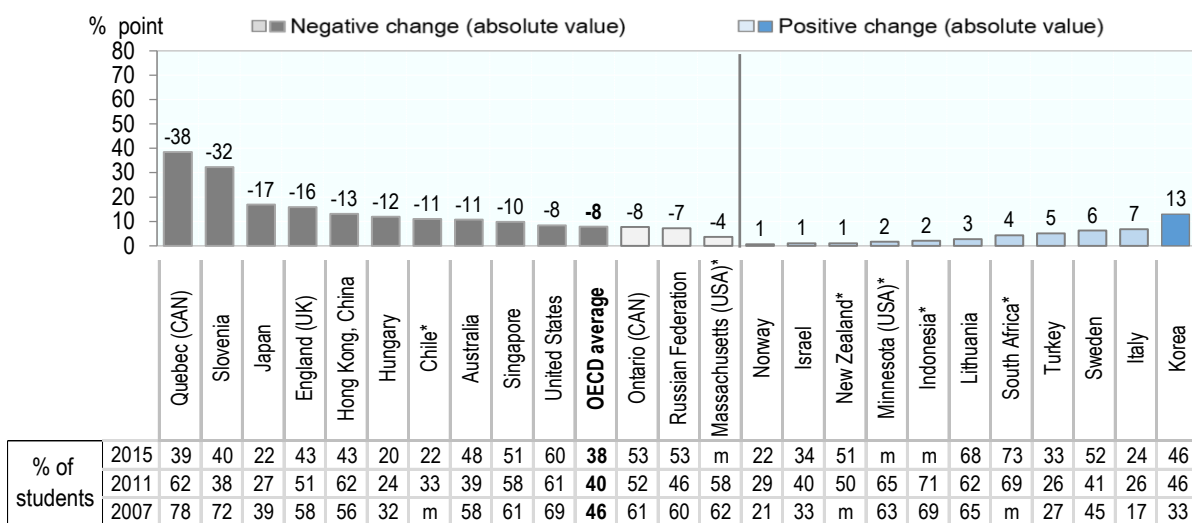


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906196>

Figure 13.22. 8th grade maths teacher participation in programmes on assessment

Change in and share of students whose teachers participated in professional development on assessment in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906215>

Science

Primary education

Change at the OECD level: small

Overall, 4th grade teachers across OECD education systems received less training on assessment in science in 2015 than they used to in 2007. At the OECD level, the share of 4th grade students whose teachers were recently trained in assessment in science decreased by 4 percentage points on average. Country-level variations resulted in an average absolute change of 6 percentage points, corresponding to a small effect size of 0.18. This practice remained stable overall. In 2015, teachers who took a training in science assessment taught 12% of the students 4th grade students. This is not a common practice. (Only in Singapore and the Russian Federation is it more widespread.)

Countries where there has been the most change

In most countries, innovation occurred through big decreases in the use of this practice. Between 2007 and 2015, the share of primary students with a teacher recently trained in science assessment declined by 31 percentage points in Slovenia. A similar trend occurred in Portugal (23 percentage points) and Chile (17 percentage points) between 2011 and 2015. Only a few increases were significant. Between 2007 and 2011, Austria and Alberta (Canada) recorded increases of 19 and 18 percentage points respectively.

Secondary education

Change at the OECD level: moderate

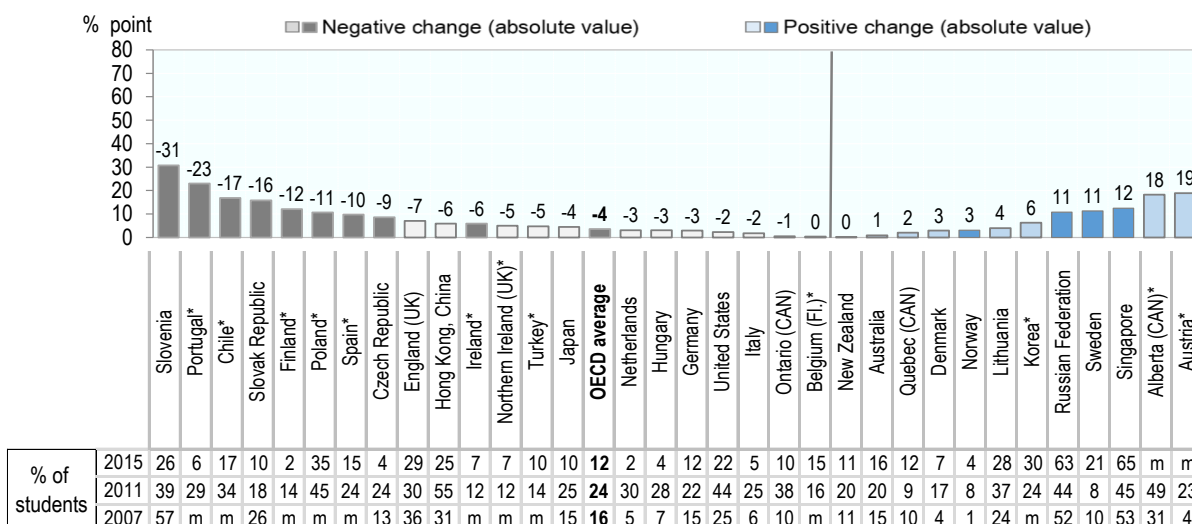
At the secondary level, most countries saw a decrease in this teacher practice. In 2015, 33% of 8th grade students had their science teachers participating in a programme on science assessment, against 43% in 2007. Positive and negative changes taken together lead to an absolute change of 13 percentage points, corresponding to a moderate effect size of 0.27. Science teachers recently trained in assessment teach 33% of secondary students on average in OECD countries. Only in Lithuania (60%) and England (55%) is this share more significant. The practice seems more common in non-OECD systems.

Countries where there has been the most change

Innovation mostly took the shape of substantial decreases in this professional development practice. The largest declines occurred in Quebec (Canada) and Slovenia (30 and 26 percentage points respectively). The share of secondary students taught by teachers with a recent training on assessment also decreased noticeably in Israel, Turkey and Hong Kong, China. Where the practice increased, this was by a small magnitude. Korea is the only country that experienced an increase above 10 percentage points.

Figure 13.23. 4th grade science teacher participation in programmes on assessment

Change in and share of students whose teachers participated in professional development on assessment in the last two years, 2007-2015, teachers report

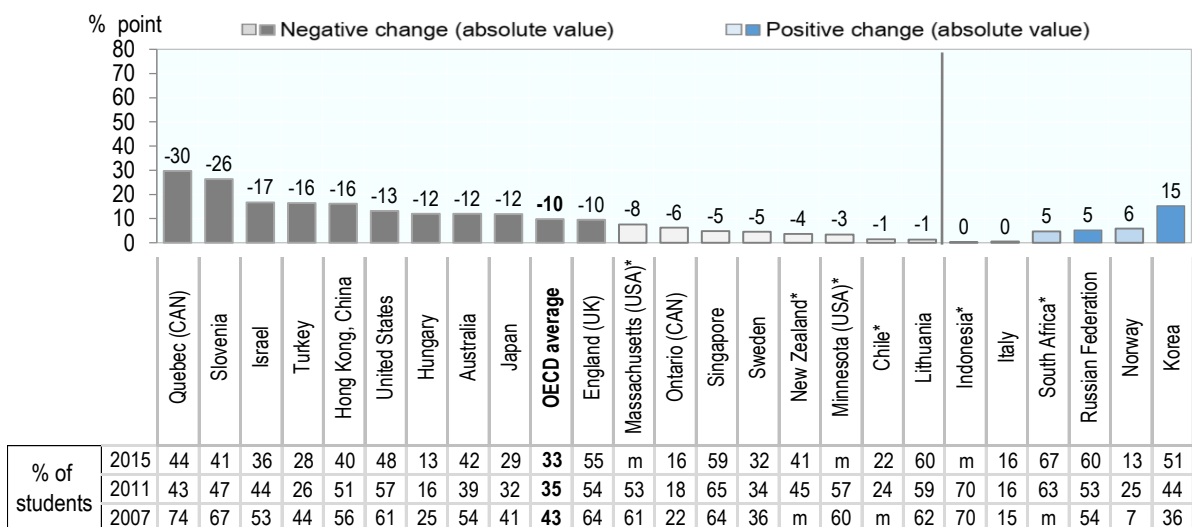


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906234>

Figure 13.24. 8th grade science teacher participation in programmes on assessment

Change in and share of students whose teachers participated in professional development on assessment in the last two years, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906234>

84. Teachers having assistance available when students are conducting science experiments

Why it matters

One impediment to the development of hands-on or experiential science education may sometimes lie in the difficulty for teachers to manage a class conducting science experiments. While it has a cost, having assistance during these learning practices may facilitate their wider adoption.

Primary education

Change at the OECD level: moderate

The expansion of this practice has outweighed its contraction, yielding an average net increase of 6 percentage points between 2007 and 2015. Negative and positive changes taken together, the absolute average change was 8 percentage points, corresponding to a moderate effect size of 0.26. In 2015, 19% of primary students had teachers with assistance available during science experiments in OECD systems, ranging from 4% in Germany, the Czech Republic and Lithuania to 62% in England (United Kingdom).

Countries where there has been the most change

The positive changes in this area are mostly above 10 percentage points with Japan (26) and Singapore (23) topping the list. On the other hand, the negative changes were quite small in magnitude. At 6 percentage points and 5 percentage points, Norway and Lithuania registered the biggest declines.

Secondary education

Change at the OECD level: moderate-low

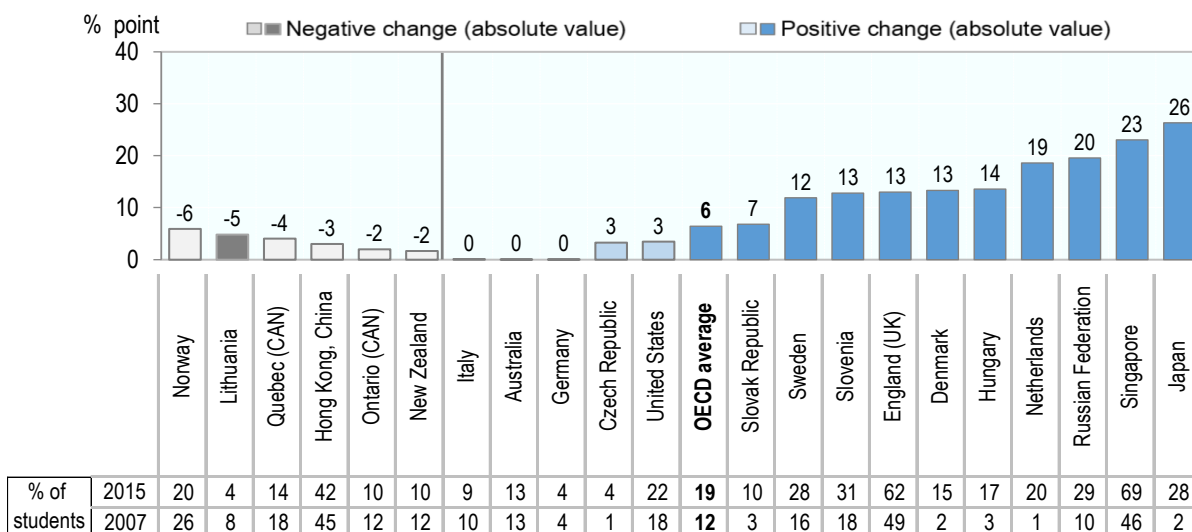
More countries have experienced an increase in this practice than a decrease. The average net increase for the covered OECD systems stood at 4 percentage points. Taking increases and decreases into account, the absolute average change was 9 percentage points, corresponding to a moderate-low effect size of 0.24. The share of 8th grade students having teachers with assistance available during science experiments amounted to 45% in 2015, with strong variations going from 95% in Quebec (Canada) to 12% in Italy and 13% in Turkey.

Countries where there has been the most change

Innovation took the shape of substantial expansions or contractions of this practice. In Japan, the share of secondary students with teacher assistance for science experiments increased by 32 percentage points between 2007 and 2015, the biggest increase, followed by Hungary (17 percentage points). Conversely, the Russian Federation experienced a sharp decline by 30 percentage points in this practice, as did Korea, where the share of concerned students fell by 16 percentage points.

Figure 13.25. 4th grade teachers with assistance when students are conducting experiments

Change in and share of students whose teachers have assistance available when they are conducting experiments, 2007-2015, school principals report



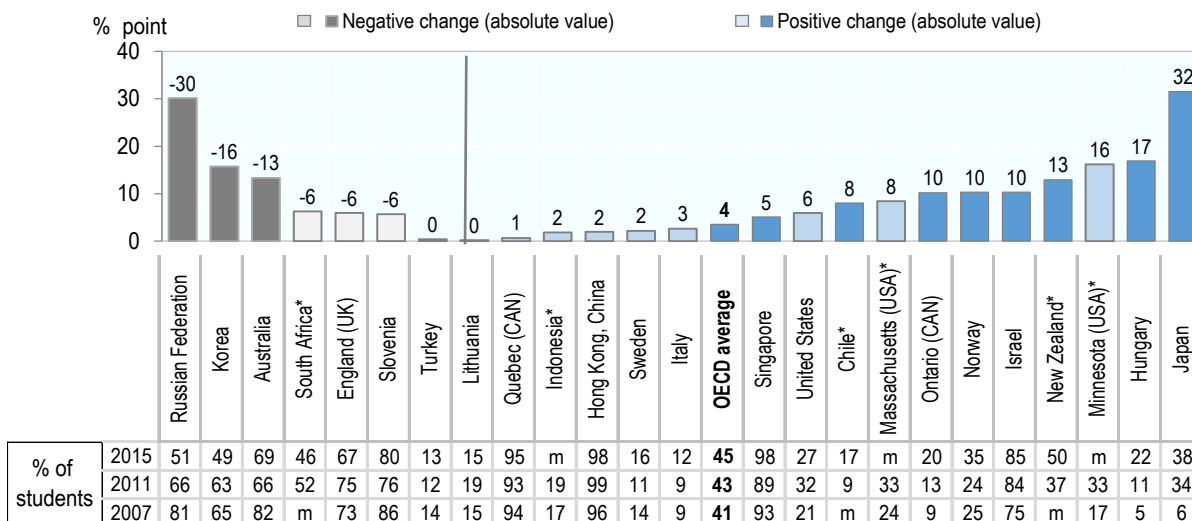
Note: Darker tones correspond to statistically significant values.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906443>

Figure 13.26. 8th grade teachers with assistance when students are conducting experiments

Change in and share of students whose teachers have assistance available when they are conducting experiments, 2007-2015, school principals report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906462>

85. Discussing how to teach a particular topic

Why it matters

An important aspect of teacher professional development lies in their participation in “professional learning communities” or “learning organisations”. Teachers improve their professional practice by reflecting on others’ practices and by learning from their peers. A key facet of this collaboration is for example a mere exchange of ideas or discussion about their teaching practice with teachers teaching the same subject or topic, a practice more common than peer observation.

Primary education

Change at the OECD level: moderate

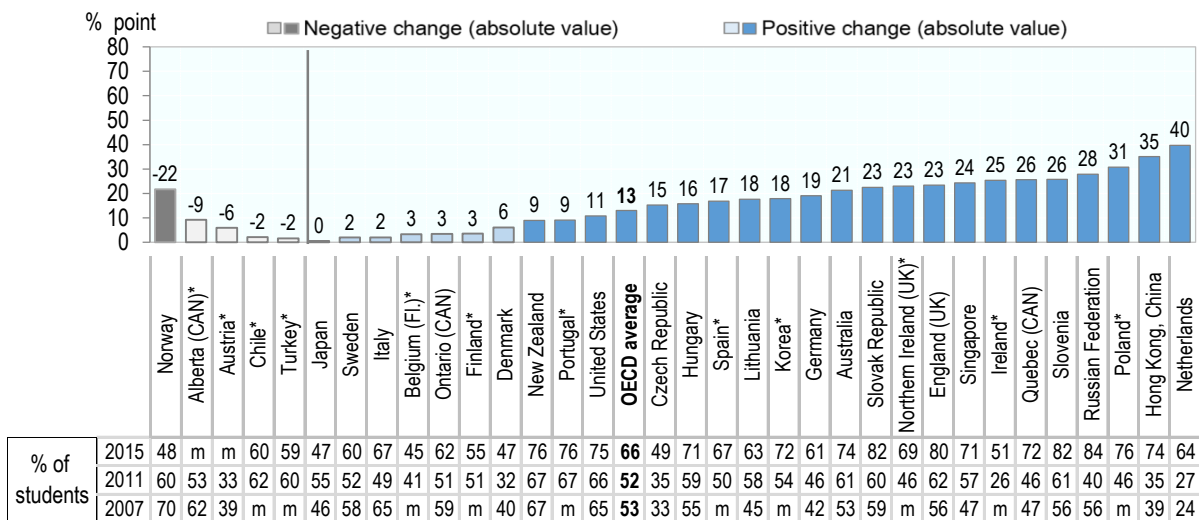
At the OECD level, this practice increased by 13 percentage points on average. Increases and decreases taken together yielded an average absolute change of 15 percentage points, corresponding to a moderate effect size of 0.33. The practice is common across OECD systems. In 2015, 66% of students had teachers who frequently discuss teaching with a colleague, with a span ranging from 45% in Belgium (Fl.) to 82% in Slovakia.

Countries where there has been the most change

The increase of this practice has been a significant innovation in several countries. The Netherlands recorded the largest increase (45 percentage points), but Hong Kong, China and Poland also experienced increases above 30 percentage points. Only Norway experienced a significant decrease (22 percentage points).

Figure 13.27. 4th grade teachers discussing how to teach a particular topic

Change in and share of students whose teachers discuss with peers how to teach a particular topic very often or often, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906272>

Secondary education

Mathematics

Change at the OECD level: large

All countries covered experienced an increase in the use of this informal professional development practice in mathematics at the secondary level. The average net increase and absolute change were both 21 percentage points, corresponding to a large absolute effect size of 0.43. This was an area of strong innovation. In 2015, mathematics teachers who frequently discussed the teaching of a particular topic with other colleagues taught on average 62% of 8th grade students, with a span ranging from 78% in Israel to 39% in Japan.

Countries where there has been the most change

Innovation took the form of large increases in the share of students whose teachers often engage in these professional discussions. This was a major innovation in Israel, where the practice spread by 43 percentage points, followed by the Russian Federation, Australia and Italy where increases exceeded 30 percentage points.

Science

Change at the OECD level: large

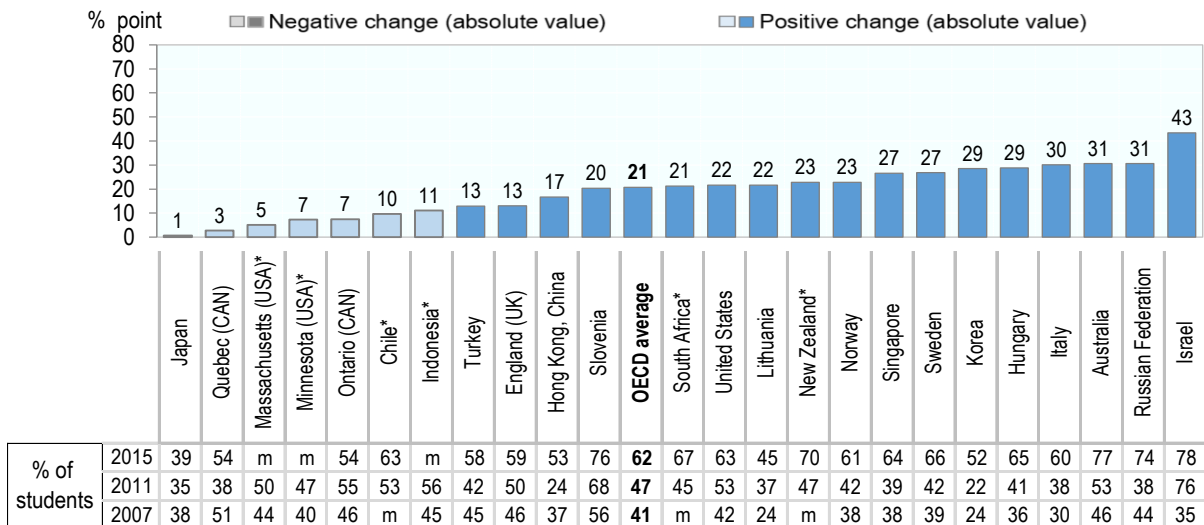
At the secondary level, the use of this practice among science teachers also increased in all OECD countries between 2007 and 2015. On average across the OECD region, 60% of secondary students had teachers frequently discussing the teaching of a topic with a colleague in 2015, against 39% in 2007. The overall change was 21 percentage points, corresponding to a large effect size of 0.44. Innovation was notable in this domain. The share of students taught by science teachers engaged in this kind of informal training ranged from 31% in Japan to 83% in Israel.

Countries where there has been the most change

Like in mathematics, 8th grade science teachers in Israel changed the most in this domain, with an increase of 48 percentage points in the share of concerned students. The Russian Federation, Slovenia and Italy also experienced a scale up of this practice above 30 percentage points. Overall, the change has been significant in a large number of countries.

Figure 13.28. 8th grade maths teachers discussing how to teach a particular topic

Change in and share of students whose teachers discuss with peers how to teach a particular topic very often or often, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

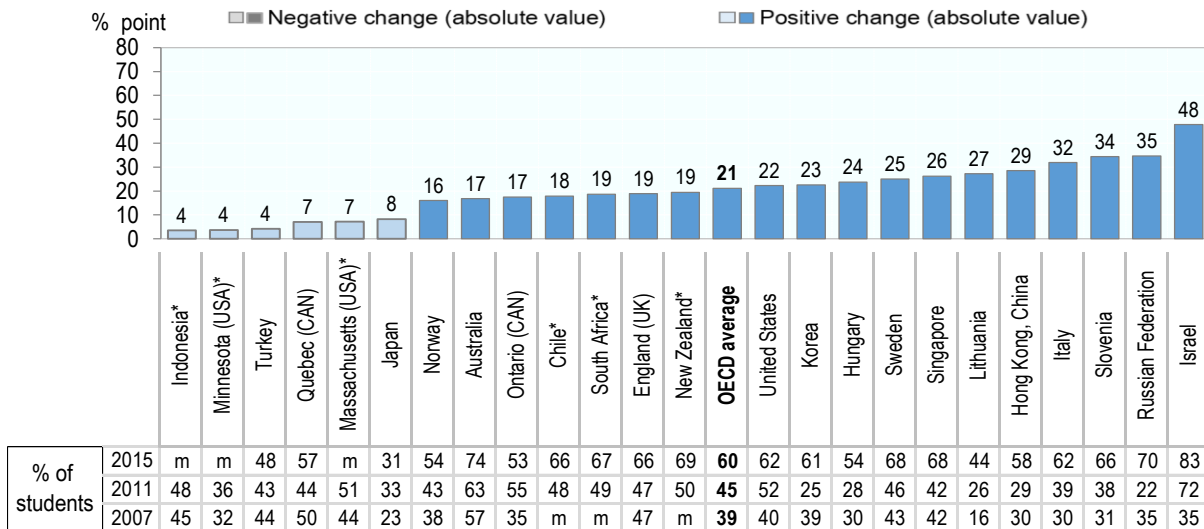
The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906291>

Figure 13.29. 8th grade science teachers discussing how to teach a particular topic

Change in and share of students whose teachers discuss with peers how to teach a particular topic very often or often, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906310>

86. Collaborating in planning and preparing instructional material

Why it matters

Collaborating in planning and preparing instructional material is one of those activities that can structure professional learning communities. It may happen within schools or outside of schools, for example through collaborative teacher platforms. Because it allows teachers to share their views and learn from others’ practices, collaboration in planning and preparing instructional is a strong source of professional development.

Primary education

Change at the OECD level: moderate

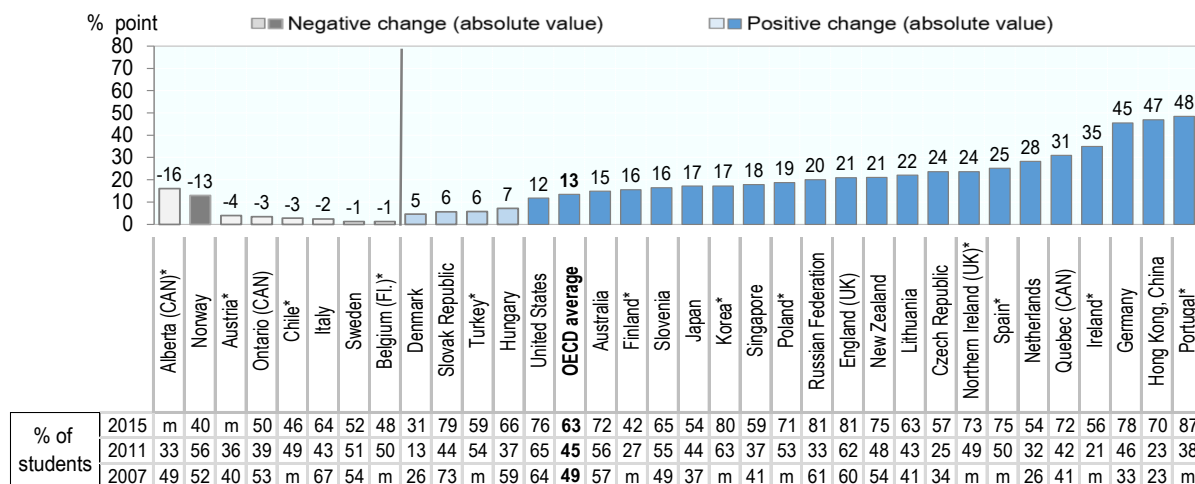
In primary education, this practice mainly expanded. With 63% of 4th grade students having teachers frequently collaborating with other teachers in planning and preparing instructional material in 2015, the OECD average has increased by 13 percentage points since 2007. The absolute change, mirroring both positive and negative trends, was 16 percentage points on average, corresponding to a moderate effect size of 0.33. The share of students with teachers often using this informal development practice ranged from 31% in Denmark to 87% in Portugal in 2015.

Countries where there has been the most change

Hong Kong, China and Germany saw this practice skyrocket with an increase over 45 percentage points between 2007 and 2015. Portugal witnessed a change of similar magnitude between 2011 and 2015. The practice gained significant ground in many other countries.

Figure 13.30. 4th grade teachers collaborating in planning and preparing lessons

Change in and share of students whose teachers collaborate with peers in planning and preparing instructional material often or very often, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906329>

Secondary education

Mathematics

Change at the OECD level: large

Apart from Japan and Minnesota (United States), all OECD systems experienced an expansion of this practice for secondary maths education, with an average net increase of 17 percentage points. The absolute change, accounting for increases and reductions, amounted to 20 percentage points, corresponding to a large effect size of 0.42. In 2015, on average 56% of 8th grade students were taught by teachers frequently collaborating to plan and prepare their instructional material, with a span ranging from 78% in Israel to 30% in Japan.

Countries where there has been the most change

Israel experienced the most innovation in this domain, with an expansion of 38 percentage points in this practice. Teachers in Italy and New Zealand also strongly innovated with an increase of 30 percentage points in the share of students with maths teachers working with colleagues to prepare their instructional materials. Only three negative changes were recorded across the sample, including two that are substantial and represent an innovation. Japan and Indonesia experienced a decline of 26 percentage points in this type of collaborative practice.

Science

Change at the OECD level: moderate

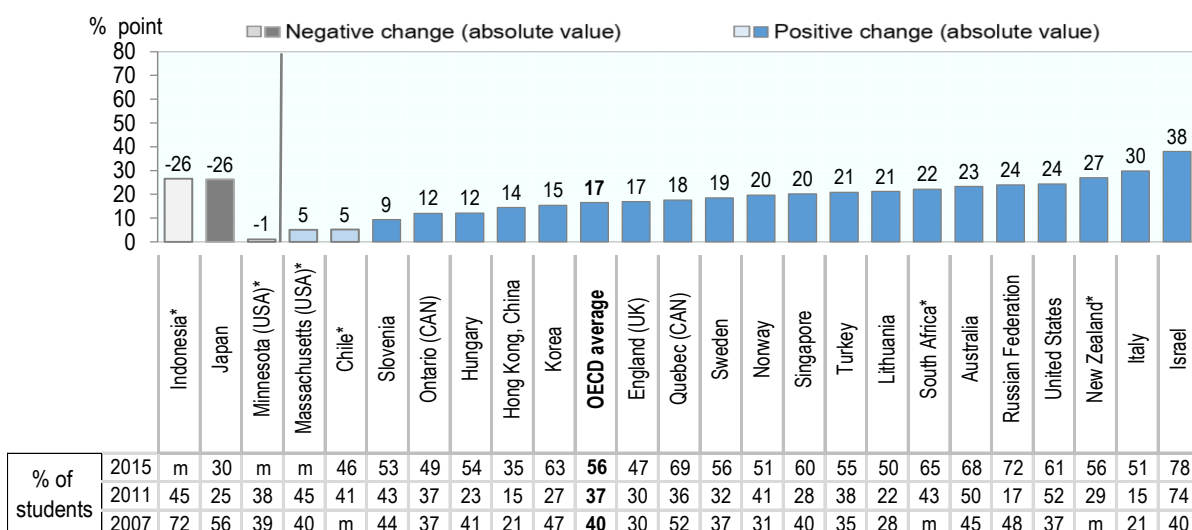
All OECD systems saw an increase in this form of teacher collaboration in 8th grade science. The share of secondary students with teachers frequently collaborating with colleagues to prepare and plan their science instructional materials rose by 19 percentage points between 2007 and 2015. The absolute change was of the same magnitude, corresponding to a moderate effect size of 0.29. Across OECD countries, science teachers frequently engaged in this collaborative practice taught 55% of 8th grade students in 2015, ranging from 29% in Japan to 78% in Israel.

Countries where there has been the most change

Innovation occurred through an increase in the use of this practice. Israel stands out with an increase of 43 percentage points, followed by New Zealand and Italy with increases of over 30 percentage points. A significant number of countries also saw large or moderate increases. Only Indonesia experienced a fall of 15 percentage points in this collaborative practice between 2007 and 2011.

Figure 13.31. 8th grade maths teachers collaborating in planning and preparing lessons

Change in and share of students whose teachers collaborate with peers in planning and preparing instructional material often or very often, 2007-2015, teachers report.

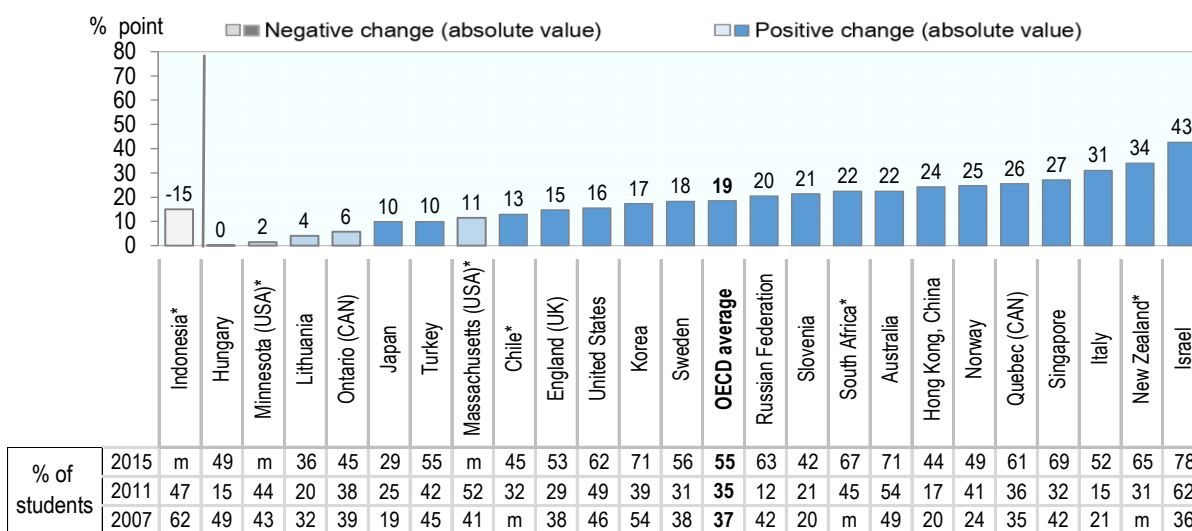


Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906348>

Figure 13.32. 8th grade science teachers collaborating in planning and preparing lessons

Change in and share of students whose teachers collaborate with peers in planning and preparing instructional material often or very often, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.
 * refers to calculations based on other years, based on data availability.
 The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.
 Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906367>

87. Visiting another classroom to learn more about teaching

Why it matters

An important source of teacher professional development comes from their participation in “professional learning communities” or “learning organisations”. Teachers improve their professional practice by reflecting on others’ practices and learn from each other. One professional practice that often contributes to this form of learning is the observation of other teachers in the teaching process. This practice is increasingly encouraged across countries.

Primary education

Change at the OECD level: large

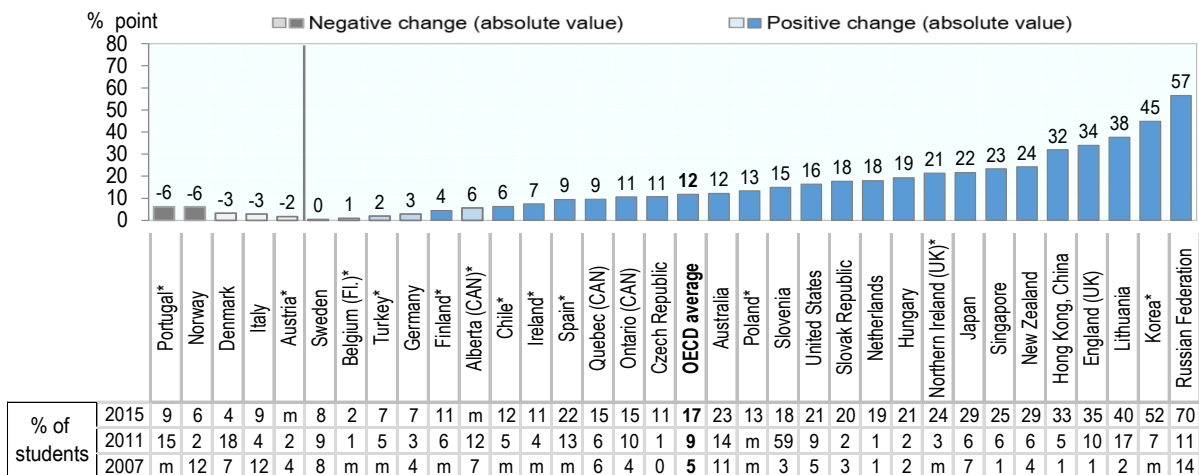
This practice has more often expanded than decreased across OECD systems. On average, the share of 4th grade students instructed by a teacher regularly visiting a colleague’s classroom to learn about teaching increased by 12 percentage points. The absolute mean change, regardless of the direction, amounted to 13 percentage points, corresponding to a large effect size of 0.44. This practice is also a novelty as only 17% of the students with teachers reporting to undertake this professional collaboration practice in 2015, as opposed to only 5% in 2007.

Countries where there has been the most change

This practice has been a major innovation in many countries. The Russian Federation experienced an outstanding increase of 57 percentage points between 2007 and 2015, and Lithuania, England and Hong Kong, China, an increase over 30 percentage points. In Korea, the practice also expanded by 45% between 2011 and 2015.

Figure 13.33. 4th grade teachers visiting a colleague’s classroom to learn about teaching

Change in and share of students whose teachers visit another classroom often or very often to learn more about teaching, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906386>

Secondary education

Mathematics

Change at the OECD level: large

In most OECD countries, more maths teachers have visited another classroom to learn about their maths teaching. The share of 8th grade students with teachers regularly visiting colleagues' classrooms has increased by 13 percentage points on average. The absolute change was also 13 percentage points, corresponding to a large effect size of 0.45. The practice remains relatively uncommon across OECD education systems: on average, maths teachers frequently taking part in peer observation taught 18% of 8th grade students in 2015, with a span ranging from 40% in Turkey to 4% in Quebec (Canada). This is a novelty that emerged in the last decade as teachers with such collaborative practice only taught 4% of secondary students on average in 2007.

Countries where there has been the most change

Innovation took the form of large increases. The share of 8th grade students with teachers frequently visiting other colleagues' classroom to improve their teaching strongly increased in the Russian Federation between 2007 and 2015 (40 percentage points). Korea and Turkey also experience big innovation in this domain, with increases of 38 and 37 percentage points respectively.

Science

Change at the OECD level: large

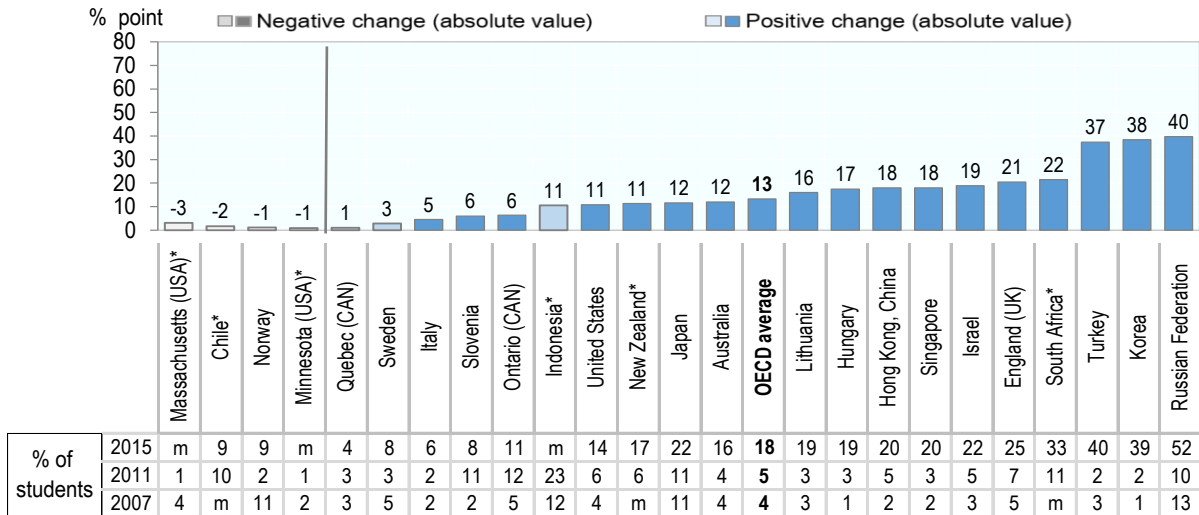
All OECD countries covered experienced an expansion of this teacher practice among secondary science teachers, resulting in a net increase and absolute change of 15 percentage points between 2007 and 2015. This corresponds to a large absolute effect size of 0.5. This has been a big innovation in this domain. In OECD countries, teachers who frequently engage in this practice taught on average 18% of 8th grade science students in 2015, with a span ranging from 37% in Korea and Turkey to 2% in Quebec (Canada). Like for maths teachers, this is a novelty that emerged in the last decade: science teachers with such collaborative practice only taught 3% of secondary students on average in 2007.

Countries where there has been the most change

While this has been a big innovation in many countries, Korea, Turkey and the Russian Federation are by far the countries that experienced the largest increases (around 35 percentage points). With increases above 20 percentage points of the students taught by teachers engaged in this collaborative practice, Hong Kong, China, Israel and England also experienced significant innovation in this area. No negative change was recorded.

Figure 13.34. 8th grade maths teachers visiting a colleague’s classroom to learn about teaching

Change in and share of students whose teachers visit another classroom often or very often to learn more about teaching, 2007-2015, teachers report



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

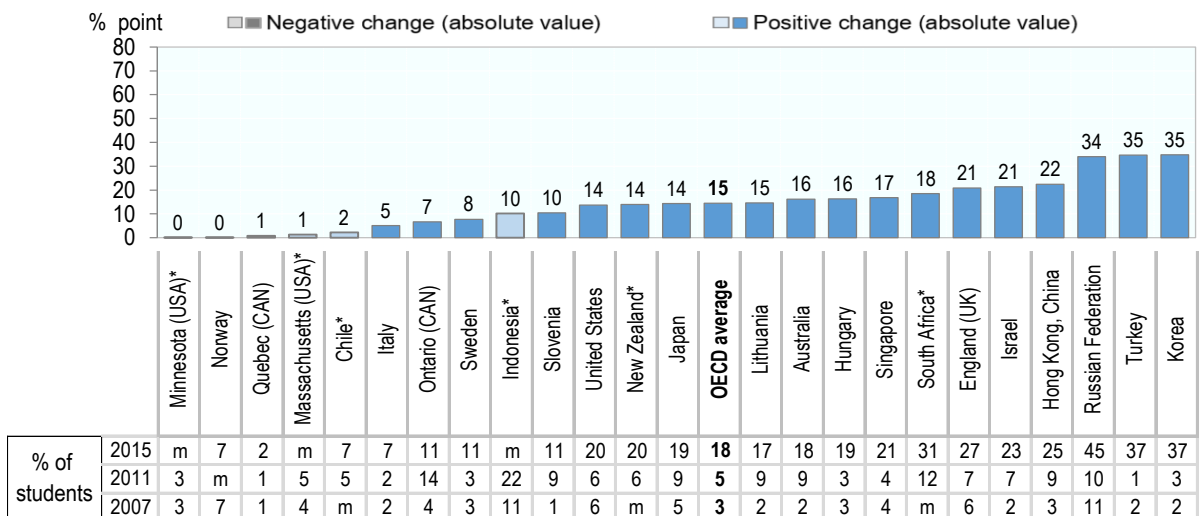
The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906405>

Figure 13.35. 8th grade science teachers visiting a colleague’s classroom to learn about teaching

Change in and share of students whose teachers visit another classroom often or very often to learn more about teaching, 2007-2015, teachers report.



Note: Darker tones correspond to statistically significant values.

* refers to calculations based on other years, based on data availability.

The OECD average is based on OECD countries with available data in 2007, 2011 and 2015.

Source: Authors' calculations based on TIMSS Databases.

StatLink <https://doi.org/10.1787/888933906424>

Table 13.1. Effect sizes for changes in teacher professional development in mathematics

	Teacher participation in a program on mathematics content		Teacher participation in a program on maths pedagogy		Teacher participation in a program on maths curriculum		Teacher participation in a program integrate to information technology into maths		Teacher participation in a program to improve students' critical thinking or problem-solving skills in maths		Teacher participation in a program on mathematics assessments	
	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade
Australia	0.01	-0.07	0.03	0.11	-0.11	0.07	0.02	0.05	-0.03	0.08	-0.16	-0.21
Austria	0.41	m	0.47	m	0.55	m	0.30	m	m	m	0.81	m
Belgium (Fl.)	0.07	m	0.15	m	0.05	m	0.09	m	m	m	-0.60	m
Canada (Alberta)	0.30	m	0.34	m	0.33	m	0.34	m	m	m	0.54	m
Canada (Ontario)	0.03	-0.19	0.32	0.12	-0.40	-0.40	0.15	0.20	0.60	0.31	0.07	-0.16
Canada (Quebec)	0.52	-0.14	0.49	-0.35	-0.20	-1.10	0.57	0.89	0.15	-0.10	0.16	-0.80
Chile	-0.07	-0.29	0.04	-0.09	0.08	-0.17	-0.19	-0.45	m	-0.07	-0.47	-0.25
Czech Republic	0.02	m	-0.08	m	-0.32	m	0.13	m	-0.05	m	-0.33	m
Denmark	-0.01	m	0.01	m	0.03	m	0.03	m	0.02	m	0.22	m
Finland	-0.13	m	-0.06	m	0.02	m	0.06	m	m	m	-0.76	m
Germany	0.00	m	-0.06	m	-0.08	m	-0.26	m	0.09	m	-0.17	m
Hungary	-0.66	-0.46	-0.59	-0.35	-0.28	-0.32	0.11	0.12	-0.21	-0.37	-0.39	-0.27
Ireland	0.29	m	0.10	m	0.08	m	0.07	m	m	m	-0.18	m
Israel	m	0.24	m	0.18	m	0.19	m	0.65	m	-0.04	m	0.02
Italy	-0.16	0.25	0.06	0.13	0.15	0.37	-0.16	-0.03	-0.04	0.44	-0.04	0.17
Japan	-0.01	-0.11	0.06	-0.21	0.01	-0.06	0.11	0.24	0.11	-0.23	-0.10	-0.37
Korea	0.01	0.07	-0.01	0.25	-0.05	0.06	0.16	0.04	m	0.26	0.16	0.27
Lithuania	-0.11	-0.55	-0.17	-0.43	-0.12	-0.29	0.09	0.01	0.06	0.02	0.33	0.06
Netherlands	0.32	m	0.32	m	0.32	m	0.00	m	0.09	m	0.28	m
New Zealand	-0.23	0.06	-0.13	0.05	-0.34	-0.25	0.32	0.11	0.11	-0.19	-0.12	0.02
Norway	-0.19	-0.50	-0.30	-0.33	-0.47	-0.75	0.13	0.03	-0.05	-0.16	0.29	0.01
Poland	0.54	m	0.77	m	0.49	m	0.71	m	m	m	-0.41	m
Portugal	-0.24	m	-0.36	m	-0.25	m	-0.28	m	m	m	-0.43	m
Slovak Republic	-0.26	m	-0.71	m	-0.41	m	-0.37	m	-0.32	m	-0.34	m
Slovenia	-0.52	-0.22	-0.42	-0.15	-0.16	-0.60	0.10	-0.14	0.27	0.00	-0.50	-0.66
Spain	0.29	m	0.20	m	0.11	m	-0.12	m	m	m	-0.38	m
Sweden	0.49	0.36	0.34	0.46	0.22	0.04	0.20	0.29	0.63	0.49	0.49	0.13
Turkey	-0.20	-0.61	-0.16	-0.44	-0.20	-0.92	-0.11	0.21	m	0.05	-0.34	0.11
UK (England)	0.07	-0.15	-0.05	-0.34	0.13	0.07	-0.28	-0.43	-0.14	0.07	0.14	-0.32
UK (Northern Ireland)	-0.10	m	0.00	m	-0.14	m	-0.32	m	m	m	0.32	m
United States	0.22	-0.06	0.24	-0.14	0.15	0.09	0.04	0.09	0.21	-0.06	0.02	-0.18
US (Massachusetts)	m	-0.55	m	-0.34	m	0.16	m	-0.22	m	-0.34	m	-0.07
US (Minnesota)	m	0.10	m	0.04	m	0.14	m	0.41	m	-0.30	m	0.04
OECD (average)	-0.01	-0.10	-0.02	-0.07	-0.09	-0.22	0.04	0.15	0.08	0.05	-0.03	-0.16
OECD (av. absolute)	0.22	0.25	0.25	0.26	0.22	0.36	0.18	0.24	0.19	0.19	0.22	0.26
Hong Kong, China	0.09	-0.32	0.01	-0.14	-0.34	-0.45	0.41	-0.11	-0.01	-0.38	-0.26	-0.26
Indonesia	m	0.00	m	-0.40	m	-0.12	m	0.17	m	0.03	m	0.05
Russian Federation	-0.59	-0.30	-0.49	0.16	0.00	0.10	0.32	0.26	-0.15	-0.39	0.21	-0.14
Singapore	0.11	-0.30	0.27	0.04	0.19	0.00	0.15	-0.27	-0.16	-0.16	0.20	-0.20
South Africa	m	0.29	m	0.17	m	0.39	m	0.21	m	0.09	m	0.09

Effect size from -0.5 to -0.2 and from 0.2 and 0.5

Effect size from -0.8 to -0.5 and from 0.5 and 0.8

Effect size equals or less than -0.8 and equals or greater than 0.8

Source: Authors' calculations based on TIMSS (2007, 2011 and 2015).

StatLink  <https://doi.org/10.1787/888933906481>

Table 13.2. Effect sizes for changes in teacher professional development in science

	Teacher participation in a program on science content		Teacher participation in a program on science pedagogy		Teacher participation in a program on science curriculum		Teacher participation in a program to integrate information technology into science		Teacher participation in a program to improve students' critical thinking or problem-solving skills in science		Teacher participation in a program on science assessments	
	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade	4th Grade	8th Grade
Australia	0.21	0.10	0.27	0.07	0.35	0.23	-0.10	-0.08	-0.10	-0.04	0.03	-0.24
Austria	0.20	m	0.05	m	0.50	m	-0.10	m	m	m	0.60	m
Belgium (Fl.)	-0.05	m	-0.10	m	0.06	m	-0.01	m	m	m	-0.01	m
Canada (Alberta)	-0.27	m	-0.27	m	-0.14	m	-0.12	m	m	m	0.37	m
Canada (Ontario)	-0.09	-0.42	0.06	-0.06	-0.30	-0.36	0.01	0.04	0.22	0.13	-0.02	-0.16
Canada (Quebec)	0.07	-0.25	0.07	-0.12	-0.03	-0.69	0.29	0.38	0.06	-0.16	0.07	-0.61
Chile	-0.04	-0.14	0.00	-0.07	-0.18	-0.13	-0.21	-0.38	m	-0.19	-0.39	-0.03
Czech Republic	-0.02	m	-0.14	m	-0.45	m	0.27	m	-0.18	m	-0.32	m
Denmark	-0.14	m	-0.15	m	-0.11	m	0.05	m	0.12	m	0.13	m
Finland	-0.37	m	-0.18	m	0.14	m	0.10	m	m	m	-0.49	m
Germany	0.00	m	0.10	m	-0.08	m	-0.02	m	0.02	m	-0.09	m
Hungary	-0.62	-0.36	-0.56	-0.29	-0.31	-0.27	-0.11	0.05	-0.36	-0.39	-0.13	-0.31
Ireland	-0.12	m	-0.04	m	-0.11	m	-0.13	m	m	m	-0.20	m
Israel	m	-0.04	m	-0.03	m	-0.32	m	0.10	m	-0.03	m	-0.34
Italy	-0.14	0.01	0.02	-0.03	0.06	0.25	-0.12	0.25	-0.01	0.21	-0.08	0.01
Japan	0.10	0.02	-0.06	0.26	-0.10	0.05	-0.07	0.13	0.00	0.24	-0.14	-0.25
Korea	-0.07	-0.01	-0.04	0.54	-0.09	0.47	0.16	0.33	m	0.16	0.14	0.31
Lithuania	-0.19	-0.30	-0.24	-0.29	0.20	-0.25	0.27	-0.09	0.05	-0.10	0.09	-0.03
Netherlands	-0.08	m	-0.03	m	0.14	m	-0.10	m	0.10	m	-0.18	m
New Zealand	0.31	-0.01	0.40	-0.18	0.18	-0.41	0.03	0.10	-0.21	-0.10	-0.01	-0.07
Norway	0.14	-0.46	0.30	-0.48	-0.19	-0.66	-0.10	-0.40	0.13	-0.07	0.24	0.20
Poland	0.83	m	0.65	m	0.71	m	0.87	m	m	m	-0.22	m
Portugal	-0.27	m	-0.39	m	-0.43	m	-0.23	m	m	m	-0.65	m
Slovak Republic	-0.30	m	-0.79	m	-0.37	m	-0.12	m	-0.16	m	-0.42	m
Slovenia	-0.81	-0.21	-0.92	0.34	-0.30	0.13	-0.04	0.44	0.02	0.28	-0.64	-0.54
Spain	-0.06	m	-0.04	m	0.06	m	-0.10	m	m	m	-0.25	m
Sweden	0.22	-0.18	0.25	0.06	0.25	0.03	0.05	0.47	-0.03	0.06	0.32	-0.10
Turkey	-0.26	-0.85	-0.19	-0.87	-0.12	-1.29	-0.02	-0.14	m	-0.21	-0.15	-0.34
UK (England)	0.12	-0.19	-0.19	-0.25	0.26	-0.18	-0.29	-0.22	-0.20	-0.12	-0.15	-0.19
UK (Northern Ireland)	0.02	m	0.07	m	-0.08	m	0.04	m	m	m	-0.17	m
United States	-0.01	-0.16	0.09	0.01	-0.03	-0.15	0.00	-0.17	0.10	-0.13	-0.06	-0.27
US.(Massachusetts)	m	-0.24	m	-0.05	m	-0.03	m	-0.08	m	-0.14	m	-0.15
US (Minnesota)	m	-0.38	m	-0.16	m	-0.23	m	0.04	m	-0.07	m	-0.07
OECD (average)	-0.05	-0.20	-0.09	-0.05	-0.05	-0.17	-0.02	0.09	-0.04	0.00	-0.10	-0.20
OECD (av. absolute)	0.20	0.23	0.26	0.24	0.21	0.36	0.10	0.23	0.12	0.16	0.18	0.28
Hong Kong, China	-0.23	-0.22	-0.07	-0.19	-0.04	-0.26	-0.01	-0.09	0.15	-0.44	-0.13	-0.32
Indonesia	m	0.26	m	-0.31	m	-0.13	m	0.39	m	0.14	m	-0.01
Russian Federation	-0.43	0.23	-0.42	0.07	0.09	0.20	0.26	0.23	0.15	0.17	0.22	0.11
Singapore	0.07	-0.19	0.23	0.15	0.21	-0.25	-0.02	-0.05	0.08	-0.11	0.25	-0.10
South Africa	m	0.34	m	0.31	m	0.33	m	0.23	m	0.20	m	0.10

Effect size from -0.5 to -0.2 and from 0.2 and 0.5

Effect size from -0.8 to -0.5 and from 0.5 and 0.8

Effect size equals or less than -0.8 and equals or greater than 0.8

Source: Authors' calculations based on TIMSS (2007, 2011 and 2015).

StatLink  <https://doi.org/10.1787/888933906500>

Table 13.3. Effect sizes for changes in teacher collaboration practices

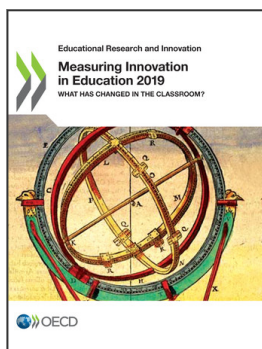
	Discussing how to teach a particular topic			Collaborating in planning and preparing instructional material			Visiting another classroom to learn more about teaching			Assistance for teachers when students are conducting science experiments	
	4th Grade	8th Grade Maths	8th Grade Science	4th Grade	8th Grade Maths	8th Grade Science	4th Grade	8th Grade Maths	8th Grade Science	4th Grade	8th Grade
Australia	0.44	0.64	0.36	0.31	0.47	0.46	0.33	0.41	0.60	0.00	-0.31
Austria	-0.12	m	m	-0.08	m	m	-0.10	m	m	m	m
Belgium (Fl.)	0.07	m	m	-0.03	m	m	0.07	m	m	m	m
Canada (Alberta)	-0.18	m	m	-0.33	m	m	0.19	m	m	m	m
Canada (Ontario)	0.07	0.15	0.35	-0.07	0.24	0.12	0.38	0.24	0.26	-0.06	0.29
Canada (Quebec)	0.53	0.06	0.14	0.64	0.36	0.52	0.32	0.05	0.07	-0.11	0.03
Chile	-0.04	0.20	0.36	-0.06	0.11	0.27	0.23	-0.06	0.09	m	0.24
Czech Republic	0.31	m	m	0.48	m	m	0.58	m	m	0.22	m
Denmark	0.12	m	m	0.10	m	m	-0.14	m	m	0.52	m
Finland	0.07	m	m	0.33	m	m	0.16	m	m	m	m
Germany	0.38	m	m	0.95	m	m	0.13	m	m	0.00	m
Hungary	0.33	0.59	0.49	0.15	0.24	0.00	0.69	0.66	0.56	0.48	0.52
Ireland	0.53	m	m	0.74	m	m	0.30	m	m	m	m
Israel	m	0.91	1.02	m	0.80	0.89	m	0.62	0.75	m	0.26
Italy	0.04	0.62	0.65	-0.05	0.64	0.66	-0.10	0.24	0.26	0.00	0.09
Japan	0.01	0.01	0.19	0.35	-0.54	0.23	0.59	0.32	0.46	0.85	0.82
Korea	0.37	0.60	0.45	0.39	0.31	0.36	1.07	1.16	1.03	m	-0.32
Lithuania	0.36	0.46	0.61	0.45	0.44	0.09	1.07	0.56	0.54	-0.21	0.01
Netherlands	0.82	m	m	0.59	m	m	0.69	m	m	0.71	m
New Zealand	0.20	0.47	0.40	0.45	0.55	0.69	0.71	0.37	0.43	-0.05	0.05
Norway	-0.45	0.46	0.32	-0.26	0.40	0.52	-0.22	-0.04	0.00	-0.14	0.23
Poland	0.64	m	m	0.39	m	m	0.75	m	m	m	m
Portugal	0.20	m	m	1.06	m	m	-0.19	m	m	m	m
Slovak Republic	0.50	m	m	0.13	m	m	0.61	m	m	0.28	m
Slovenia	0.57	0.43	0.70	0.33	0.19	0.47	0.52	0.30	0.49	0.30	-0.15
Spain	0.34	m	m	0.53	m	m	0.25	m	m	m	m
Sweden	0.04	0.55	0.51	-0.03	0.37	0.37	0.01	0.11	0.31	0.29	0.06
Turkey	-0.03	0.26	0.08	0.12	0.42	0.20	0.09	1.05	1.00	m	-0.01
UK (England)	0.51	0.26	0.38	0.47	0.35	0.30	1.06	0.61	0.59	0.26	-0.13
UK (Northern Ireland)	0.47	m	m	0.49	m	m	0.69	m	m	m	m
United States	0.24	0.44	0.45	0.26	0.49	0.31	0.52	0.40	0.42	0.09	0.14
US (Massachusetts)	m	0.10	0.14	m	0.10	0.23	m	-0.24	0.06	m	0.19
US (Minnesota)	m	0.15	0.08	m	-0.02	0.03	m	-0.08	0.00	m	0.38
OECD (average)	0.26	0.42	0.43	0.27	0.33	0.37	0.39	0.45	0.51	0.18	0.07
OECD (av. absolute)	0.33	0.43	0.44	0.33	0.42	0.39	0.45	0.45	0.51	0.26	0.24
Hong Kong, China	0.73	0.34	0.58	0.98	0.33	0.53	0.99	0.62	0.72	-0.06	0.12
Indonesia	m	0.22	0.07	m	-0.55	-0.30	m	0.28	0.28	m	0.05
Russian Federation	0.62	0.64	0.71	0.45	0.49	0.41	1.23	0.89	0.79	0.51	-0.65
Singapore	0.50	0.54	0.53	0.36	0.41	0.55	0.81	0.63	0.55	0.47	0.26
South Africa	m	0.43	0.38	m	0.45	0.46	m	0.54	0.46	m	-0.13

Effect size from -0.5 to -0.2 and from 0.2 and 0.5

Effect size from -0.8 to -0.5 and from 0.5 and 0.8

Effect size equals or less than -0.8 and equals or greater than 0.8

Source: Authors' calculations based on TIMSS (2007, 2011 and 2015).



From:
Measuring Innovation in Education 2019
What Has Changed in the Classroom?

Access the complete publication at:
<https://doi.org/10.1787/9789264311671-en>

Please cite this chapter as:

Vincent-Lancrin, Stéphan, *et al.* (2019), "Innovation in teacher professional development and collaborative practices", in Stéphan Vincent-Lancrin, *et al.*, *Measuring Innovation in Education 2019: What Has Changed in the Classroom?*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/f296ef24-en>

This work is published under the responsibility of the Secretary-General of the OECD. The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org. Requests for permission to photocopy portions of this material for public or commercial use shall be addressed directly to the Copyright Clearance Center (CCC) at info@copyright.com or the Centre français d'exploitation du droit de copie (CFC) at contact@cfcopies.com.