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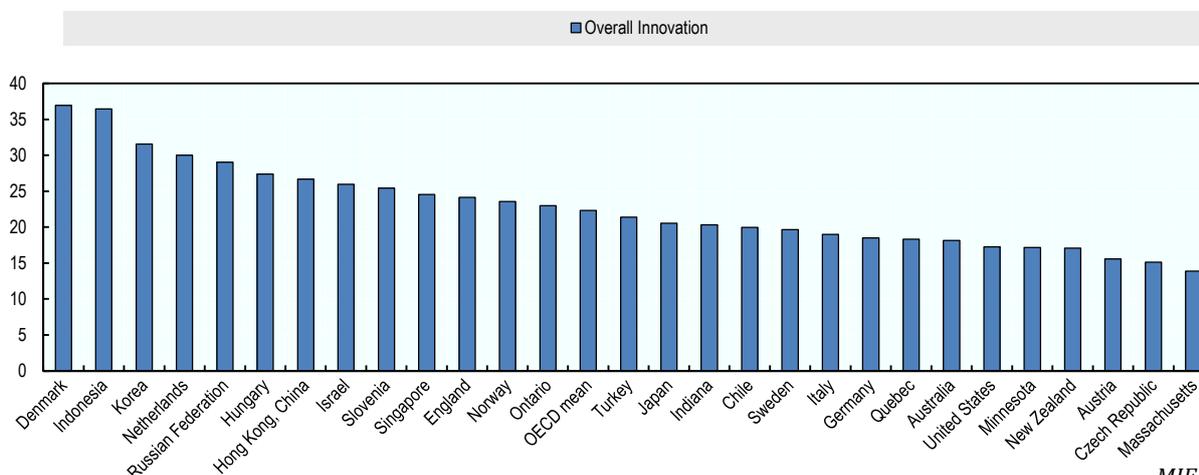
The purpose of the *Measuring Innovation in Education* report

The ability to measure innovation is essential to an improvement strategy in education. Knowing whether, and how much, practices are changing within classrooms and educational organisations, how teachers develop and use their pedagogical resources, and to what extent change can be linked to improvements would provide a substantial increase in the international education knowledge base.

The OECD *Measuring Innovation in Education* report offers new perspectives to address this need for measurement in educational innovation through a comparison of innovation in education to innovation in other sectors, identification of specific innovations across educational systems, and construction of metrics to examine the relationship between educational innovation and changes in educational outcomes. This brief provides a short overview of the key findings of the report, as well as the top pedagogic and organisational innovations in Ontario (Canada) identified by this report.

Key findings on innovation in education – did you know?

Overall composite innovation index, 2000-2011



MIE Figure 17.1

- In education, innovation can take place through either significant changes in the use of a particular educational practice or the emergence of new practices in an educational system.
- Contrary to common belief, there is a fair level of innovation in the education sector, both relative to other sectors and in absolute terms.
- Within education, innovation intensity is greatest in higher education, with secondary and primary education approximately equal.
- Compared to other sectors, knowledge and method innovation is above average in education, product and service innovation is below average, and technology innovation is at the average sectorial level.
- In Europe, higher education stands out in terms of speed of adopting innovation compared to the economy average as well as the rates in primary and secondary education.

- There have been large increases in innovative pedagogic practices across all countries studied for this report in areas such as relating lessons to real life, higher order skills, data and text interpretation and personalisation of teaching.
- In their pedagogic practice, educators have innovated in their use of assessments and in the accessibility and use of support resources for instruction.
- Educational organisations have innovated in the areas of special education, creation of professional learning communities for teachers, evaluation and analytics and relationship building with external stakeholders, such as parents.
- In general, countries with greater levels of innovation see increases in certain educational outcomes, including higher (and improving) 8th grade mathematics performance, more equitable learning outcomes across ability and more satisfied teachers.
- Innovative educational systems generally have higher expenditures than non-innovative systems; however, their students are no more satisfied than those in less innovative systems.

Approach to measuring system innovations

While *Measuring Innovation in Education* identifies and analyses hundreds of innovations at the classroom and organisational levels, this brief identifies the top innovations in pedagogic and organisational practices in Ontario between 2003 and 2011. To determine each educational system's top innovations in pedagogic and organisational practices, data from three international education datasets – Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), and the Programme on International Student Assessment (PISA) – were analysed to identify the areas in which each education system has demonstrated emerging or changing organisational and pedagogic practices over a specific period. For a full description of the data and methods used for analysis in this report, see report Annex A: Data Sources and Methods.

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Note regarding data from Israel

The statistical data for Israel are supplied by and are 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.

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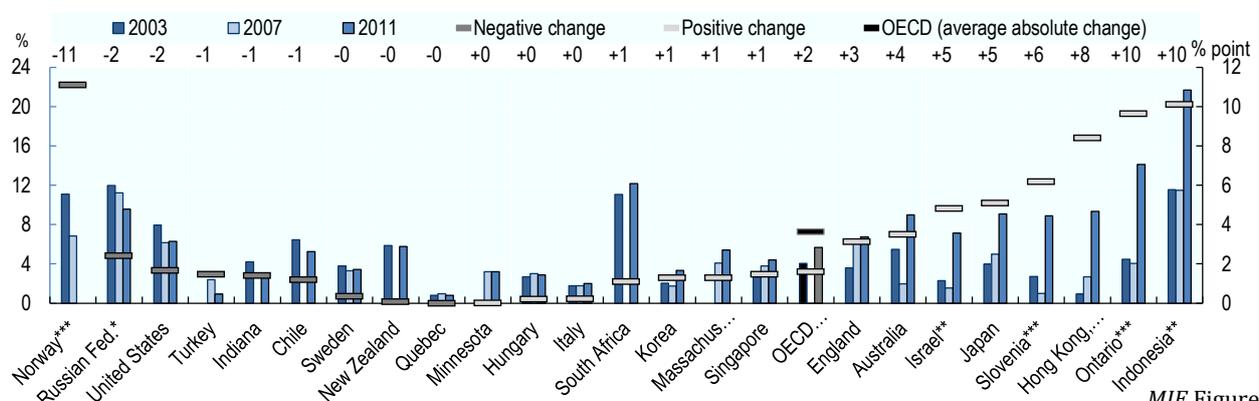
Ontario's top innovations in organisational policy and practice:

(1) More external evaluation of primary and secondary school classrooms...

Primary and secondary schools in Ontario underwent frequent observations of teachers' practices by inspectors or other persons external to the school. Between 2003 and 2011, Ontario saw a 16% point increase in the percentage of 4th grade students in schools in which observations by external evaluators were used to evaluate the practices of their teachers. Over the same period, 8th grade science students saw a 12% point increase in this metric, while 8th grade mathematics students saw a 15% increase.

(2) More teacher observations of secondary school classrooms...

Percentage of 8th grade science students who have a teacher who visits another classroom to learn more about teaching once a week or more and change over time



MIE Figure 13.8

Secondary school teachers in Ontario also more frequently observed each other's classrooms to learn about other instructors' teaching practices. Between 2003 and 2011, the percentage of 8th grade mathematics students in Ontario who had a teacher that observed other classrooms one or more times per week increased by 9% points; the same statistic for 8th grade science classrooms increased by 10% over the specified time period.

(3) More peer discussions amongst secondary science teachers...

Between 2003 and 2011, the level of peer-to-peer discussion amongst 8th grade science teachers to exchange pedagogic ideas increased by 12% points. Of the educational systems analysed in this report, Ontario saw the second-largest change in this metric; Israel, the system with the largest change, had a system-level increase of 34% points over this period.

(4) More peer evaluation of teachers in primary education...

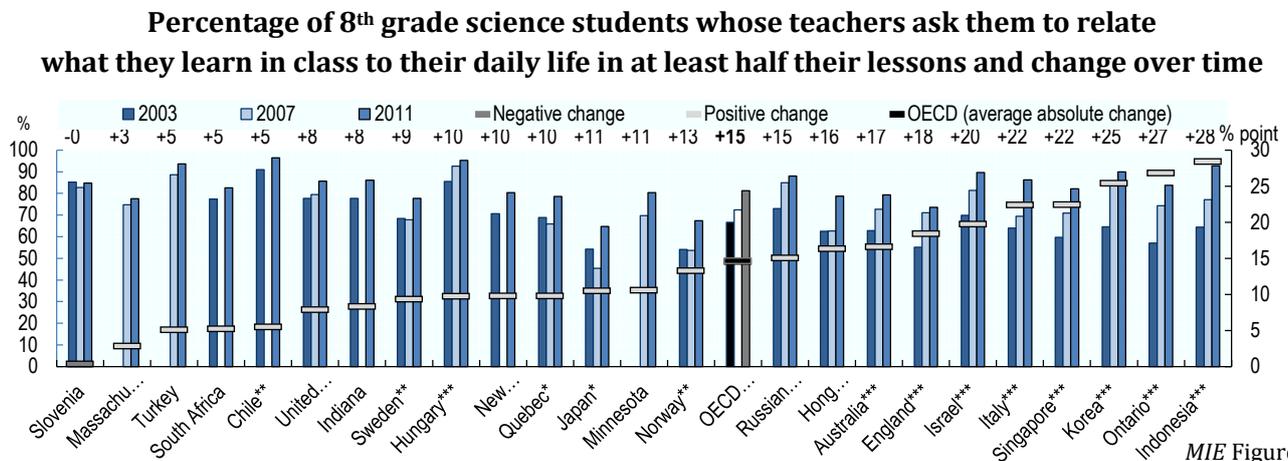
Another top organisational innovation in primary schools in Ontario is the increased use of teacher peer review. This educational system saw significant changes in peer review evaluation of teacher practices in 4th grade classrooms, with an increase of 8% points in the percentage of students in schools with peer review evaluations between 2003 and 2011. This observed difference is slightly greater than the mean change in this metric across all OECD countries, which was 6% points over the same period.

(5) More teacher collaboration to develop secondary science materials...

Change in collaboration in planning and preparation of instructional materials is another indicator of innovation in instructional collaboration. Between 2003 and 2011, the percentage of 8th grade science students in Ontario who have a teacher who collaborates with other teachers in planning and preparing instructional materials increased from 33% to 38%, slightly above the 2011 OECD mean value of 34.9%.

Ontario's top innovations in pedagogic practice:

(1) More relating of lessons to real life in primary and secondary lessons...



MIE Figure 6.3

Ontario's top pedagogic innovation is the practice of relating content in lessons to students' daily life. Between 2003 and 2011, Ontario saw a 27% point difference in the percentage of students whose teachers ask them to relate what they learn in class to their daily life in at least half of their lessons. Ontario also experienced large gains in the percentage of 4th grade students whose teachers ask them to relate what they read with their own experience in at least half their lessons, with an 18% point gain in this metric from 2001 to 2011.

(2) More observation and description in secondary school science lessons...

Another pedagogic innovation in Ontario's educational system was the change in use of explanation and elaboration of answers in secondary school science lessons. Between 2007 and 2011, teachers in Ontario reported a 26% point increase in the percentage of students whose teachers ask them to observe and describe natural phenomena in at least half of their 8th grade science lessons.

(3) More self-direction in complex decision-making in secondary mathematics...

Innovation in the classroom has also resulted in a change in the use of student self-directed work during lessons in secondary education. Between 2001 and 2011, the percentage of 8th grade students whose teachers ask them to decide on their own procedures for solving complex problems in mathematics lessons increased by 26% points (according to teachers). This change was the highest of any educational system included in this analysis and was 21% points higher than the average change for OECD countries.

(4) More self-directed experiments in primary science lessons...

Between 2001 and 2011, the percentage of primary science students whose teachers ask them to design or plan experiments or investigations at least once a month increased by 18% points according to teachers. This change was higher than the mean OECD country change (a 9% point increase) and the fifth-largest change of all countries analysed in this report. Educational systems with larger increases in this metric were Denmark (29% points), Singapore (28% points), Sweden (20% points), and Québec (19% points).

(5) More text interpretation in primary lessons...

Finally, the extent to which students interpret text in 4th grade reading lessons has risen in Ontario. Between 2001 and 2011, the percentage of students whose teachers ask them to make generalisations and draw inferences from a text one or more times per week increased from 80% to 94%, a 14% point gain. While this increase is significant, it is below the mean difference in this metric for OECD countries, which was 16% points over the same period. That being said, this practice is now nearly universal in Ontario.