

The future of education Perspectives from PISA 2022

OECD Japan Seminar



PISA participants

Around **690,000** 15-year-old students in **81 countries and economies** took PISA 2022

PISA Newcomers: El Salvador, Jamaica, Mongolia, the Palestinian Authority and Uzbekistan



Mathematics (PISA)

Student performance



OECD average

2003

2006

2009

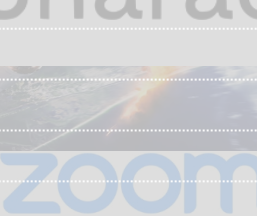
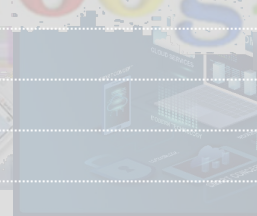
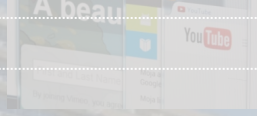
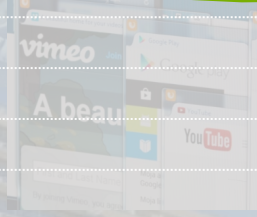
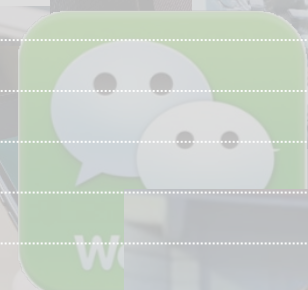
2012

2015

2018

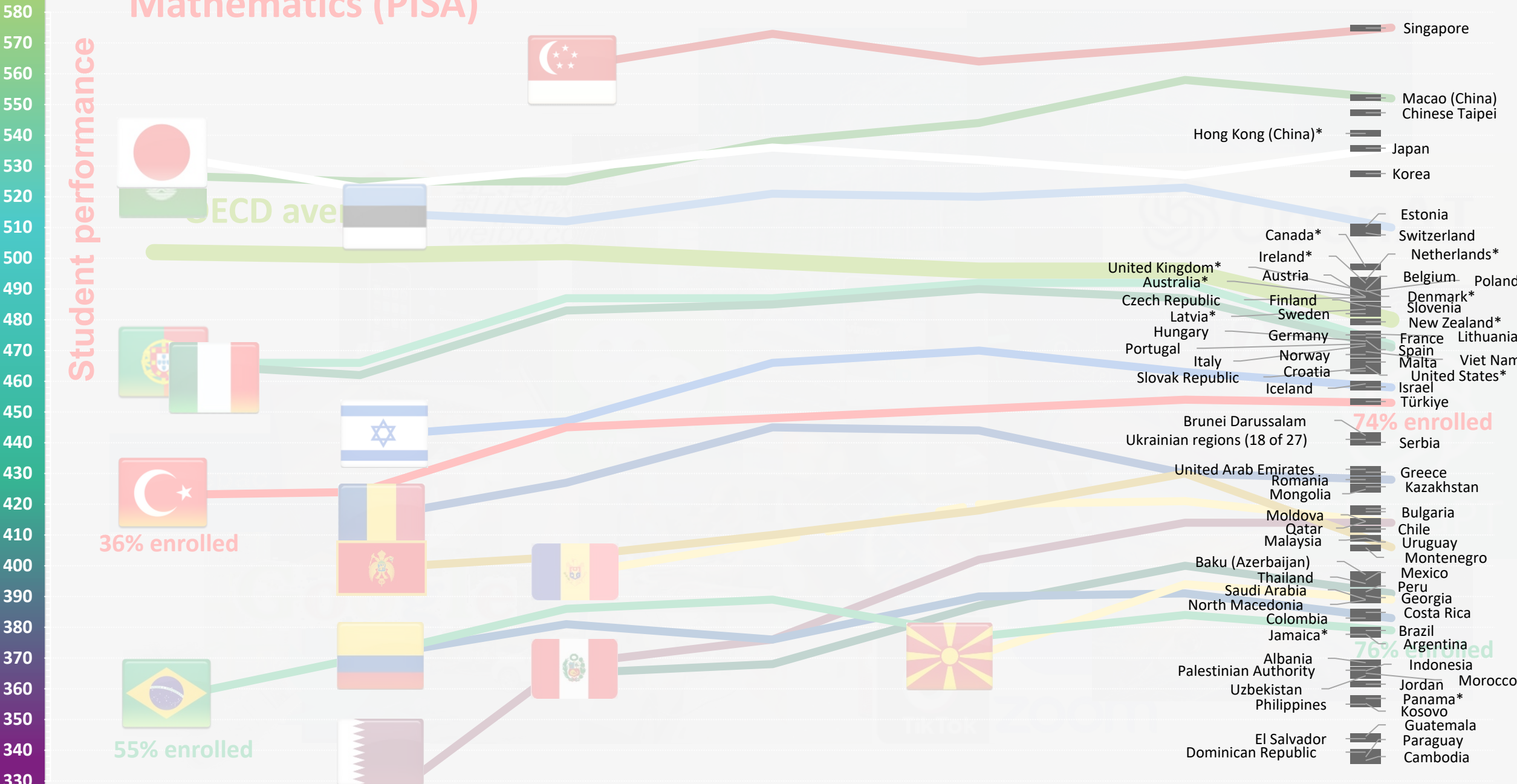
2022

580
570
560
550
540
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330



Mathematics (PISA)

Student performance



36% enrolled

55% enrolled

74% enrolled

76% enrolled

2003

2006

2009

2012

2015

2018

2022

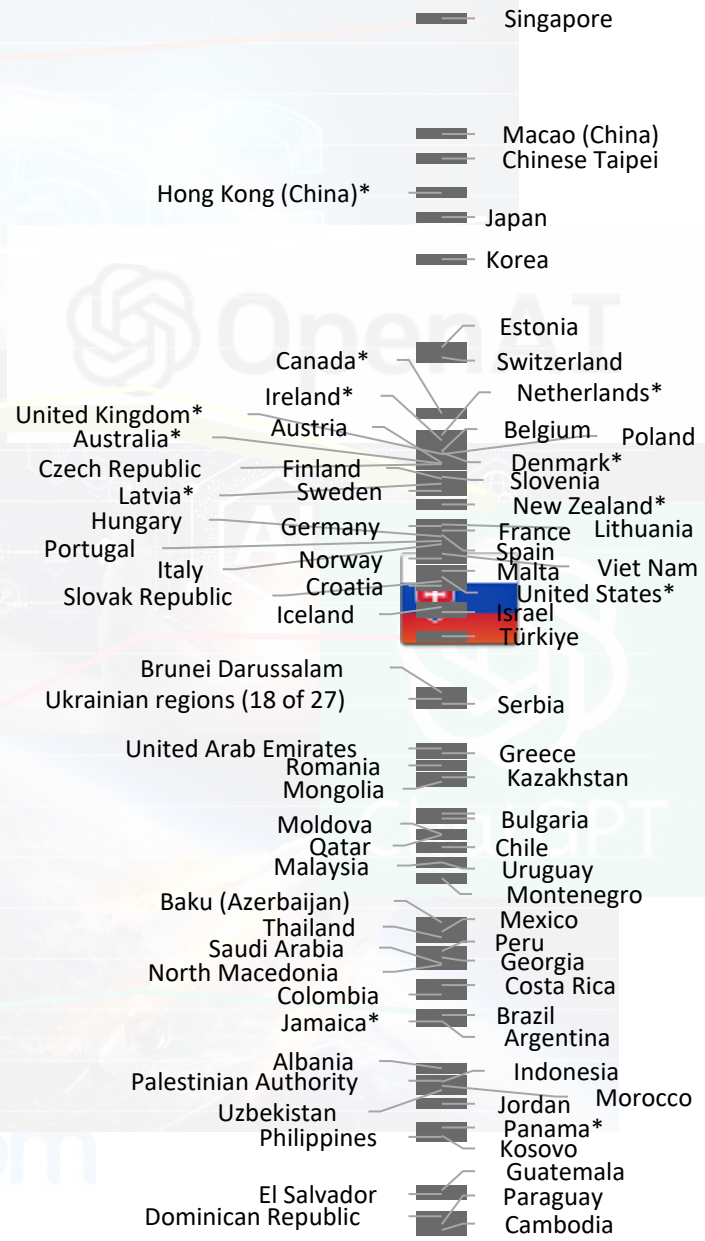
Poverty need not be destiny

Student performance

Math skills of students from most advantaged decile

Math skills of students from poorest decile

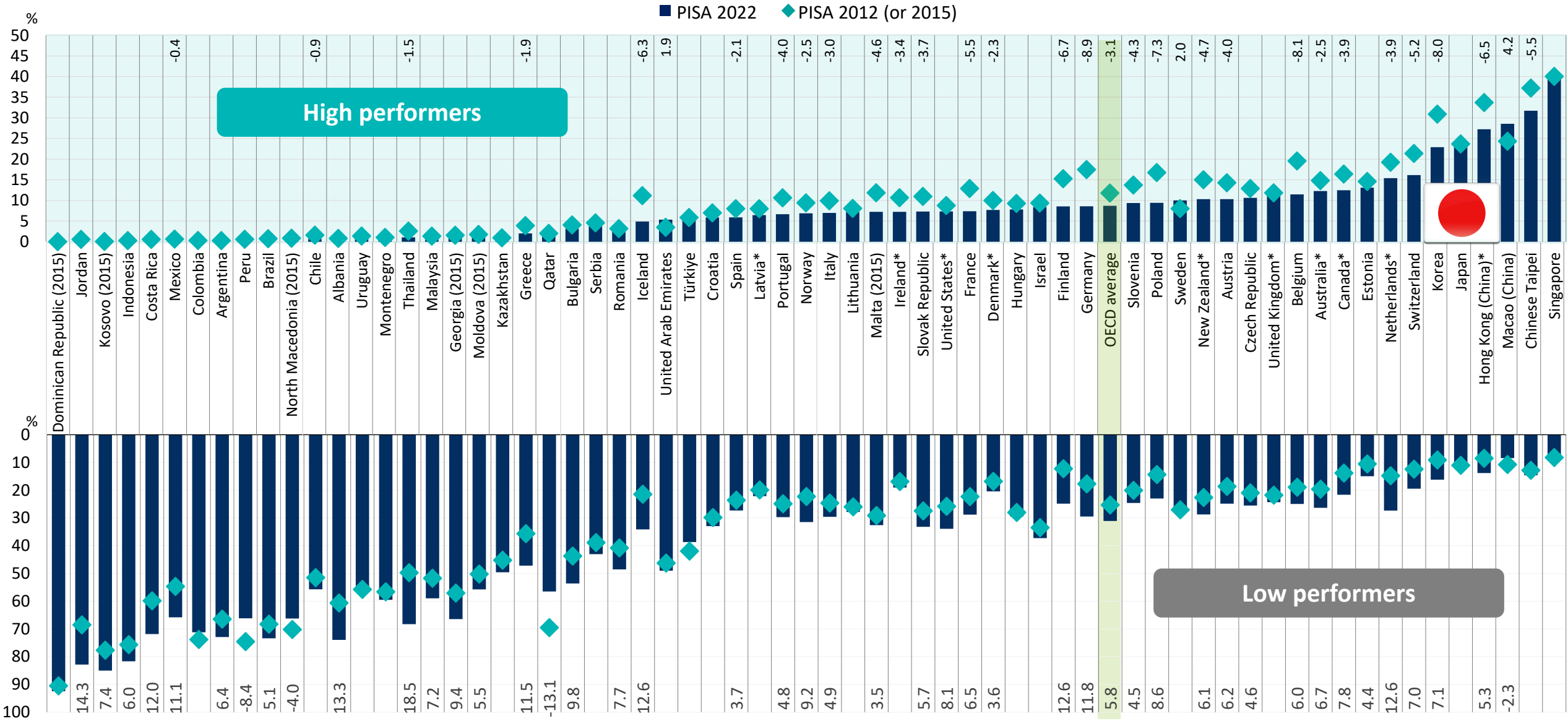
2003 2006 2009 2012 2015 2018 2022





Percentage of low-performing students and top performers in mathematics in 2012 and 2022

Figure I.6.5

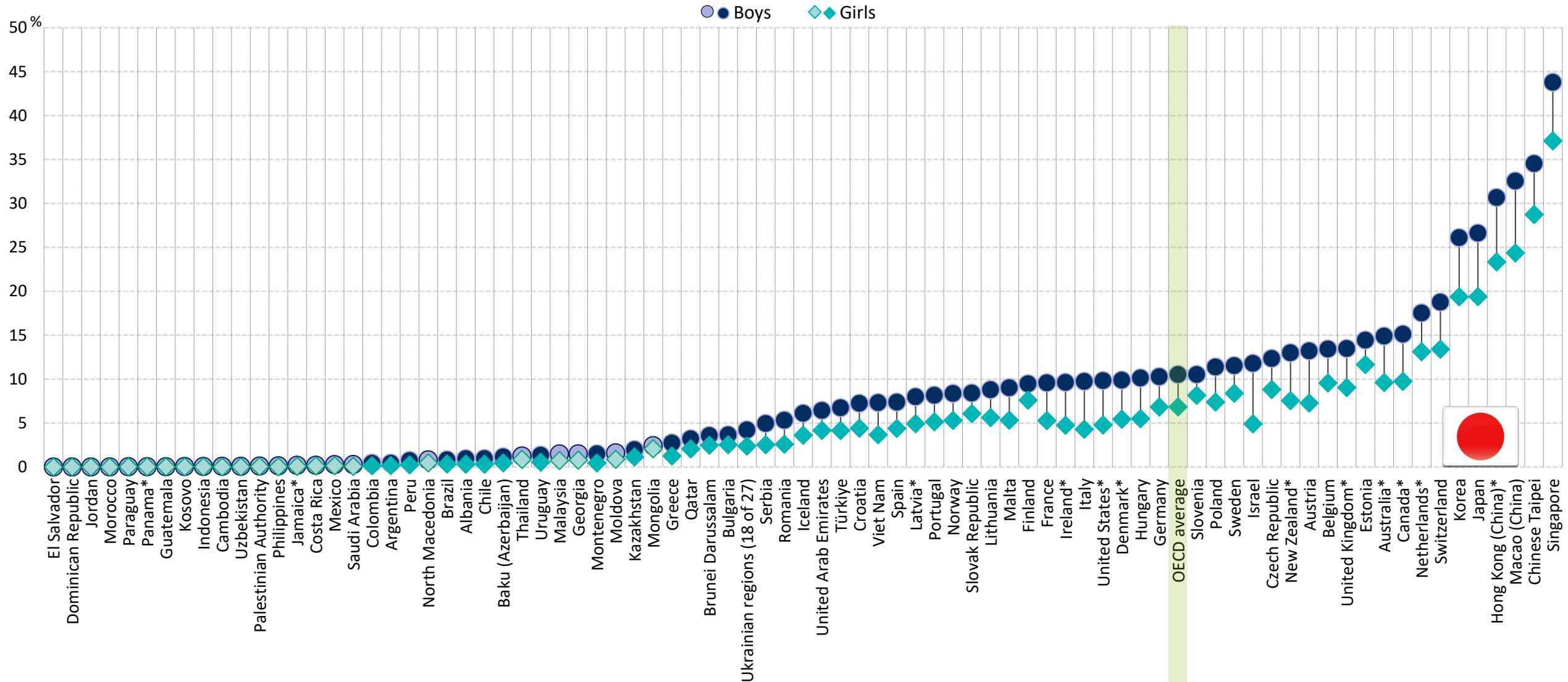




Top performers in mathematics, by gender

Figure I.4.11

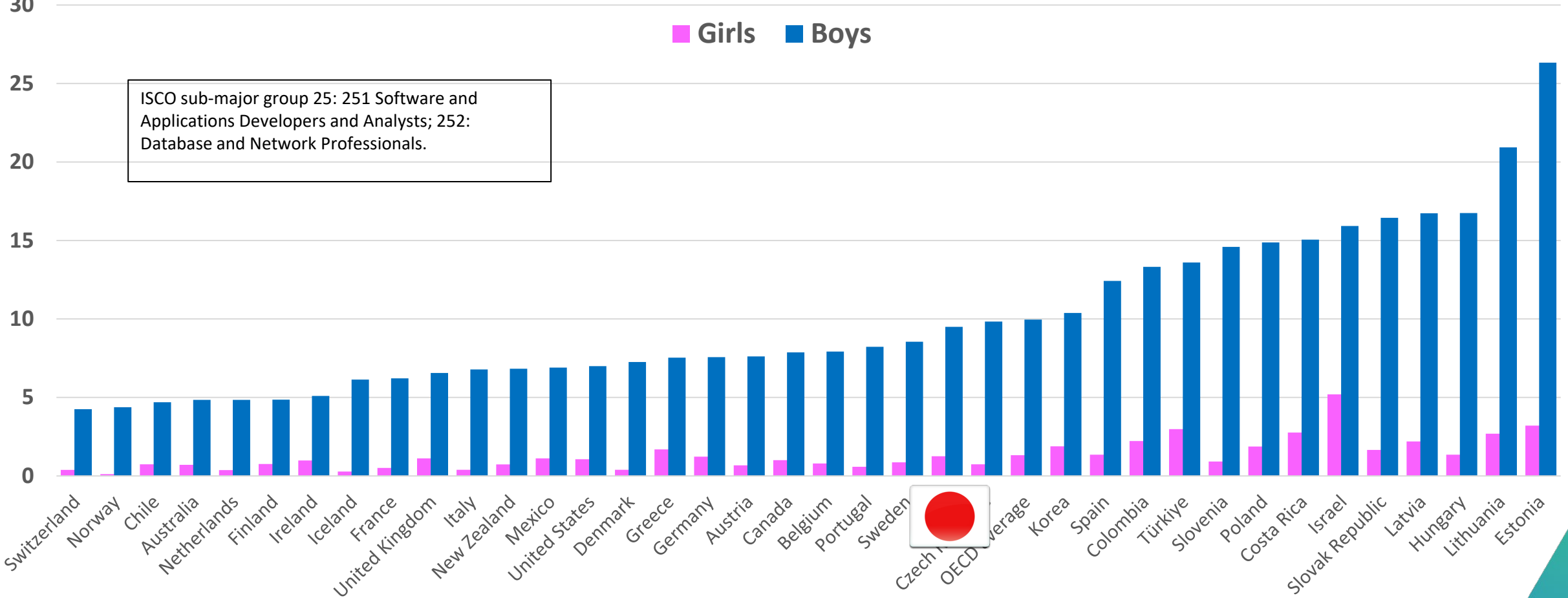
Percentage of students who scored at proficiency Level 5 or above in mathematics, by gender





Student **interest in IT careers** remains severely gendered (PISA)

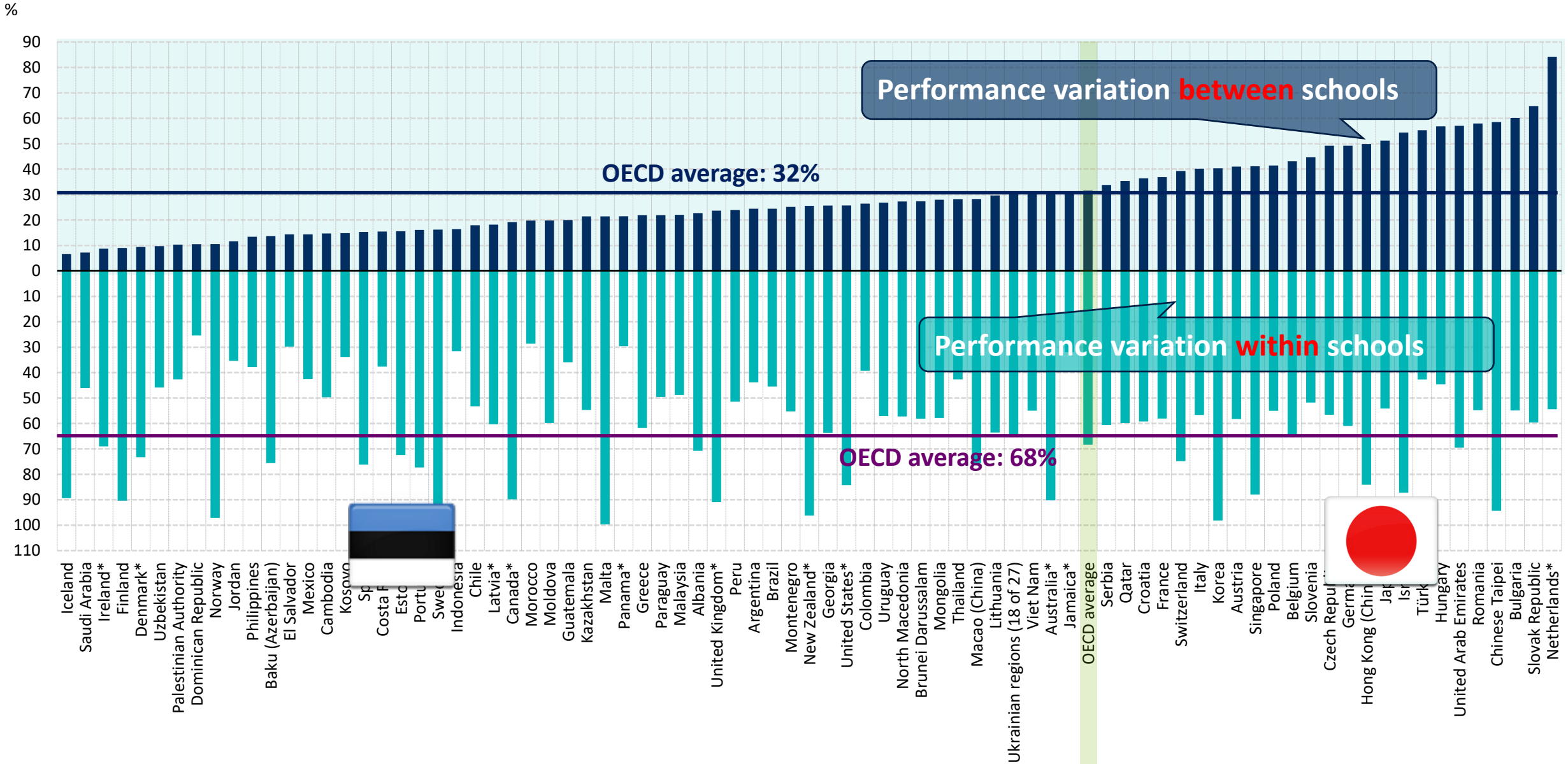
Percentage of students who expect a career in ICT. By gender. PISA 2022.



Can the closest school be the best school?

Variation in mathematics performance between and within schools

Figure I.2.6



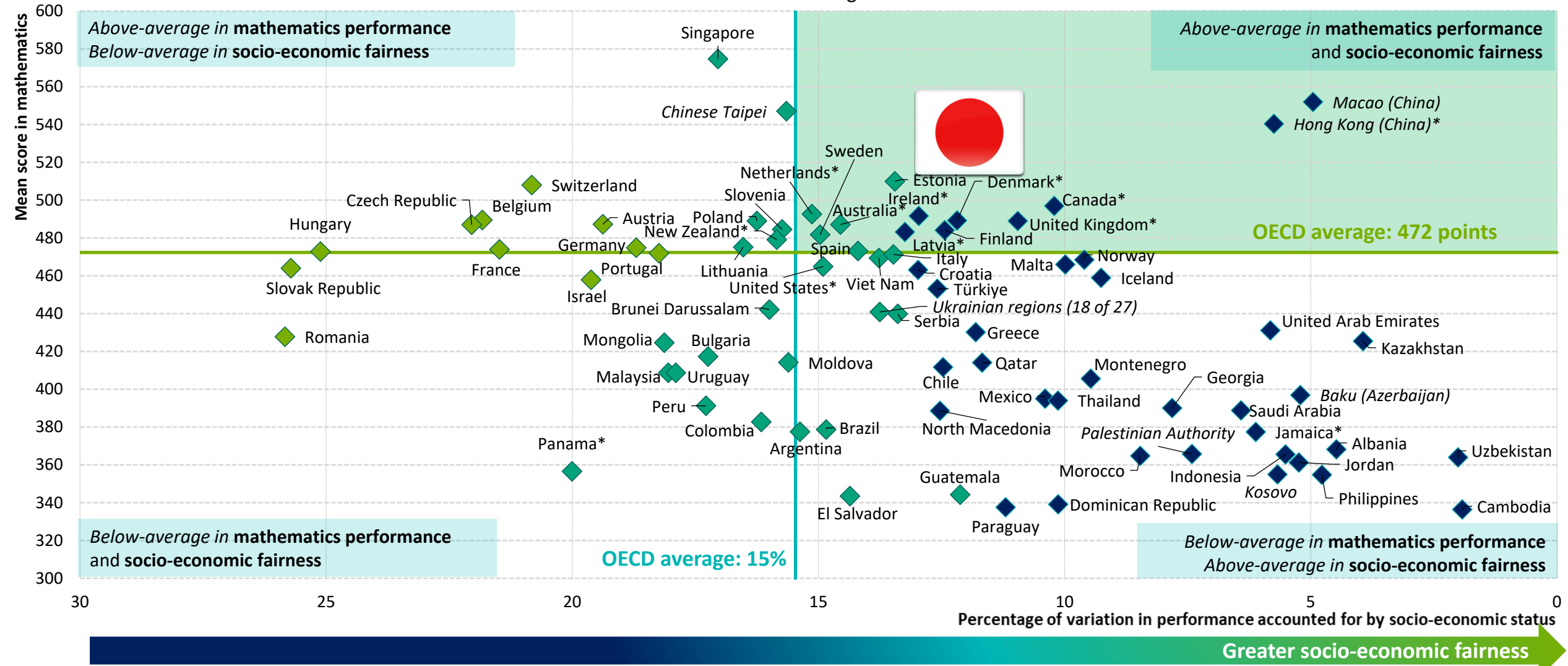


Combining excellence and equity

Strength of socio-economic gradient and mathematics performance

Figure I.4.2

- ◆ Socio-economic fairness is below the OECD average
- ◆ Socio-economic fairness is not statistically significantly different from the OECD average
- ◆ Socio-economic fairness is above the OECD average





Other PISA outcomes

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Academic performance refers to the knowledge and cognitive skills students have acquired throughout their education and the extent to which they can use what they have learnt to solve real-life problems.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Psychological wellbeing refers to the extent to which students experience positive emotions, are satisfied with their life and believe their life has meaning and purpose.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

The agency and engagement dimension looks at whether students have the **ability and willingness to positively influence their own lives and the world around them, by setting goals, reflecting on their roles and responsibilities and acting responsibly to improve themselves and bring about positive change.**

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

The resilience dimension considers students' beliefs in their ability to withstand stressful and difficult situations, their confidence in themselves and their autonomy as learners

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Engagement with school refers to the extent to which students assign value to their time at school, put effort in their studies so to achieve good results, and help their teachers create a productive learning environment.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

The quality of relationships and community vitality dimension captures both the quantity and the quality of students' social networks. It reflects the extent to which students feel accepted and appreciated by their peers, and whether they perceive support and care from their parents and their teachers.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Study-life balance means putting enough time into academic work while also taking time to enjoy the other parts of one's life, including social, sporting and cultural opportunities.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Material and cultural wellbeing considers whether students enjoy living conditions that are sufficient for their cognitive and emotional development, as well as their access to a home environment that provides opportunities for cultural development.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

Material and cultural well-being

Openness to diversity



Other PISA outcomes

Openness to diversity refers to students' capacity to establish deep and respectful connections with people from different cultural backgrounds, being aware and open to different perspectives and willing to learn other people's language, habits and conventions.

Academic performance

Psychological well-being

Agency and engagement

Resilience

Engagement with school

Quality of relationship & community vitality

School-leisure balance

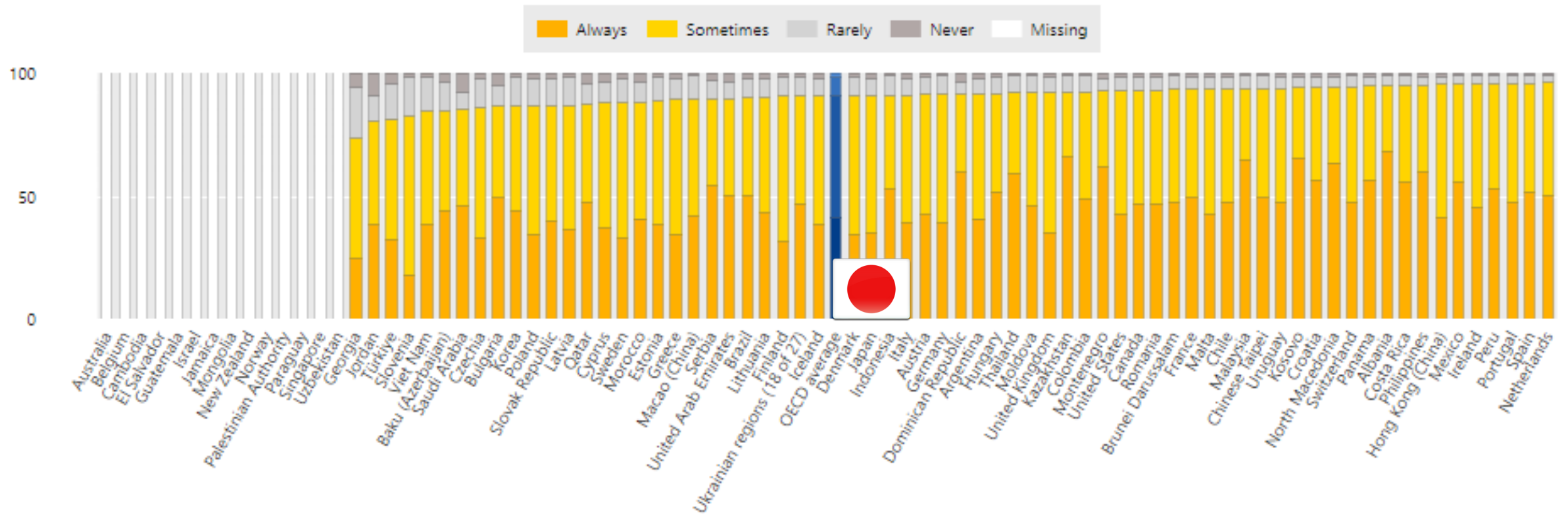
Material and cultural well-being

Openness to diversity



Emotional states

Happy: Percentage of students who reported experiencing this emotion



Note: White bars represent missing data.

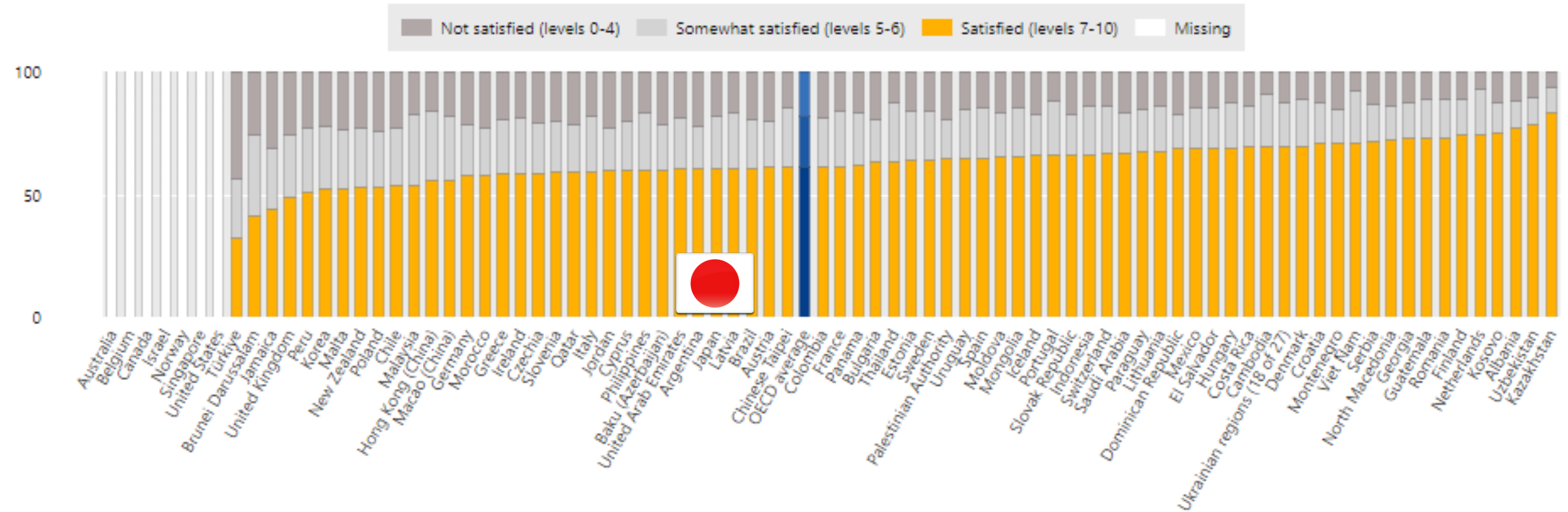
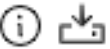
Source: OECD, PISA 2018 Database.

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Life satisfaction

Percentage of students who reported the feeling satisfied or not satisfied about life

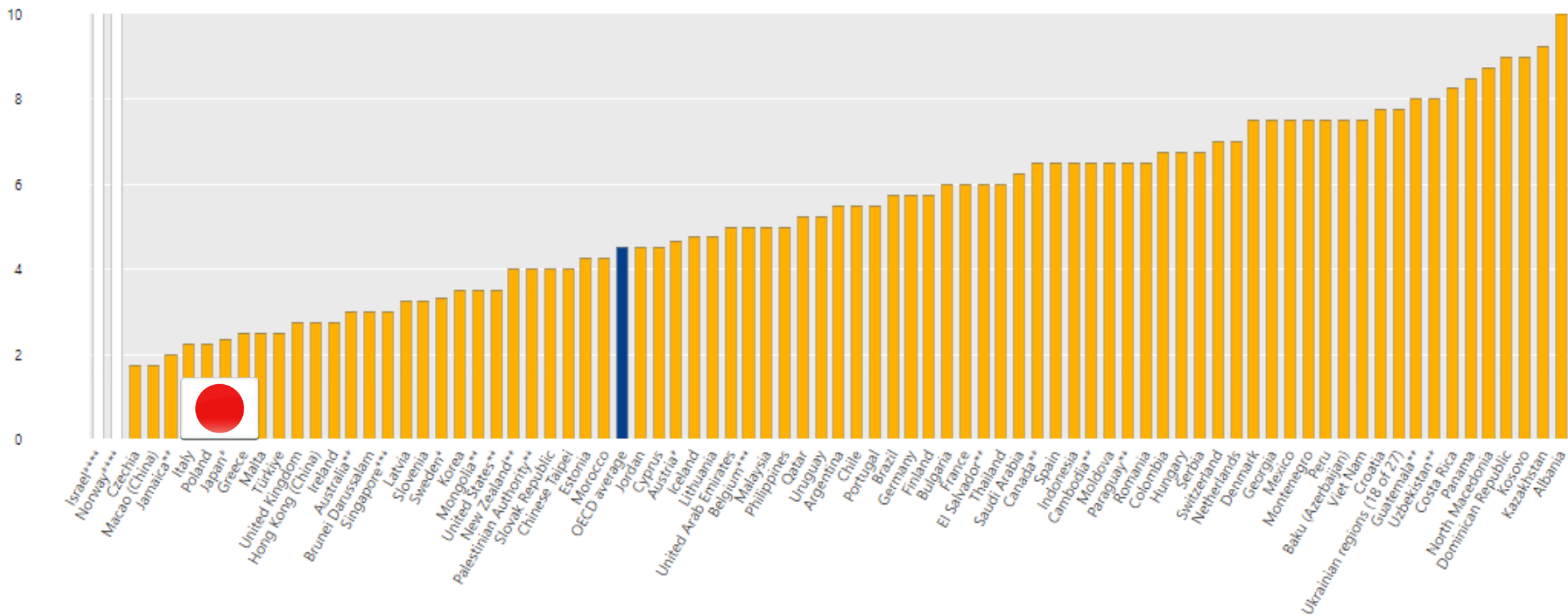


Note: The life-satisfaction scale ranges from 0 to 10 where "0" means 'not at all satisfied' and "10" means 'completely satisfied'.

Source: OECD, PISA 2022 Database.



Index of psychological well-being



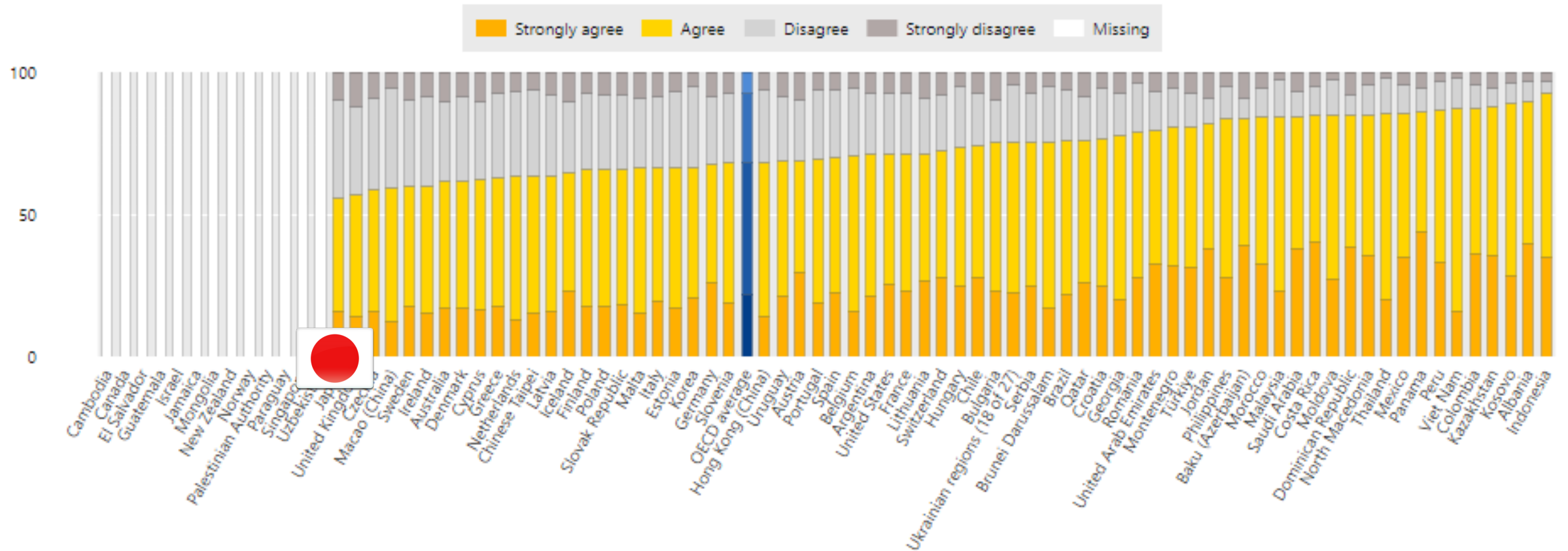
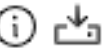
Note: White bars represent missing data and each * beside the country name represents the number of missing indicators in the index. Note that results for countries with missing indicators are not fully comparable with those of countries without missing indicators, and so should be used with caution.

Source: OECD, PISA 2018 Database and PISA 2022 Database.



Sense of purpose in life

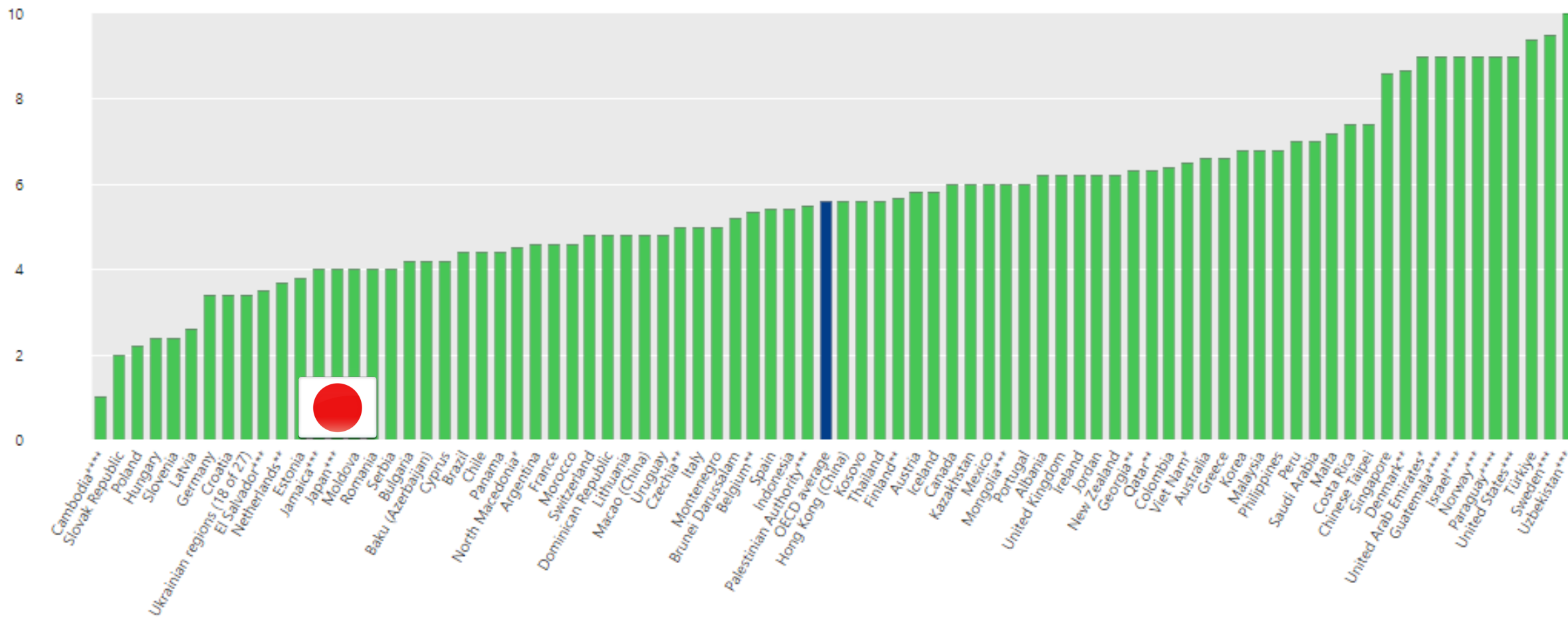
Percentage of students who reported they agreed or disagreed that their life had a clear meaning



Source: OECD, PISA 2018 Database.



Index of agency and engagement



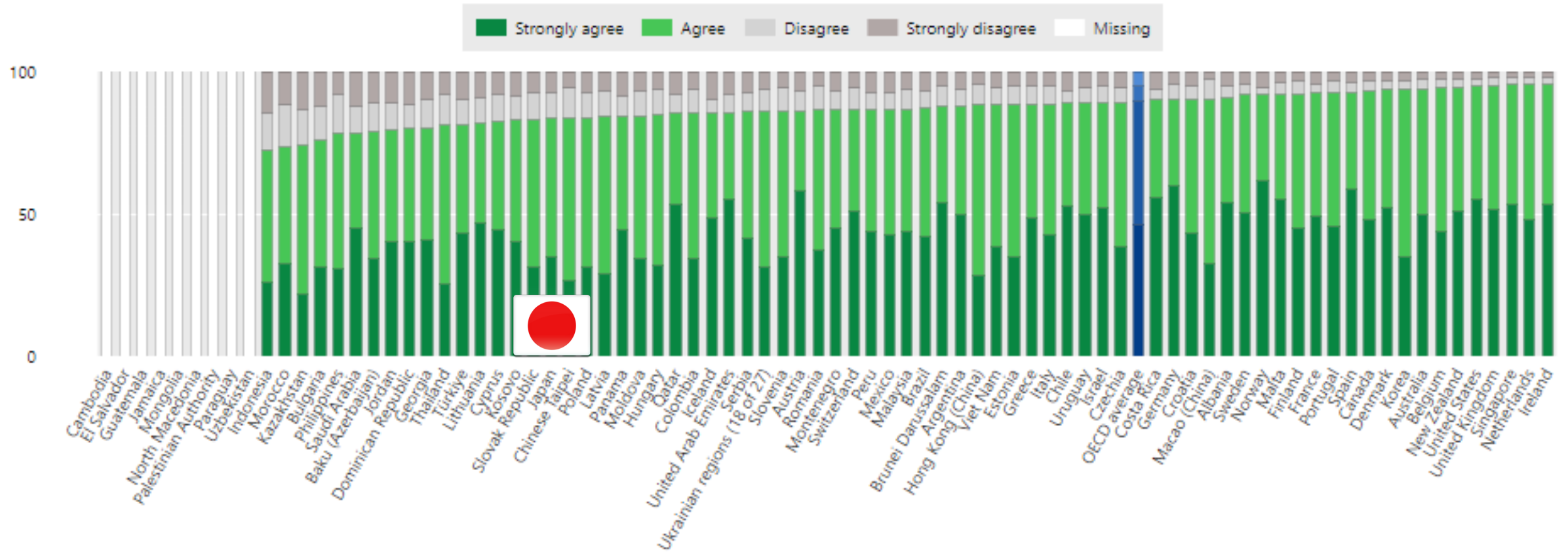
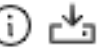
Note: Each * beside the country name represents the number of missing indicators in the index. Note that results for countries with missing indicators are not fully comparable with those of countries without missing indicators, and so should be used with caution.

Source: OECD, PISA 2018 Database and PISA 2022 Database.



Engagement to stop bullying

I like it when someone stands up for other students who are being bullied: Percentage of students who reported they agreed or disagreed with this statement

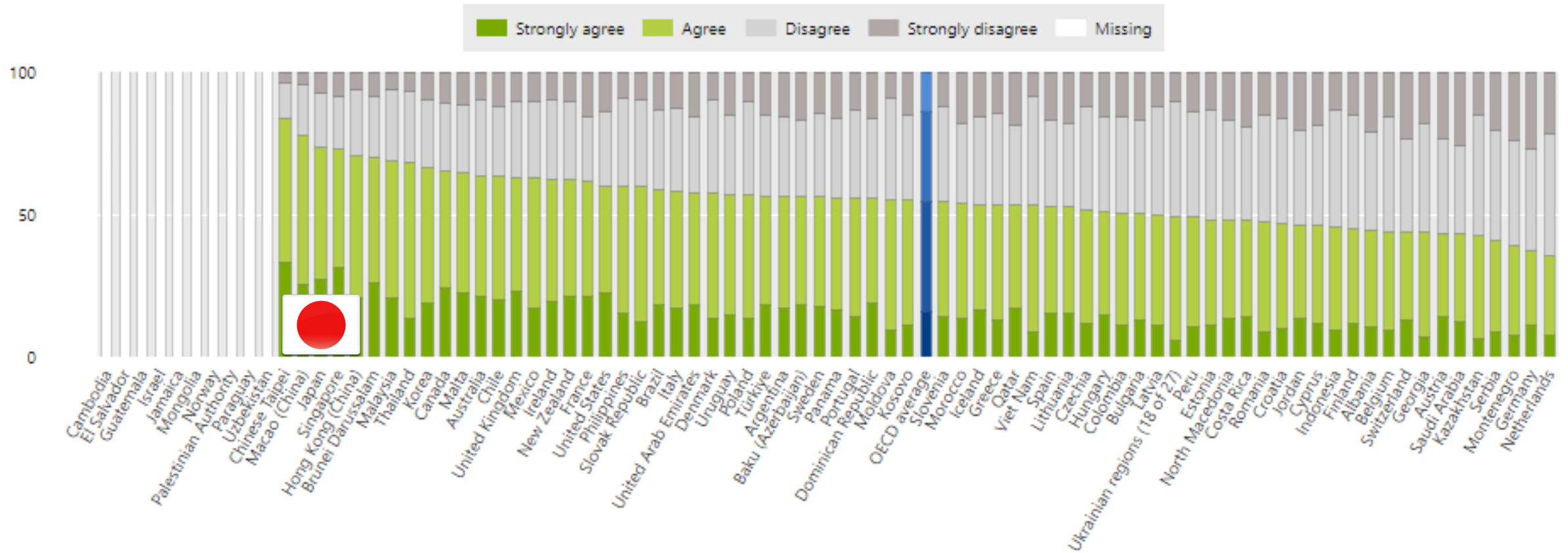


Source: OECD, PISA 2018 Database.



Fear of failure

When I am failing, I am afraid that I might not have enough talent: Percentage of students who reported they agreed or disagreed with this statement



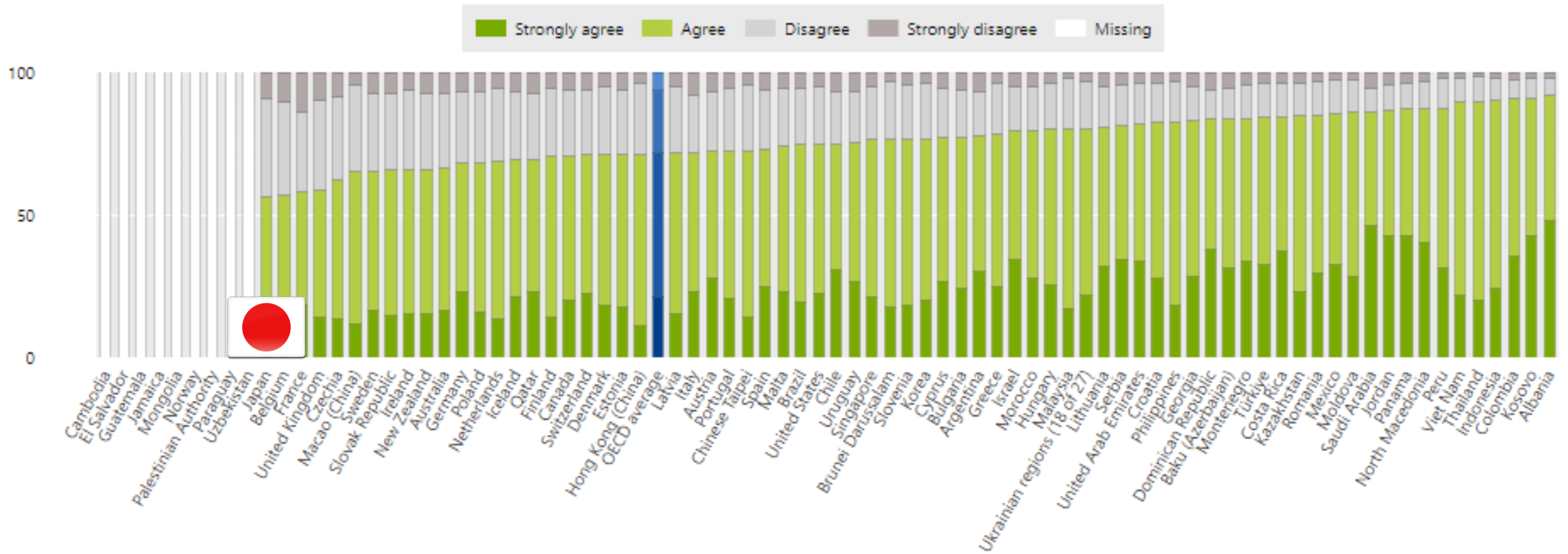
Source: OECD, PISA 2018 Database.

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Belief in self

My belief in myself gets me through hard times: Percentage of students who reported they agreed or disagreed with this statement



Source: OECD, PISA 2018 Database.

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Using resources effectively

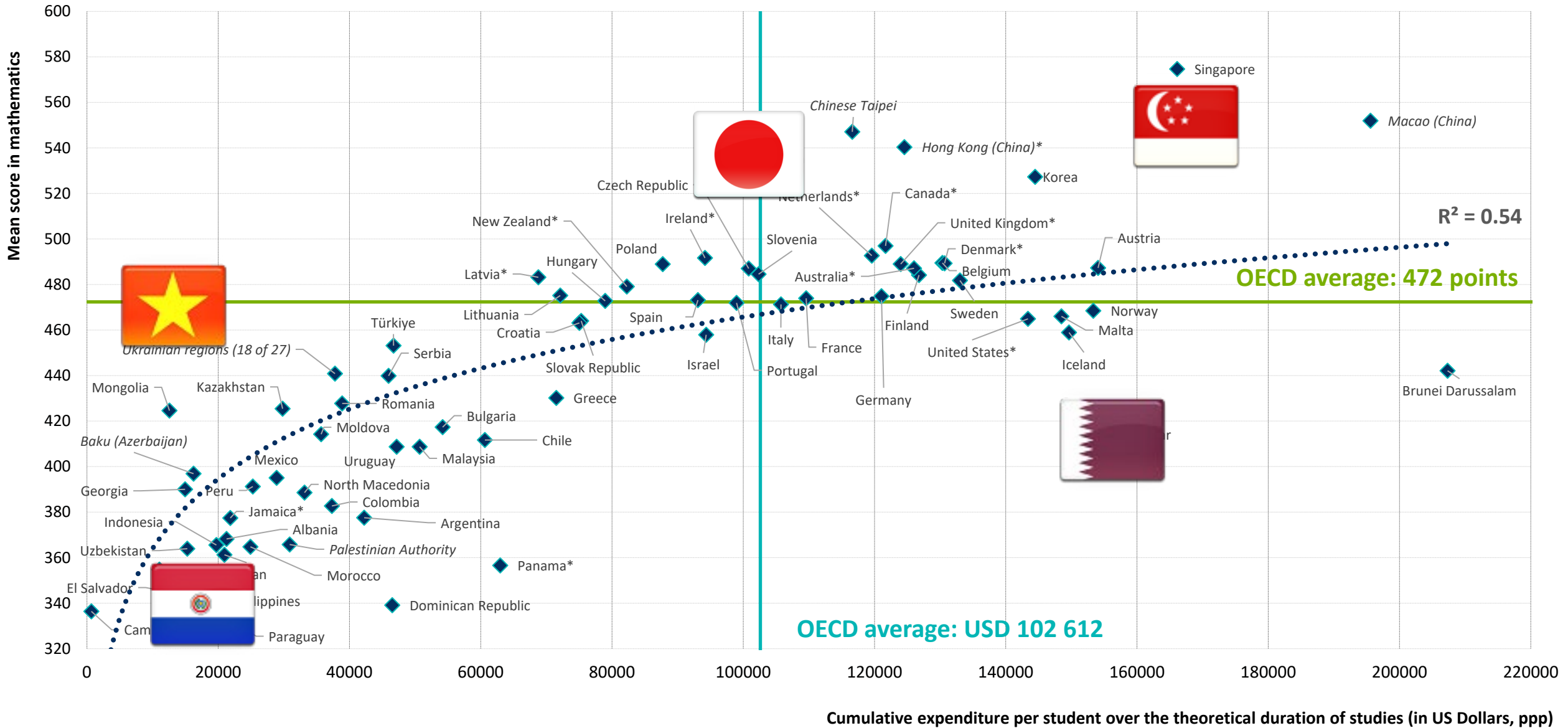
Money matters up to a point





Money is necessary but not sufficient

Figure I.4.15





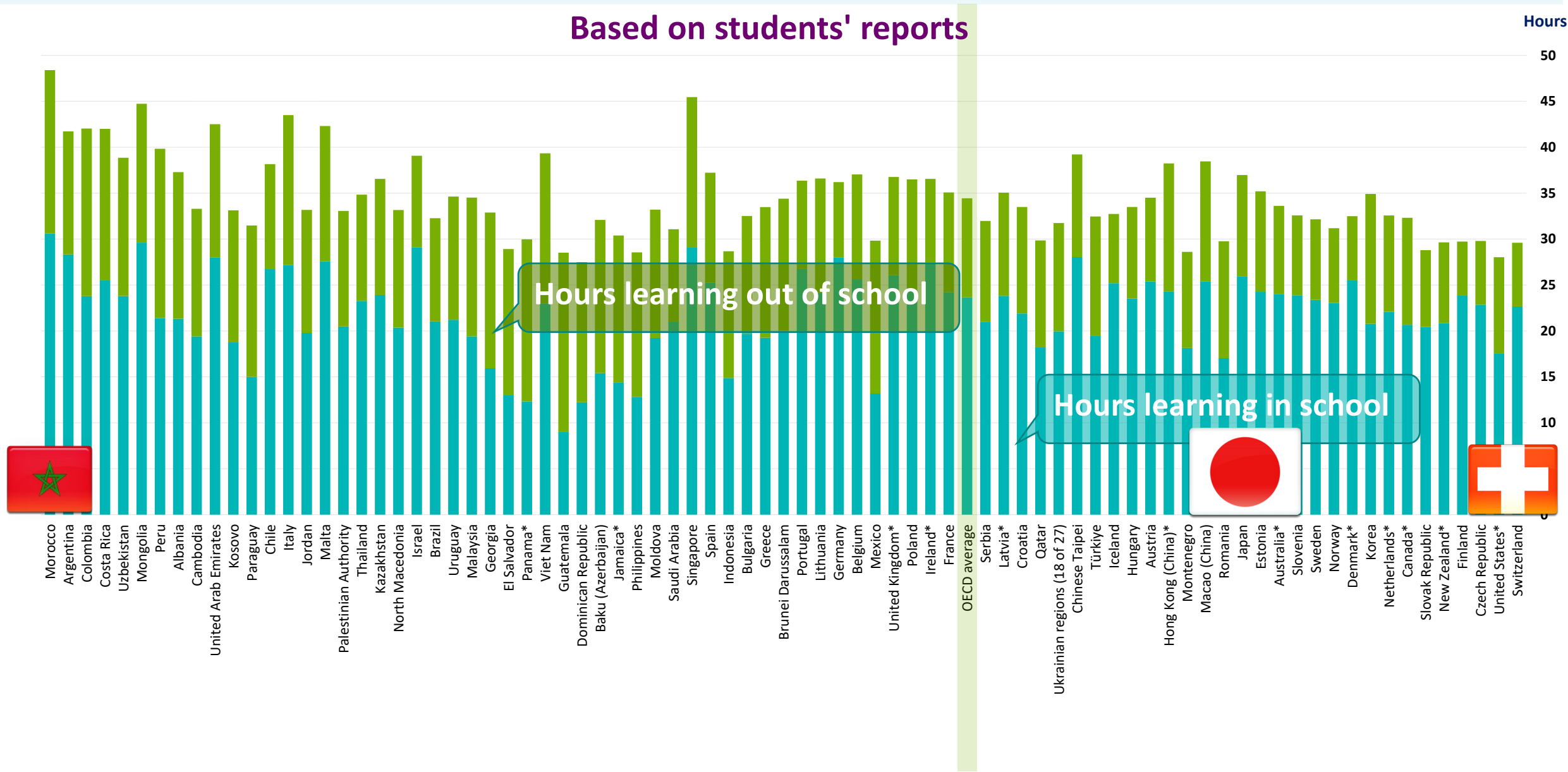
Learning time ≠ learning outcomes

Figure II.5.11

Based on students' reports

Hours

Score points in mathematics per hour of total learning time



Hours learning out of school

Hours learning in school



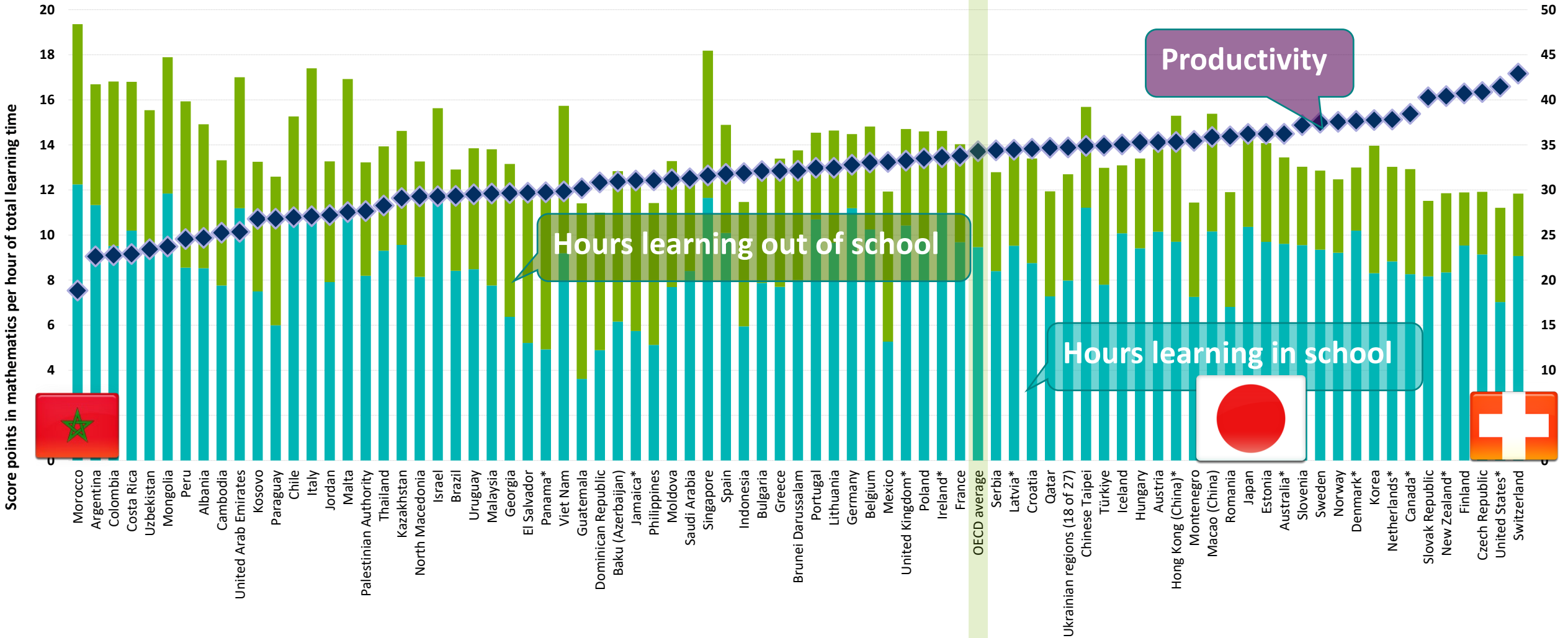


Learning time ≠ learning outcomes

Figure II.5.11

Based on students' reports

Hours



Revolutionising learning?

Unlocking the potential of the digital world

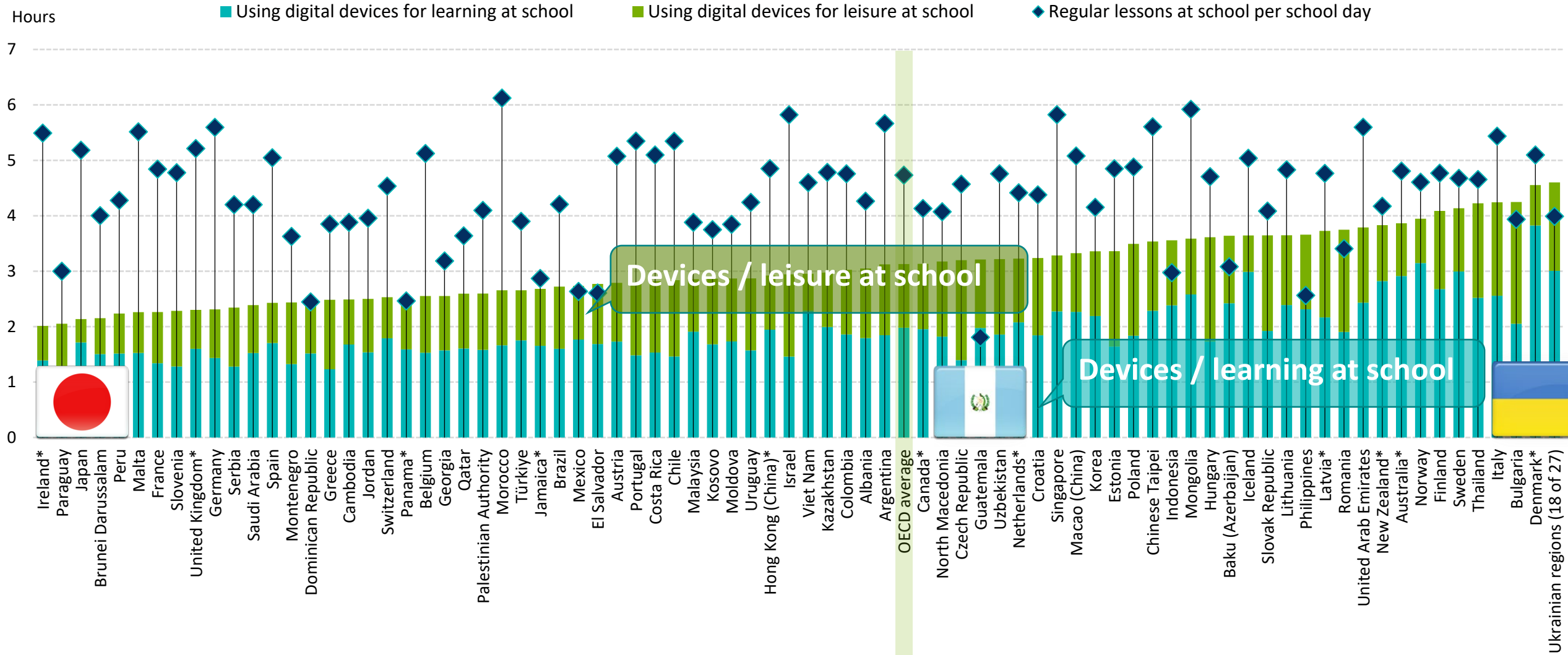




Time spent at school in regular lessons and on digital devices

Figure II.5.15

Time spent per day by students (in hours)

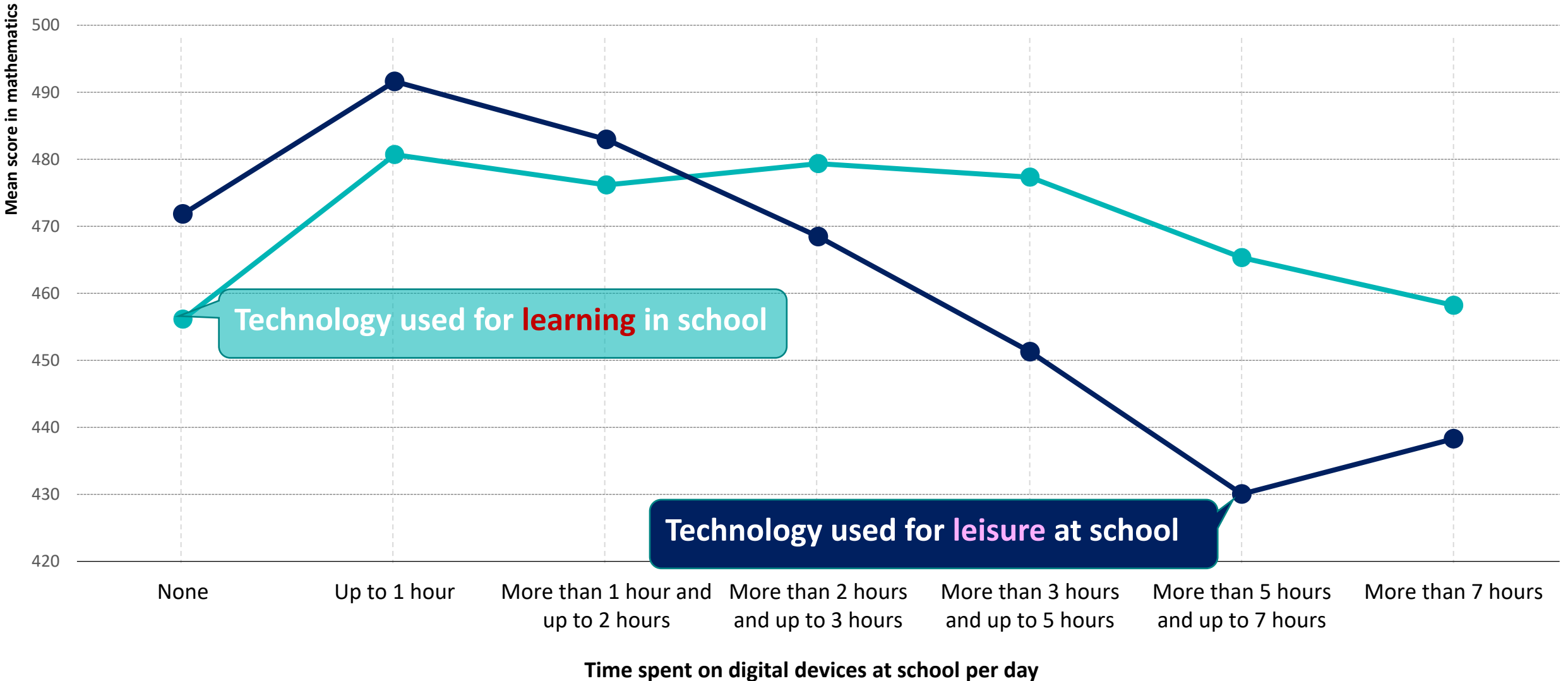




Time spent on digital devices at school and mathematics performance

Figure II.5.14

Based on students' reports; OECD average



Digital distractions

How smart phones and tablets can impair learning



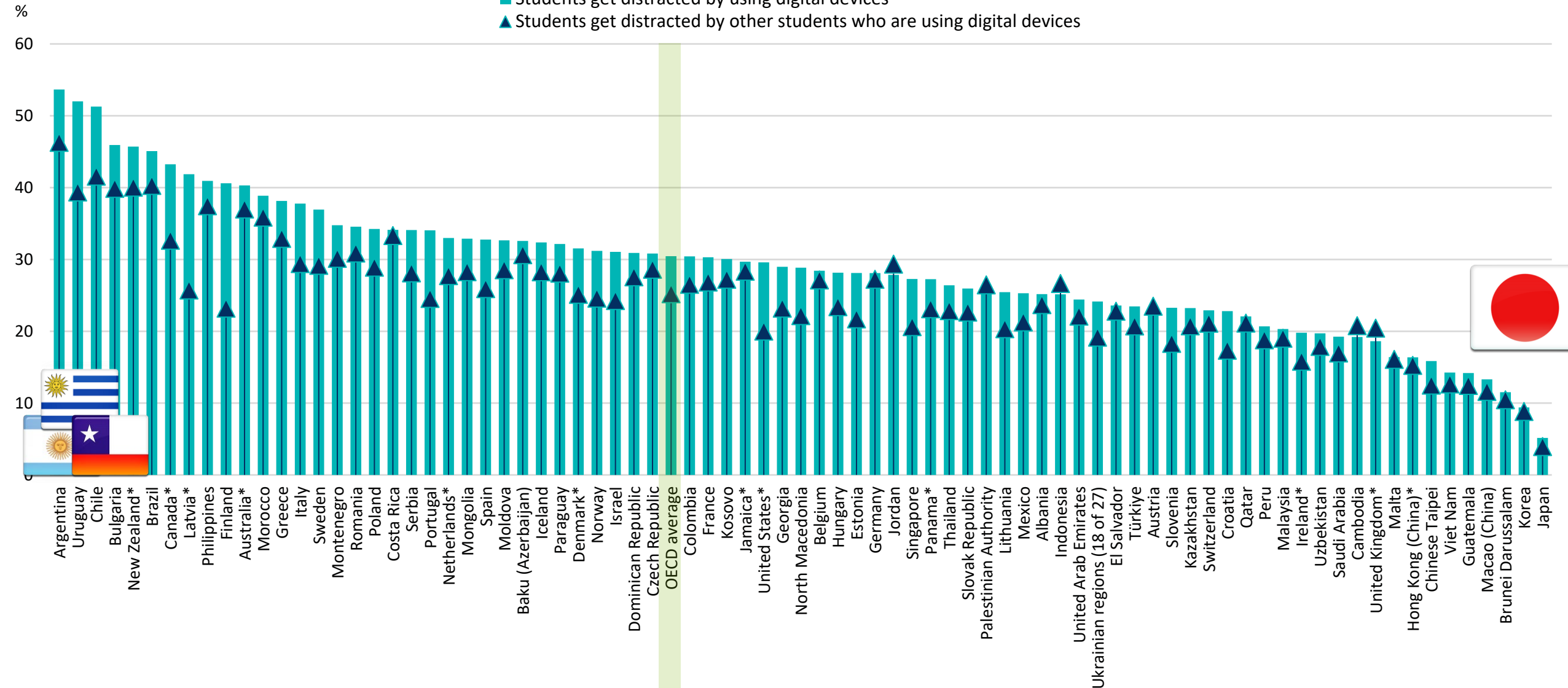


Distraction from digital devices in mathematics lessons

Figure II.3.4

Percentage of students who reported that the following happens in every or in most of their mathematics lessons

- Students get distracted by using digital devices
- ▲ Students get distracted by other students who are using digital devices

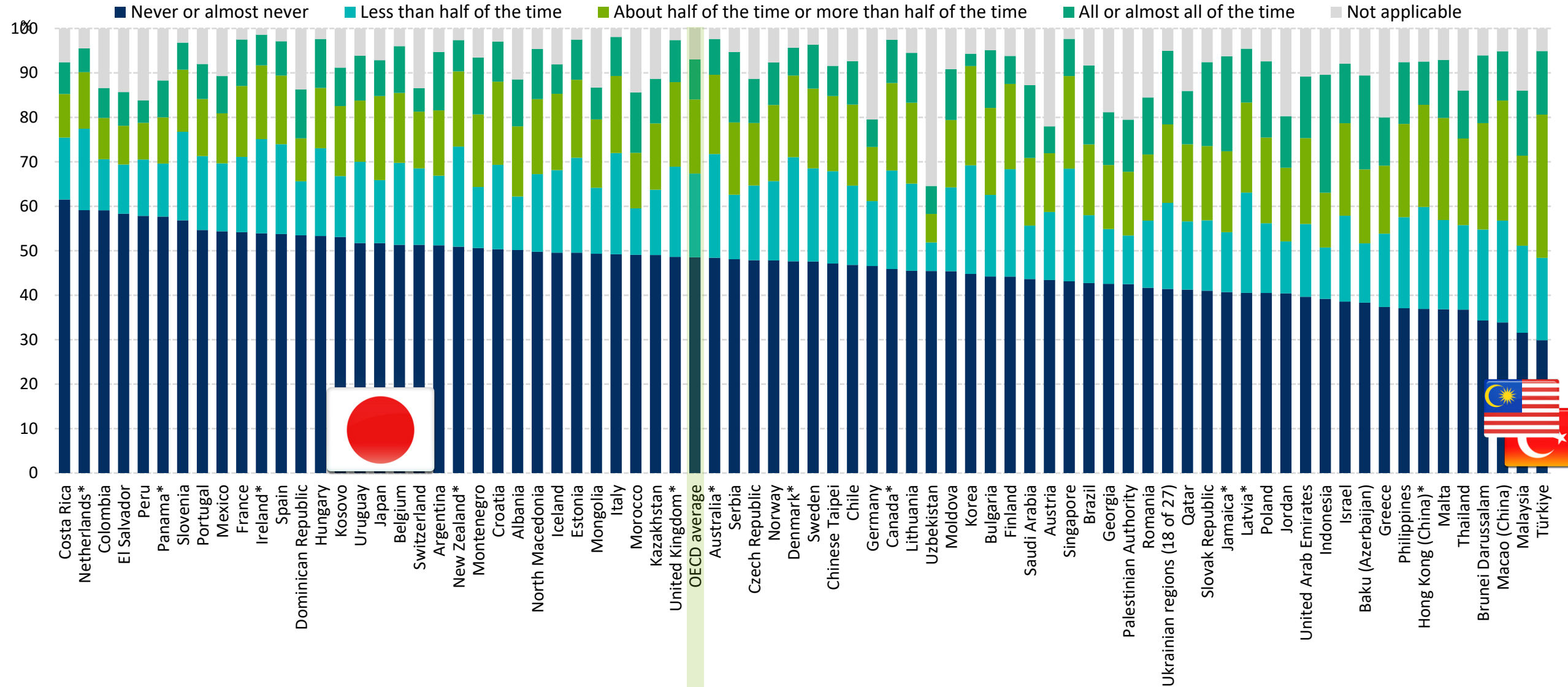




Feeling nervous/anxious when digital devices are not near

Figure II.5.16

Based on students' reports



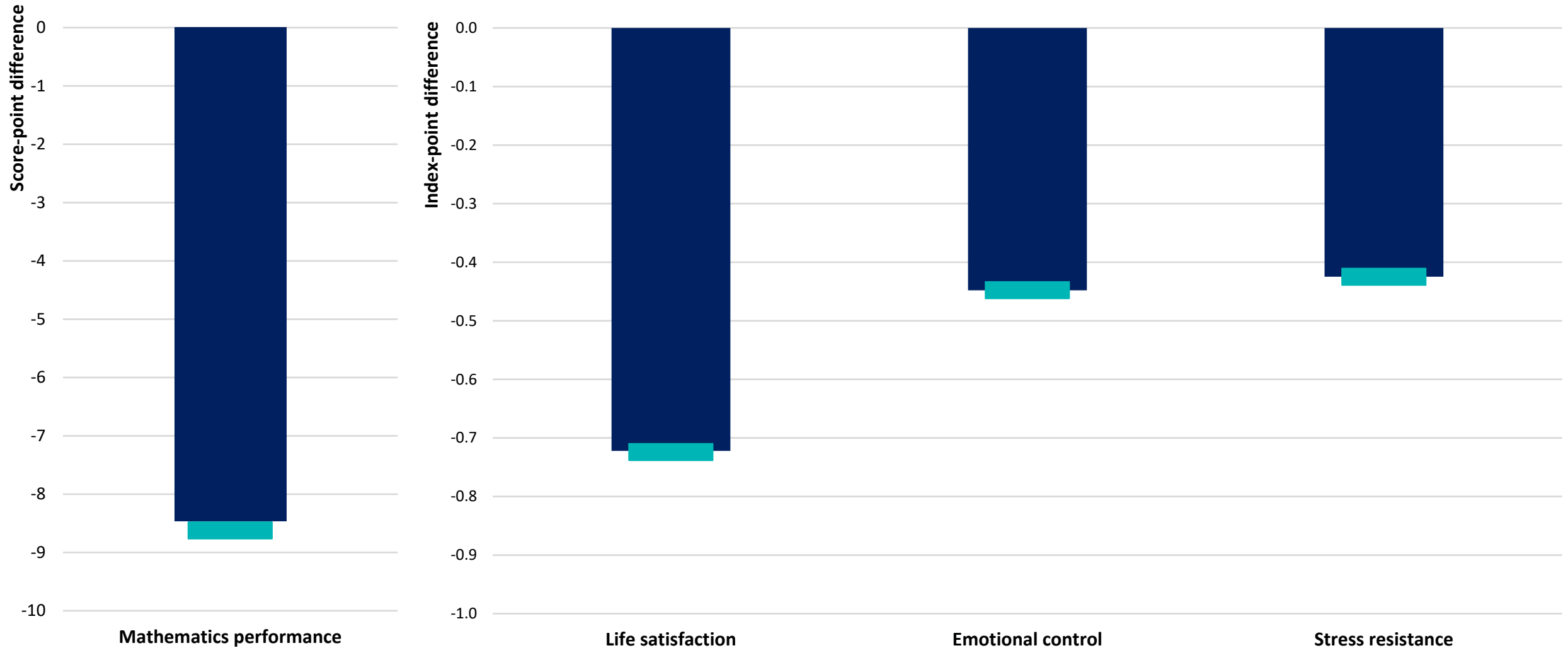


Outcomes of feeling nervous/anxious when digital devices are not near

Figure II.5.17

Based on students' reports; OECD average

■ Before accounting for students' and schools' socio-economic profile¹ — After accounting for students' and schools' socio-economic profile

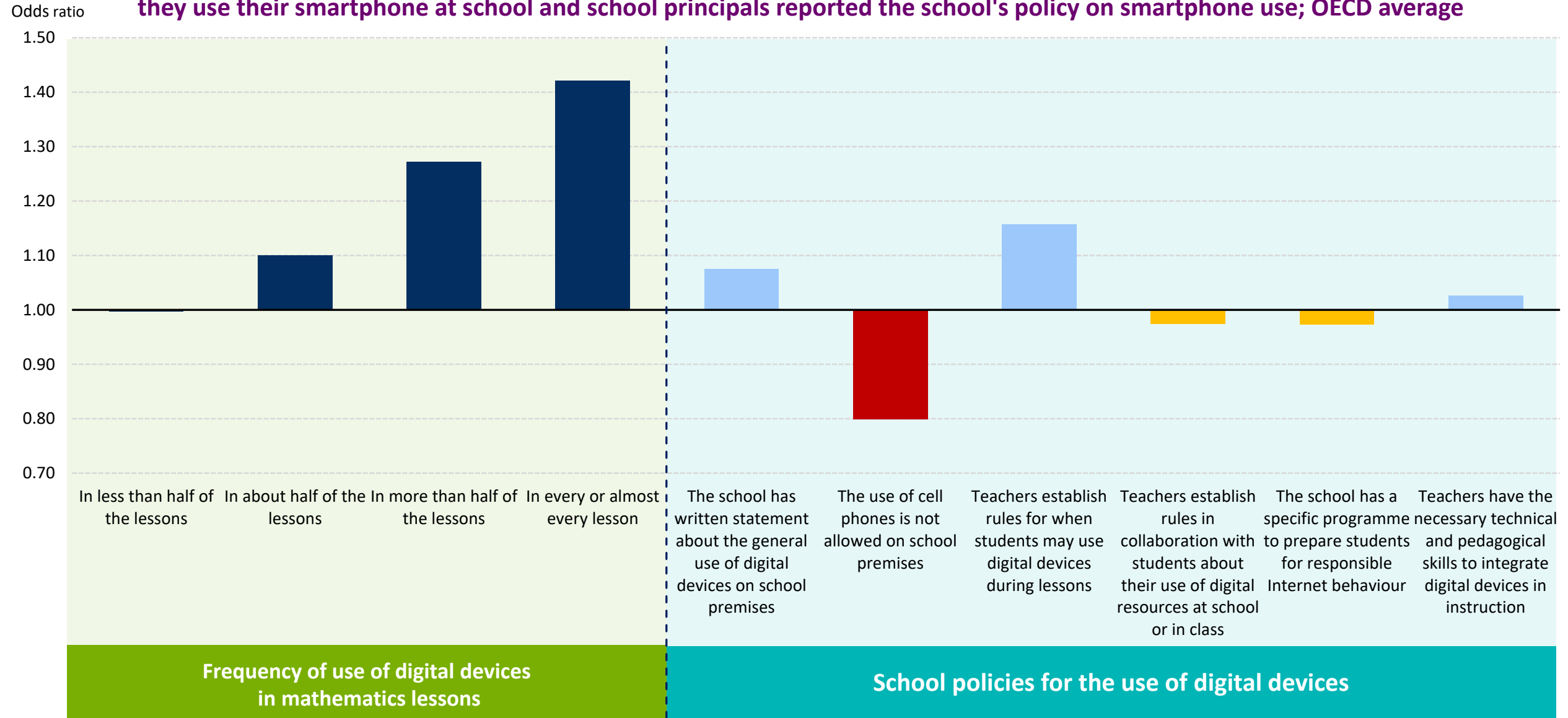




Digital devices, distraction and school policies

Figure II.5.9

Change in the likelihood of students becoming distracted by using digital devices in mathematics lessons when students reported that they use their smartphone at school and school principals reported the school's policy on smartphone use; OECD average



Teachers and teaching

Are some students being let down?

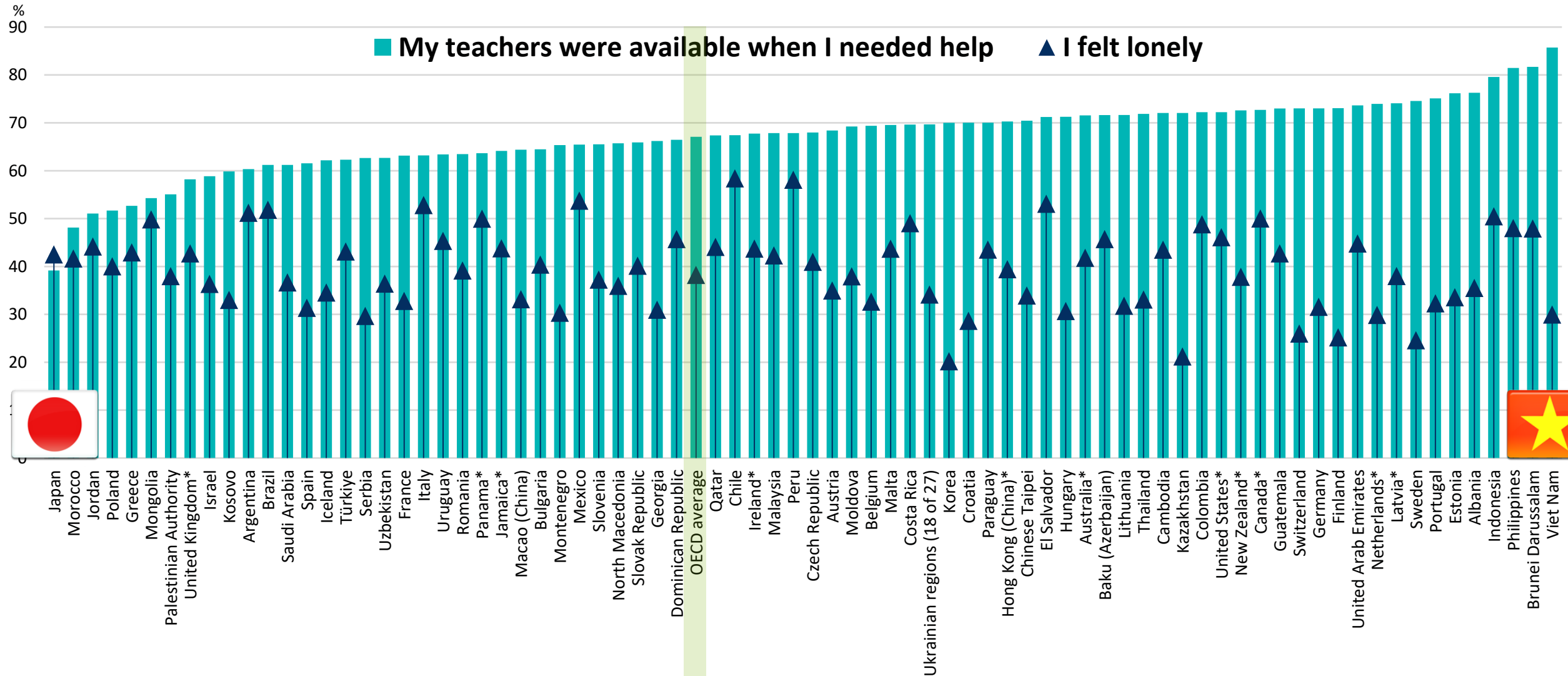




Teacher support

Figure II.2.10

Percentage of students who agreed or strongly agreed with the following statements about the time when their school building was closed because of COVID-19; based on students' reports





Students learn best from teachers they love

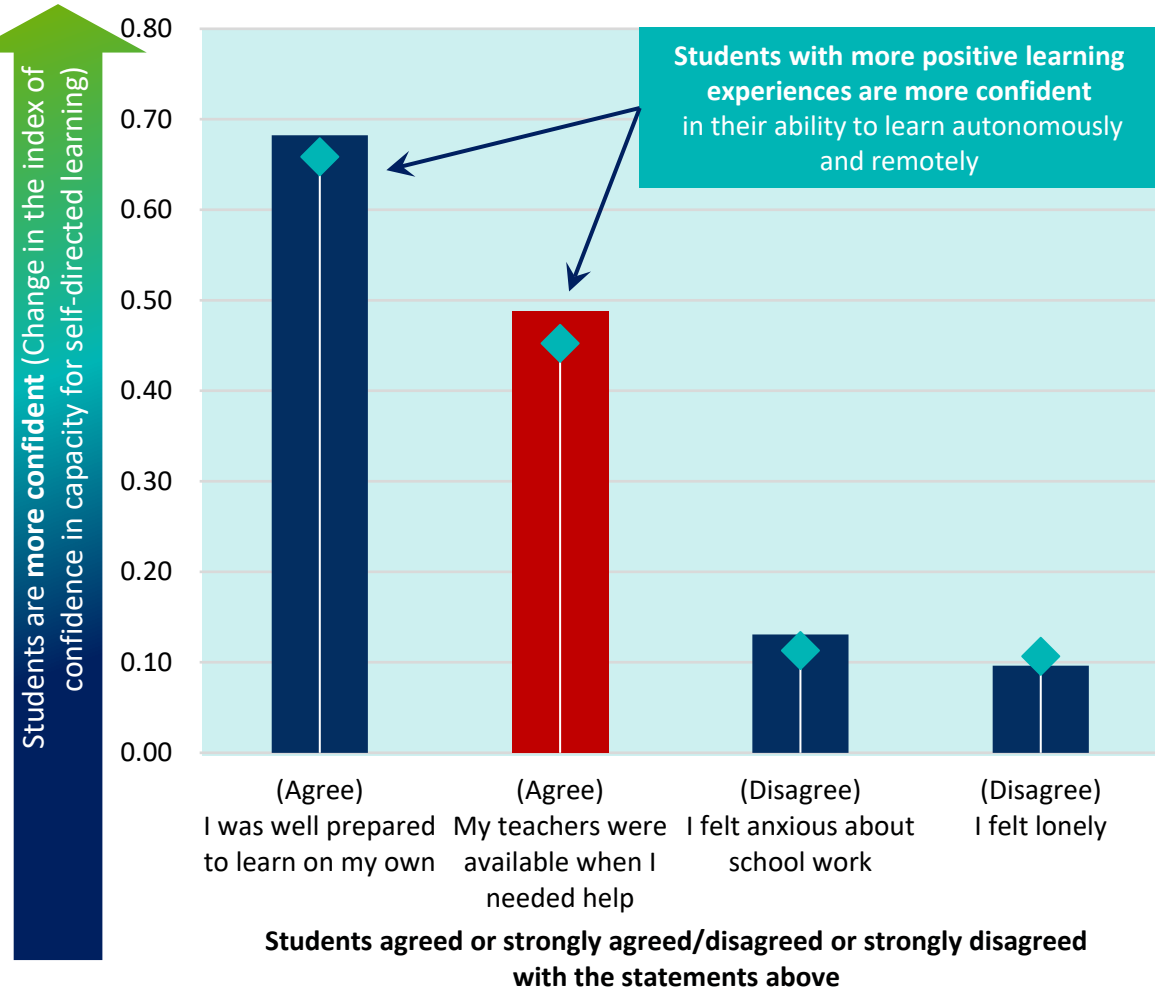
Remote learning, mathematics performance and confidence in self-directed learning

Figure II.2.12

Change in the index of confidence in students' capacity for self-directed learning/in mathematics performance, when students agreed or disagreed with the following statements about the time when their school building was closed because of COVID-19; OECD average

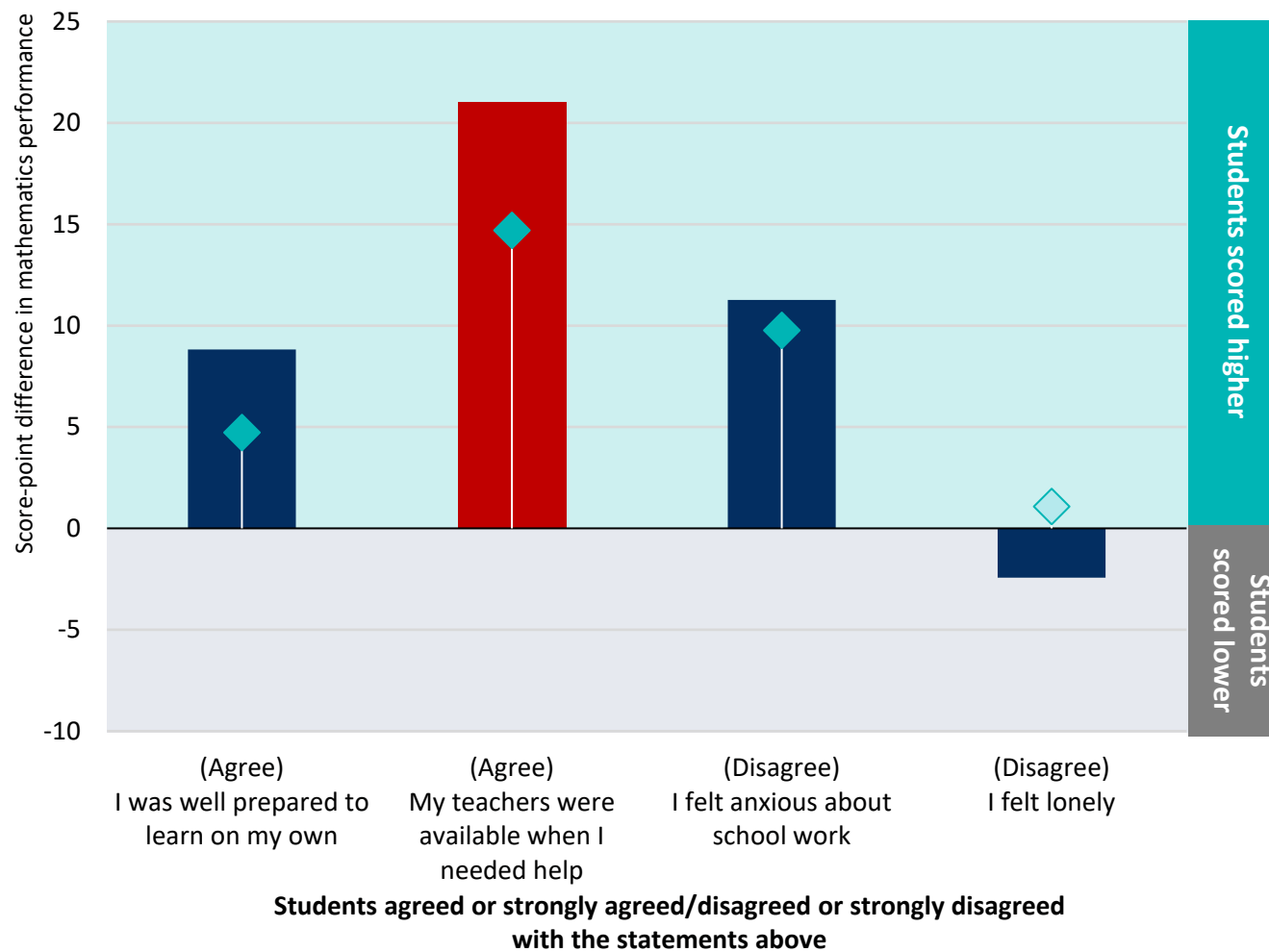
■ Before accounting

◆ After accounting for students' and schools' socio-economic profile, and mathematics performance



■ Before accounting

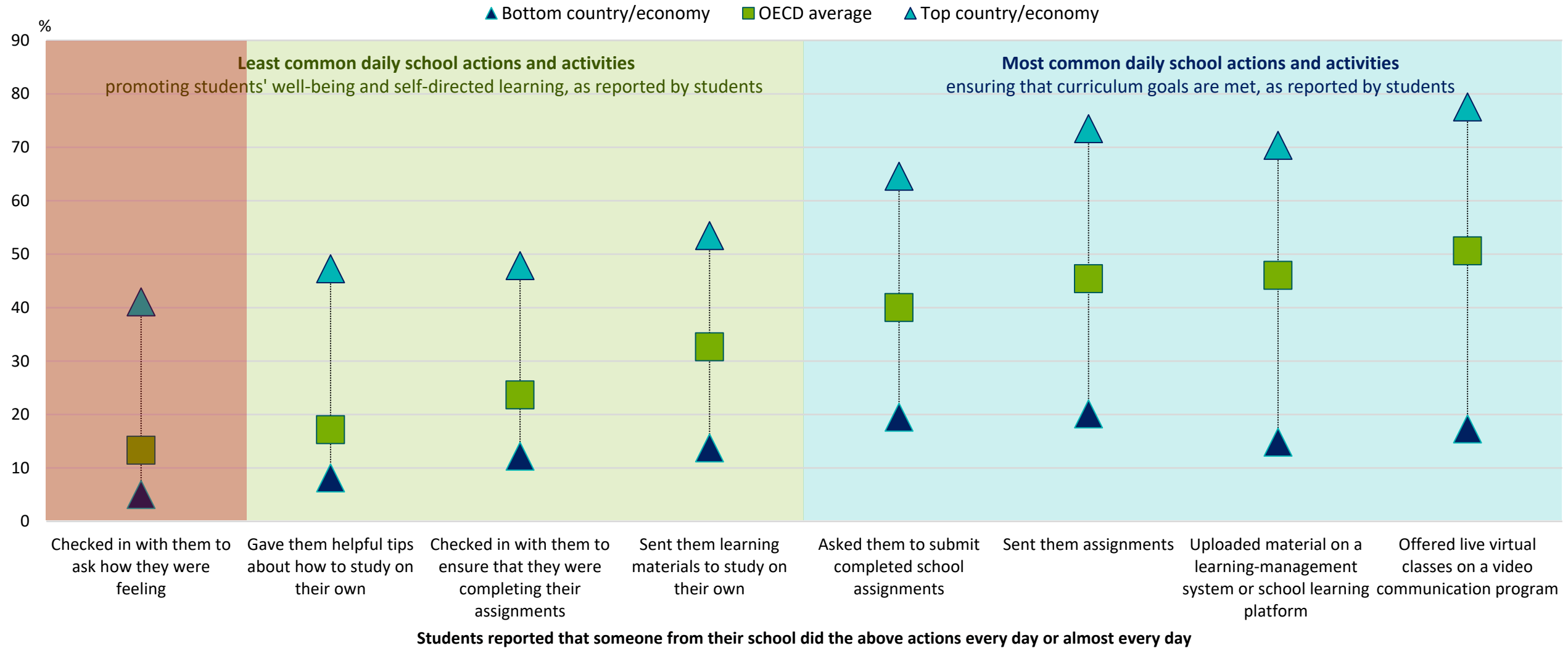
◆ After accounting for students' and schools' socio-economic profile



School actions and activities to maintain learning and well-being

Figure II.2.16

Percentage of students who reported that someone from their school did the following actions every day daily when their school building was closed because of COVID-19; OECD average



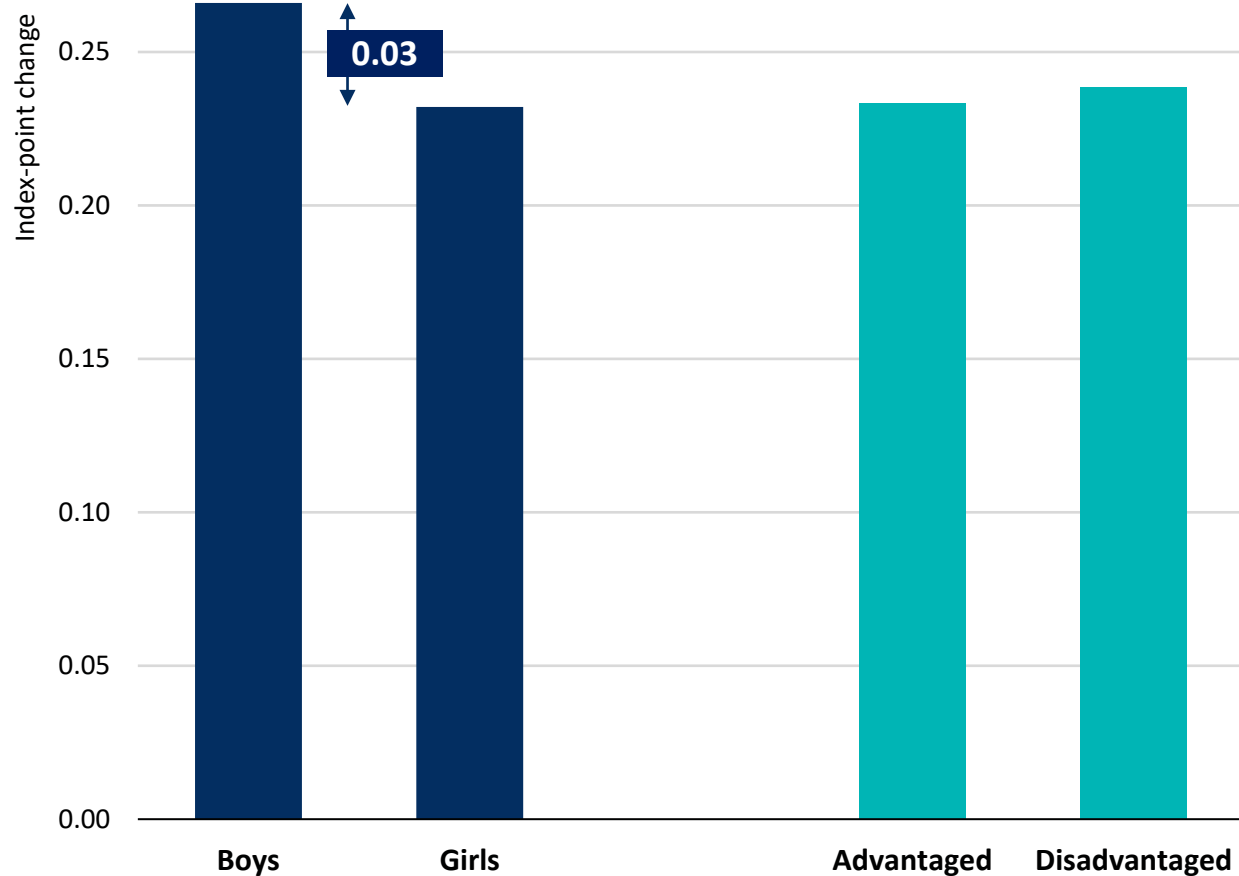


School actions to maintain learning and selected student outcomes

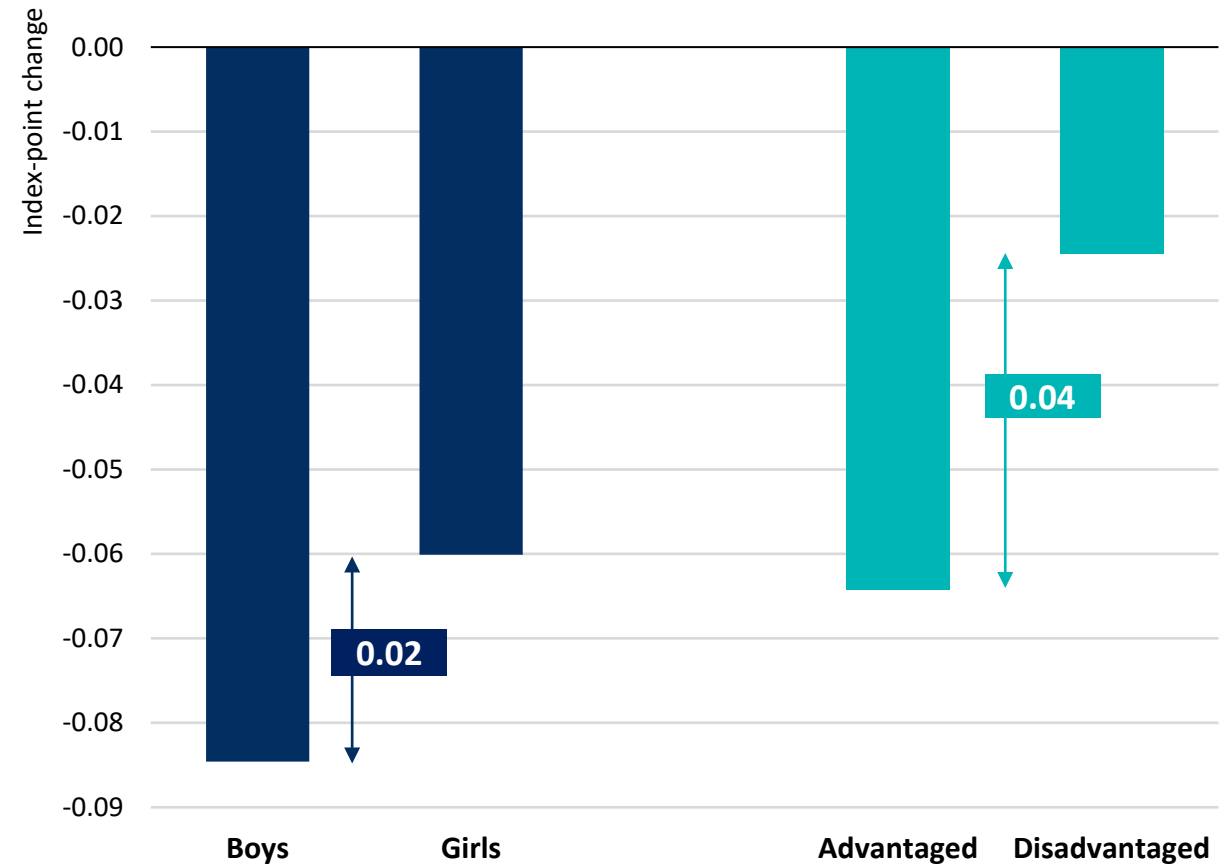
Figure II.2.18

Change associated with a one-unit increase in the index of school actions and activities to maintain learning; OECD average

Change in the index of students' confidence in their capacity for **self-directed learning**



Change in **mathematics anxiety**



Beyond academic learning

Student well-being

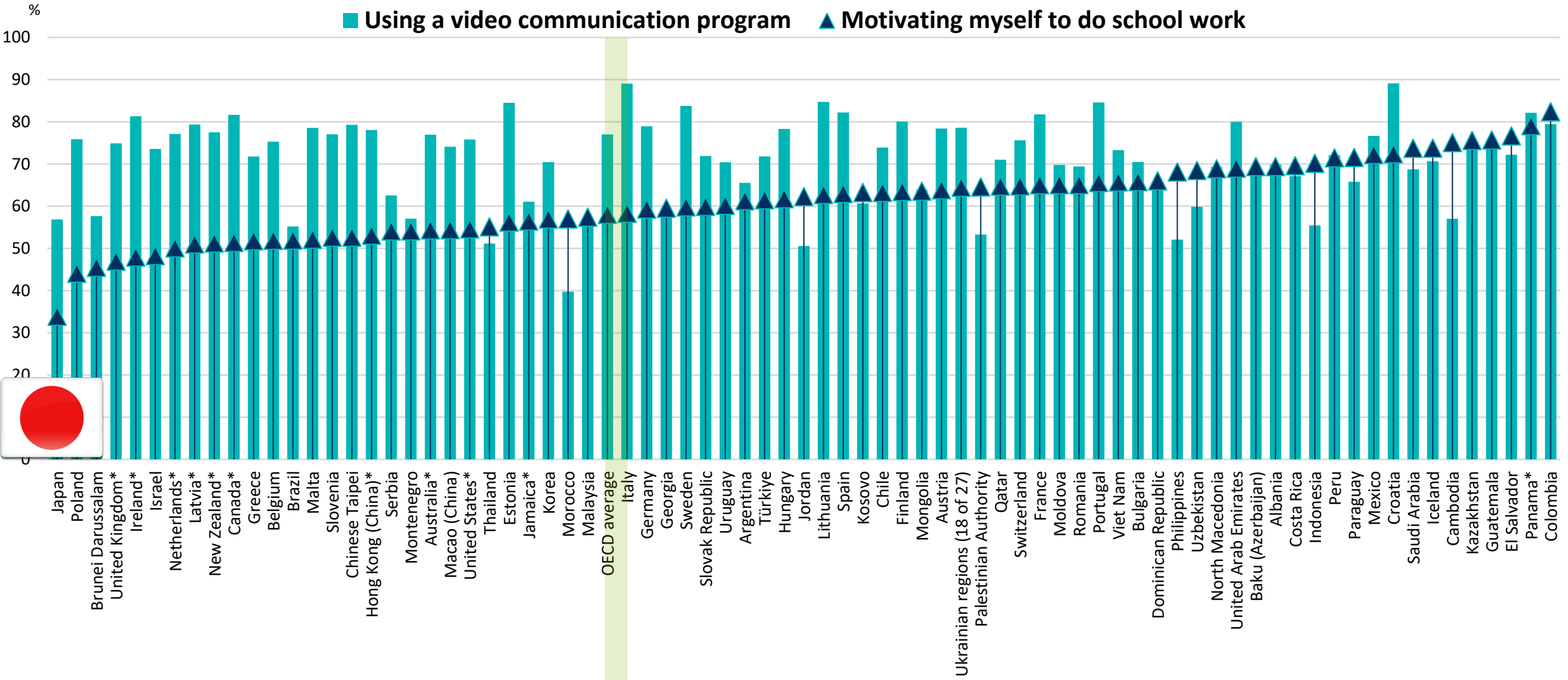




Students' confidence in self-directed learning

Figure II.2.5

Percentage of students who reported feeling confident/very confident in taking the following actions if their school building closes again in the future



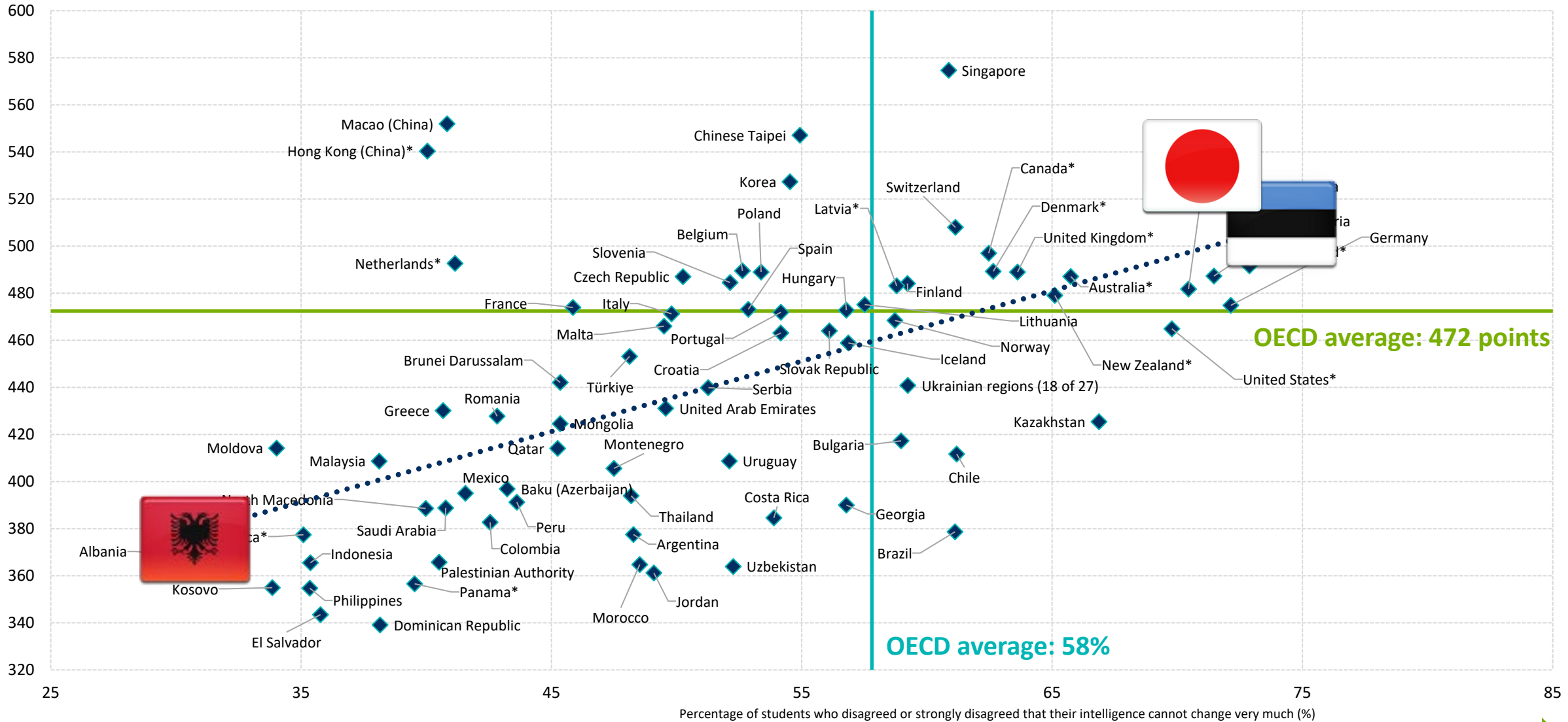


Growth mindset and mathematics performance

Table I.B1.2.1 &
Table I.B1.2.16

Higher score

Mean score in mathematics

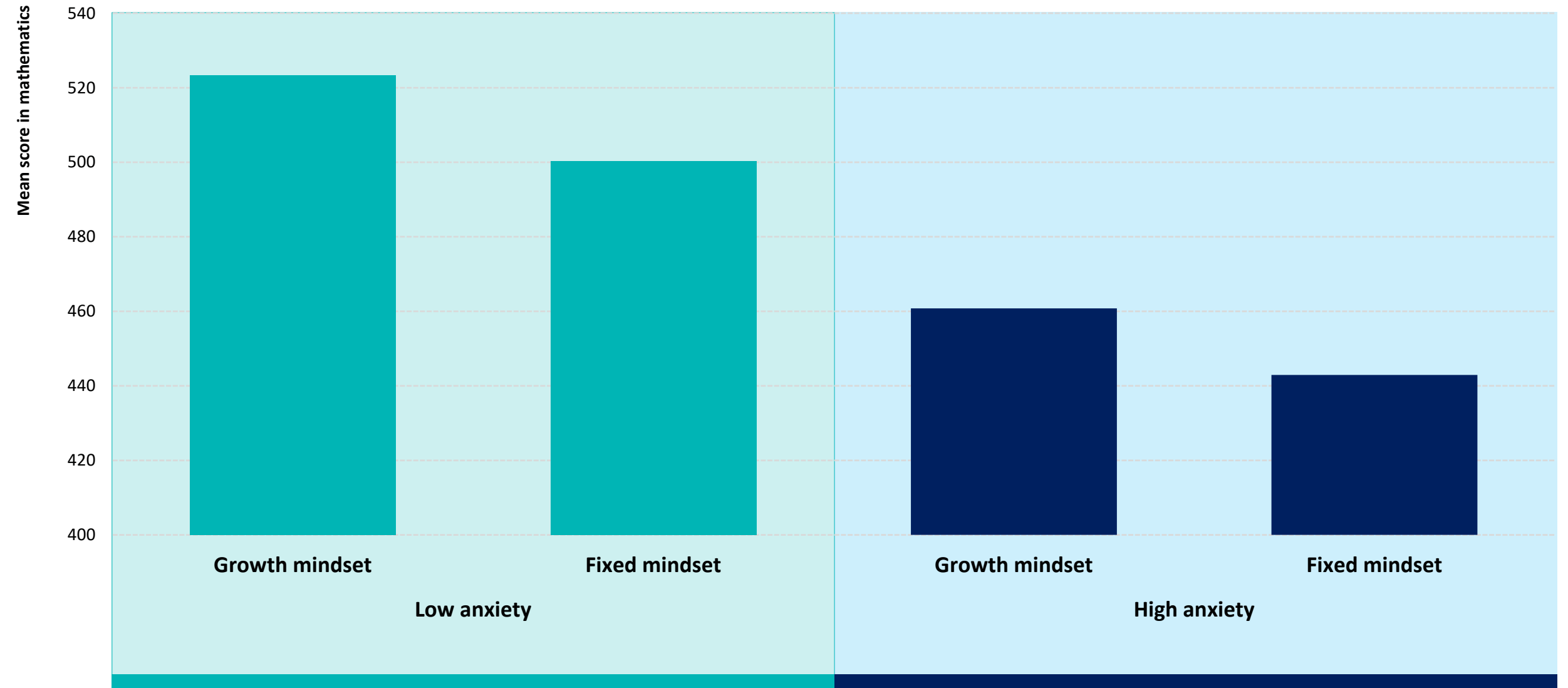


More students holding a growth mindset



Mathematics performance and anxiety in mathematics among students with fixed and growth mindsets

Figure I.2.2



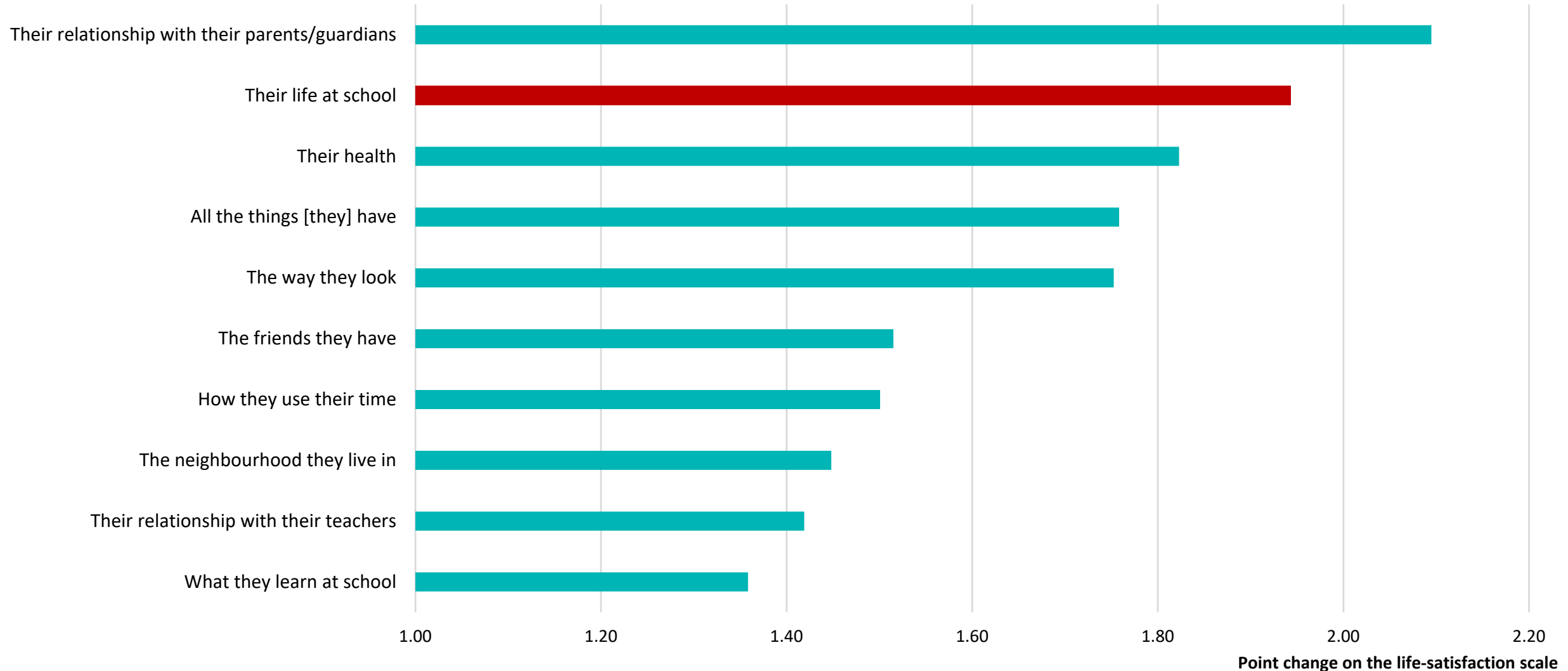


Life satisfaction and satisfaction with different aspects of life

Figure II.1.7

Average of countries/economies with available data

Change in life satisfaction when students reported that they are satisfied or totally satisfied with the following:

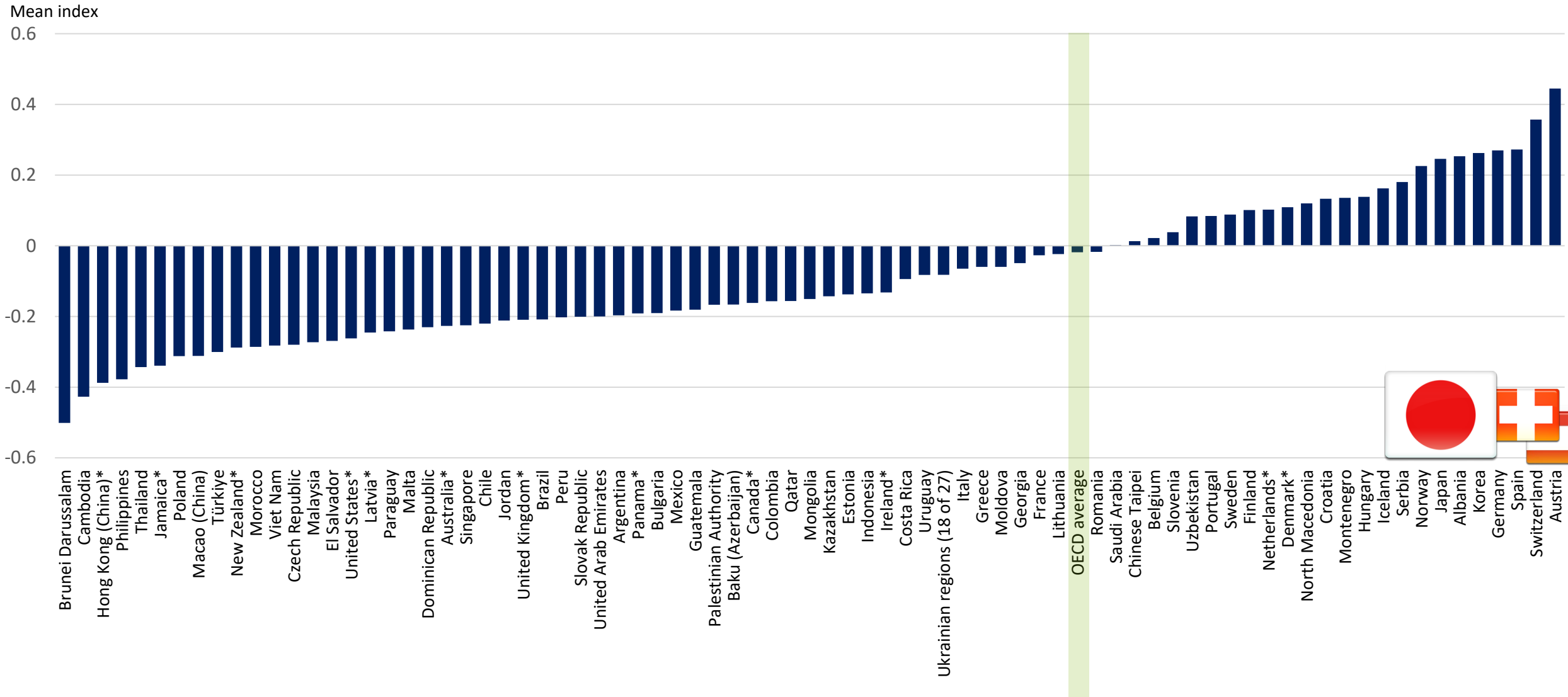




Students' sense of belonging at school, across all countries and economies

Table II.B1.1.1

Based on students' reports

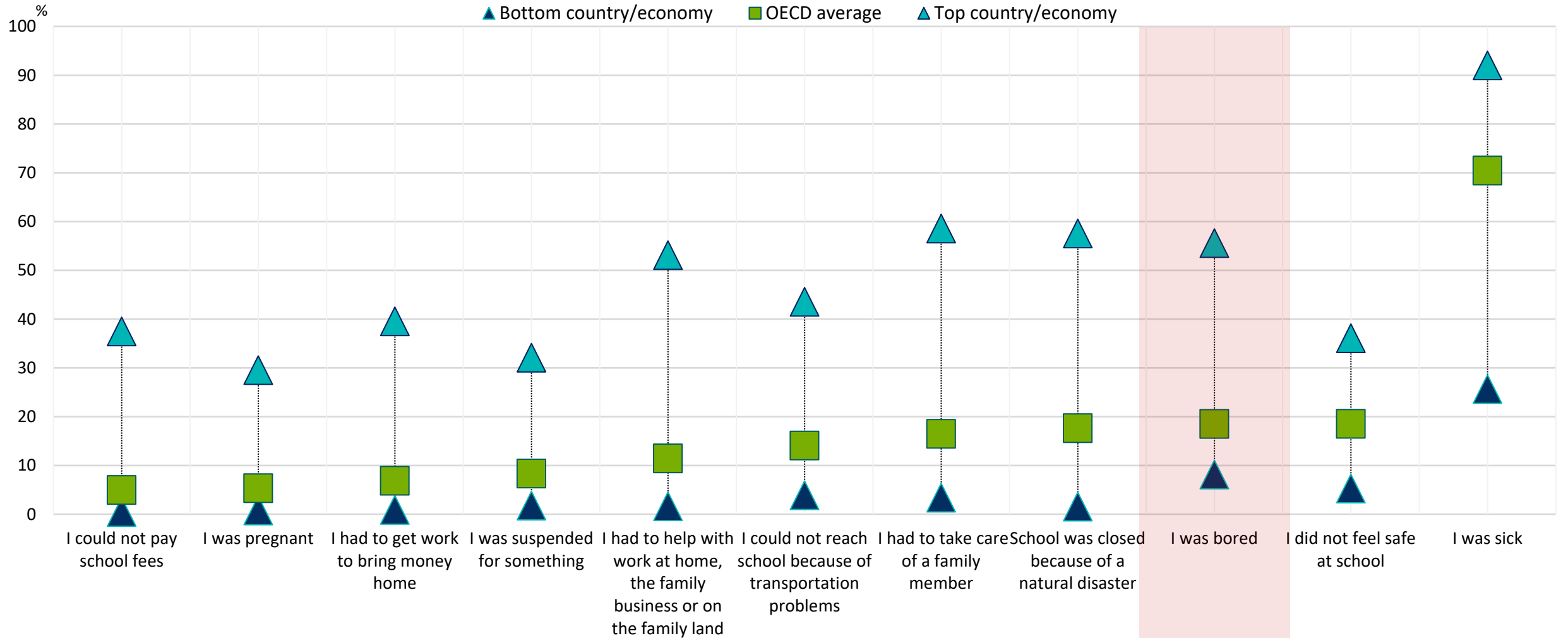




Reasons for long-term absenteeism

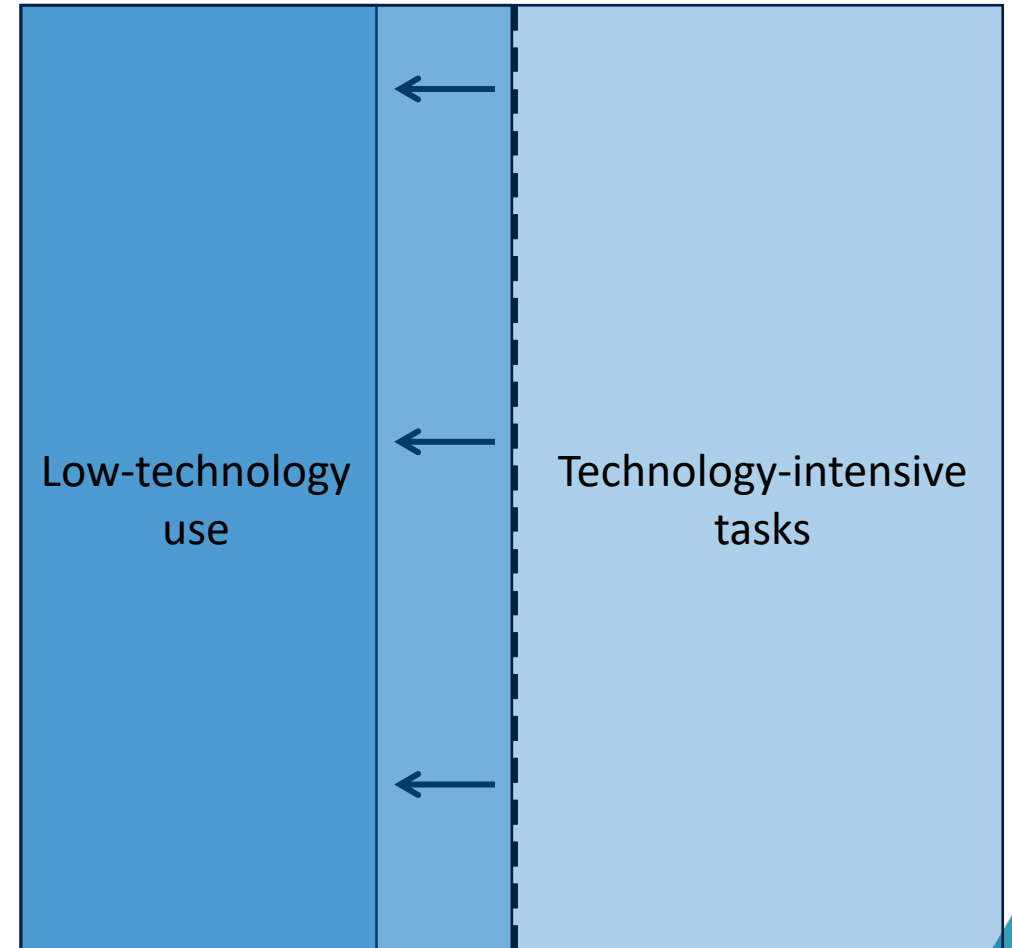
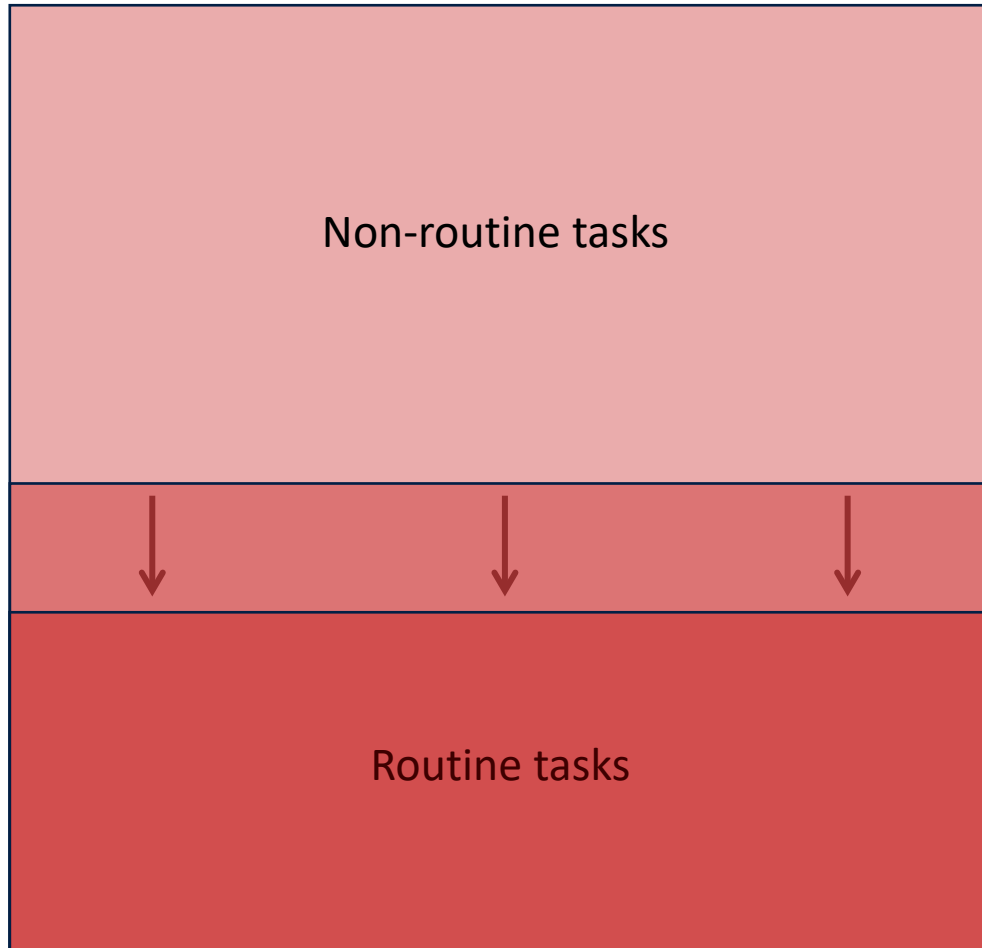
Figure II.3.13

Percentage of students who reported the following reasons for having missed school for more than three consecutive months



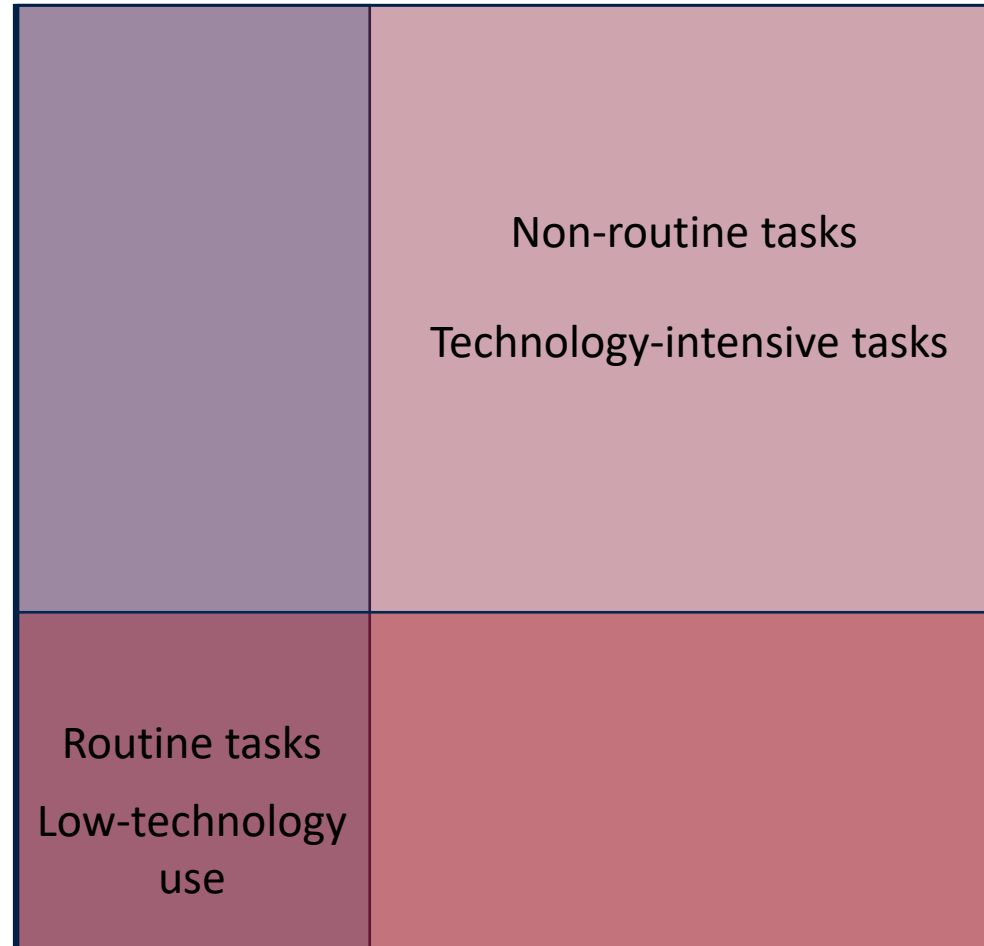


The kinds of things that are easy to teach... ... have now become easy to digitise and automate



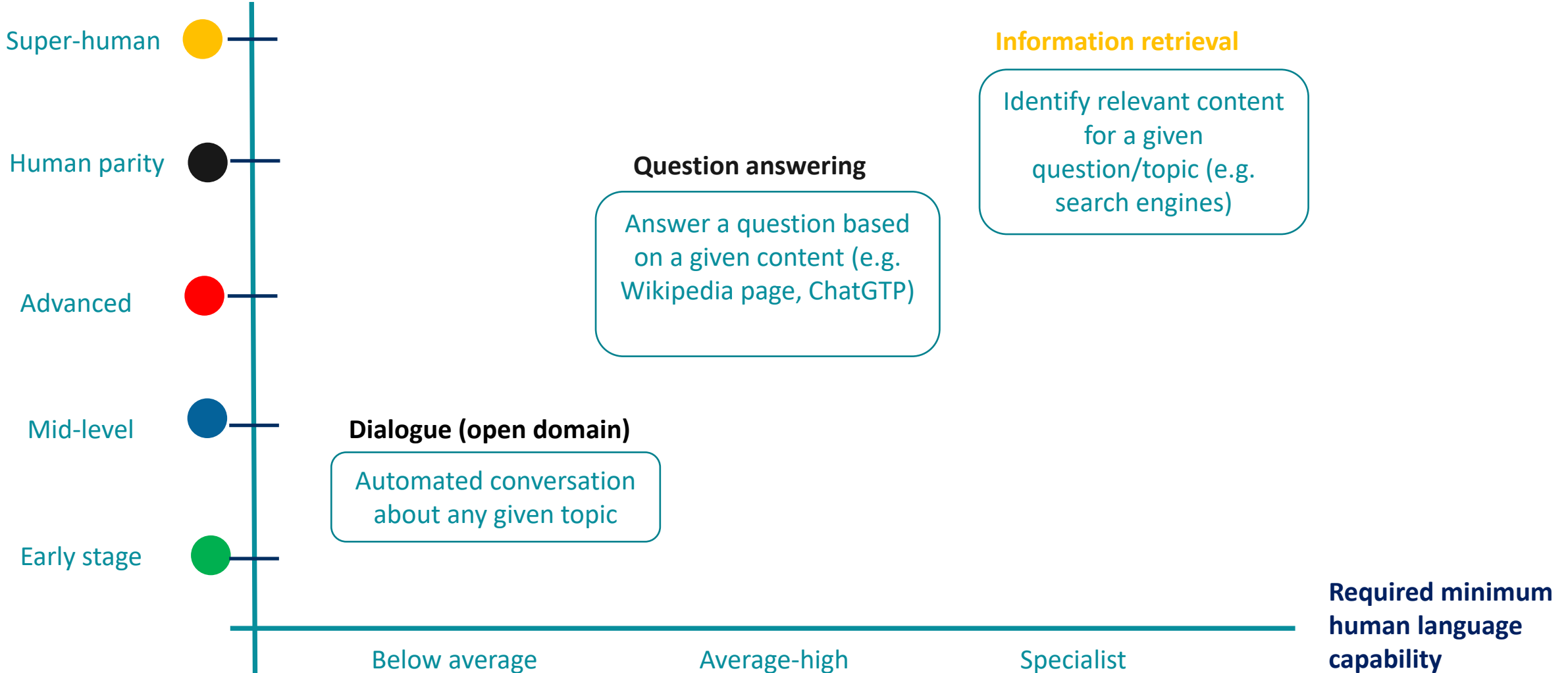


The kinds of things that are easy to teach...
... have now become easy to digitise and automate



AI versus humans – benchmarks

State of the art Natural Language Processing performance



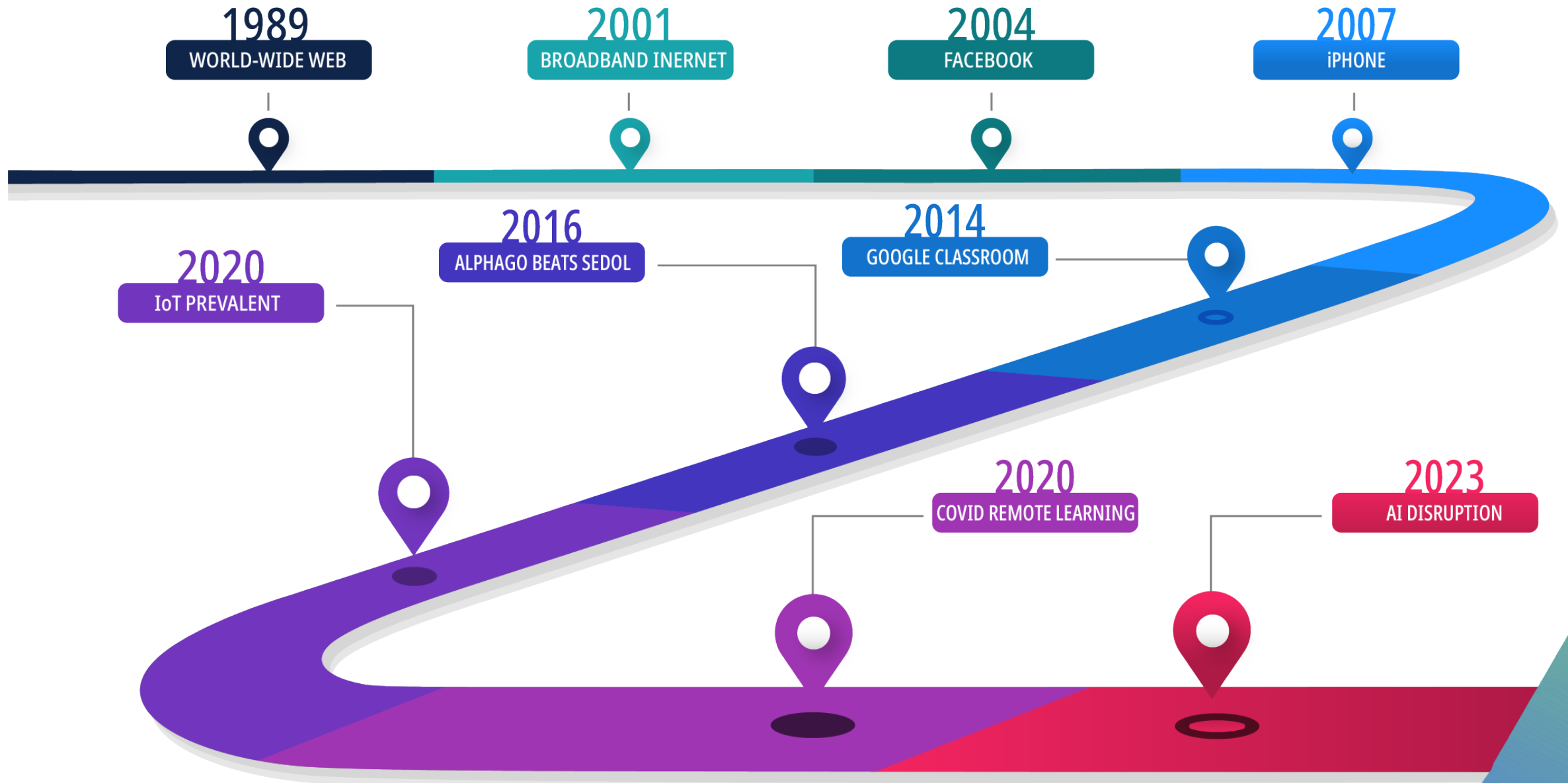


What does it mean for education?

- Education should offer new ways of seeing, sensing and interpreting the world, in ways that reconcile competing beliefs and values, re-build meaning in people's lives and restore well-being.
- Education should provide opportunity and fulfilment for everyone, respecting and nurturing a broader range of strengths, including dispositions for caring and creativity.
- Education should equip people to design and establish the next set of economic, societal and organisational models.



The digital education transition is accelerating



Personalising learning

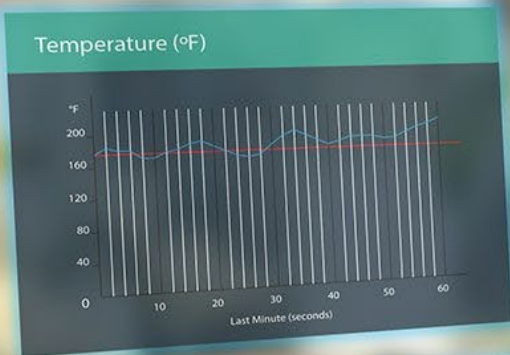


A young boy with short dark hair, wearing a blue t-shirt with a cartoon character and a black watch, is focused on playing a video game. He is holding a silver Sony DualShock 3 controller. The game on the monitor shows a character in a grassy field. In the background, other people and computer monitors are visible, suggesting a public gaming area or exhibition. A large purple rounded rectangle with the word "Fun" in white is overlaid on the right side of the image.

Fun

Virtual reality embeds learners 3D

Augmented reality superempowers the real world



PLC Status All ▾

Status	Metric	Value
●	Servo Temp	220 °F
●	Air Pressure	285 PSI
●	Hydolyser	11%
●	Pressure Pump	2915 PSI
●	Fan Speed	1300 RPM
●	Compressor	4450 PSI

Robotic Arm Health and Performance

Overall Performance	Unit Efficiency	Temperature	Humidity
89%	49%	195 °F	25%



Learning through teaching?



Classroom analytics: make visible what's invisible



Source: Roca, Kidzinski and Dillenbourg, 2015

Input
(sensors)



Output
(dashboard)



A. Regulating teachers' attention using Lantern devices

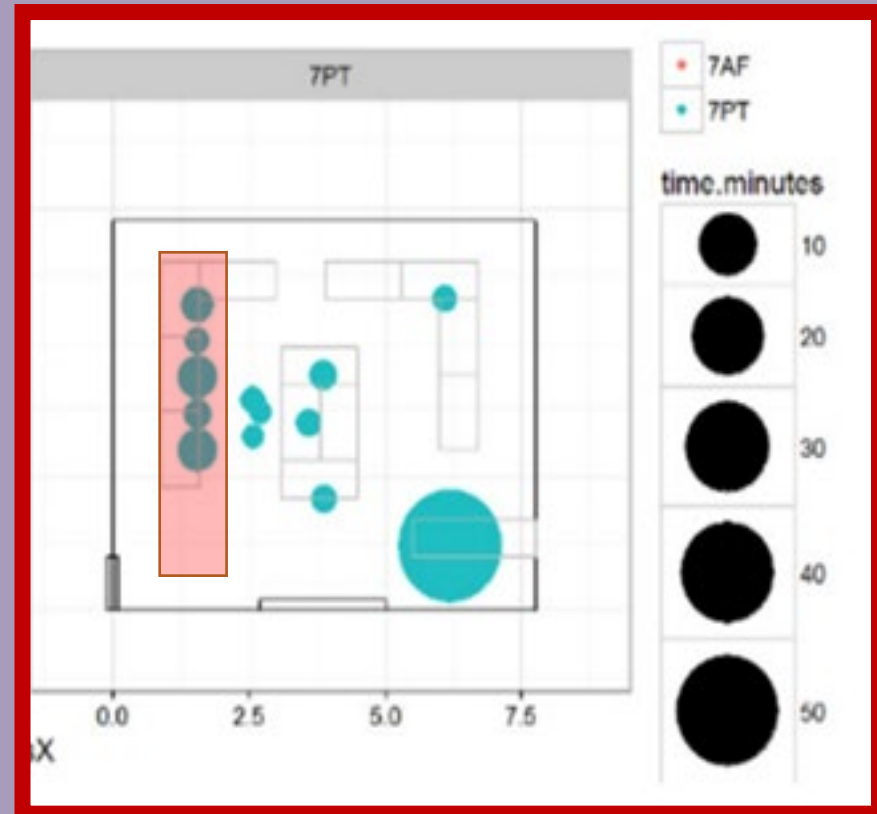


Source: (Alavi and Dillenbourg, 2012[22])



Professional feedback

Showing teachers where the spend time in the classroom



Source: Prieto et al., 2017

Re-integrating learning and assessment



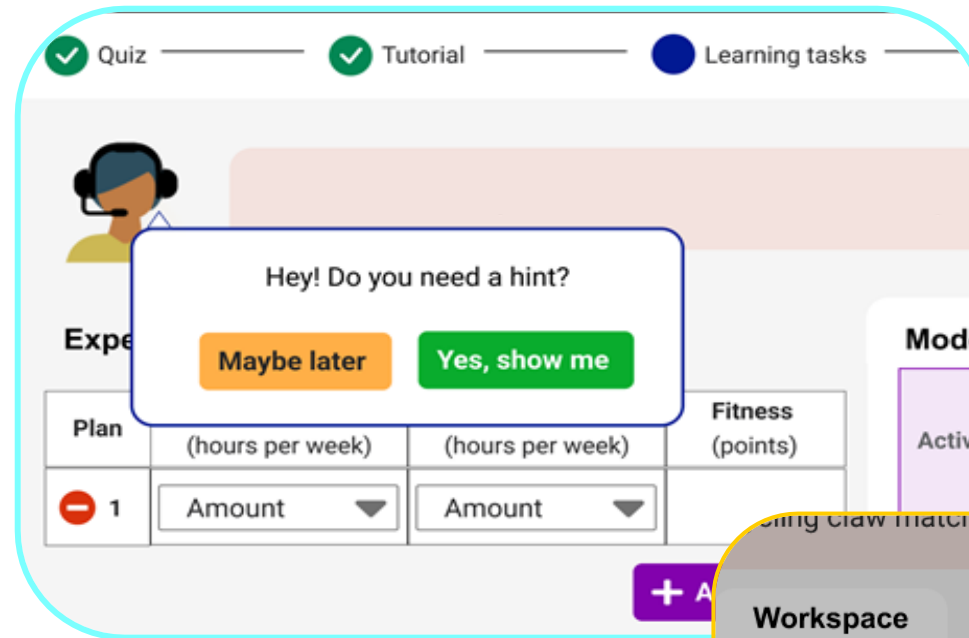
VS





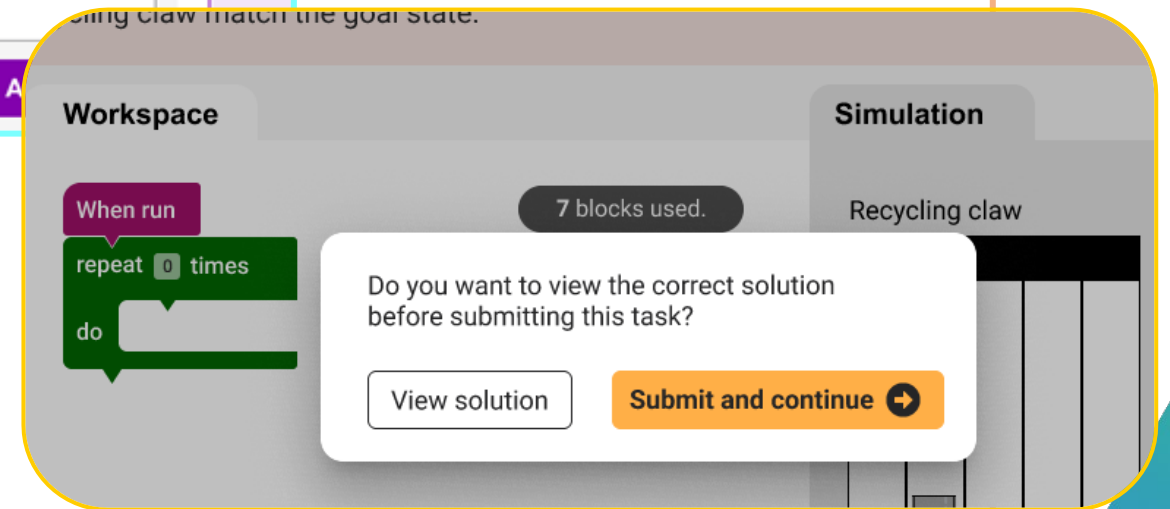
How will students **demonstrate their learning skills?**

Students will also...



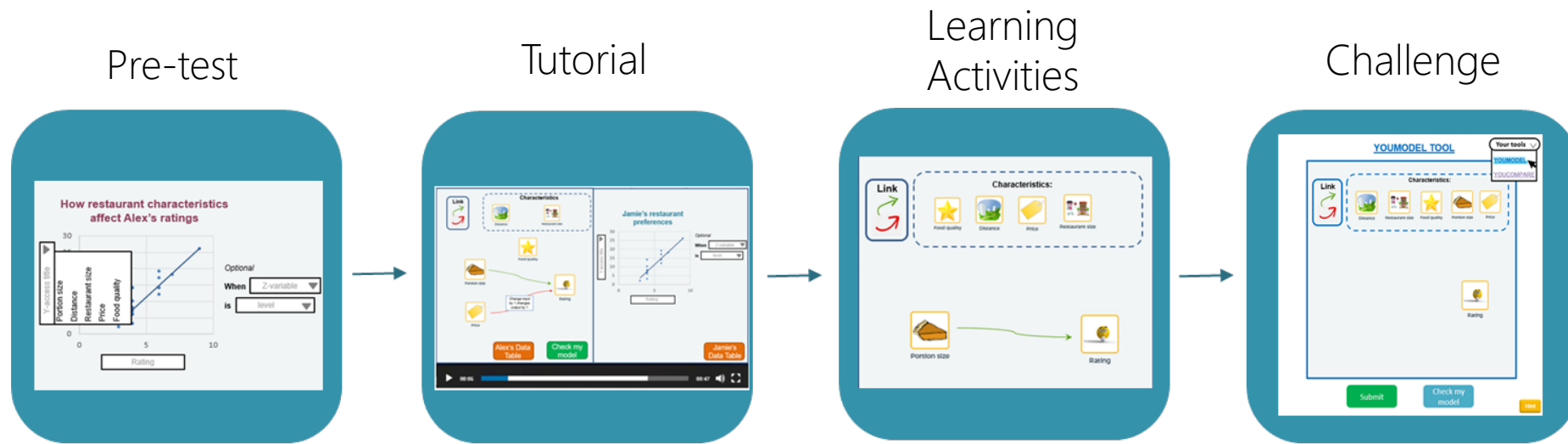
- **Reflect on their achievements** during the assessment

- **Interact with an intelligent tutor** to get help when they are stuck



What can we learn from these assessments about education systems?

Information on student learning

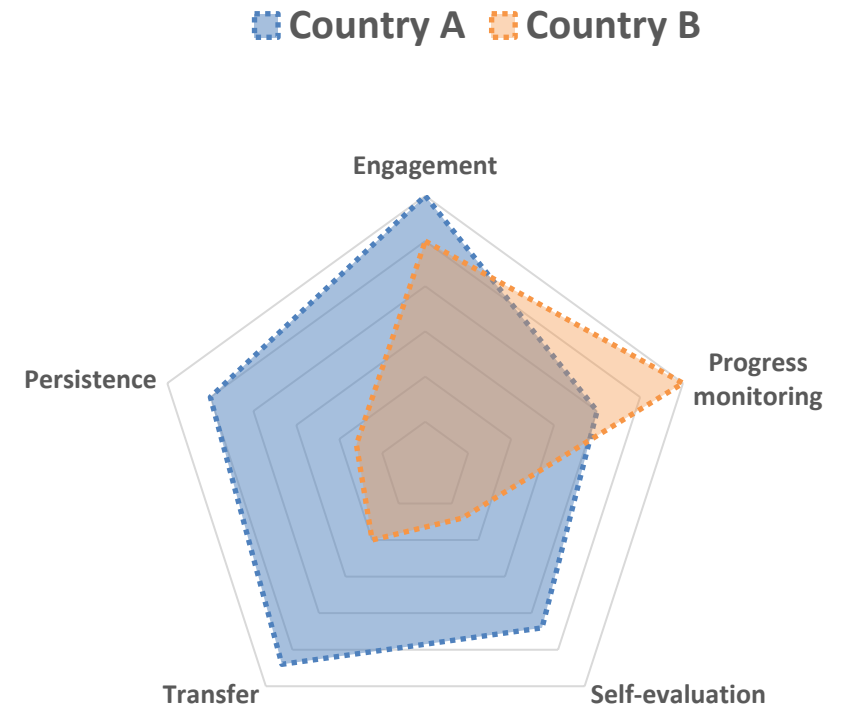
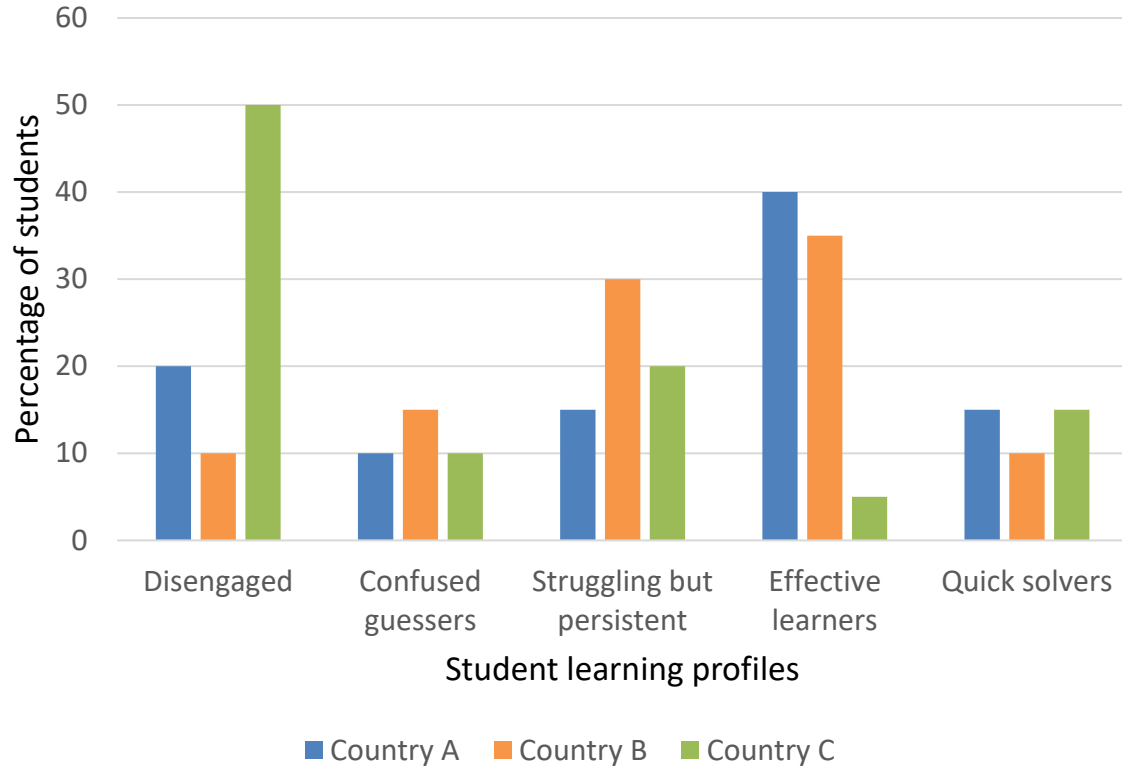


Baseline measure of students' prior knowledge

Measure of learning gain =
Score on LDW test after accounting for pre-test score



What can we learn from these assessments about education systems?



Profiles of self-regulated learners



Seizing the opportunities of AI and digital technology in education...

- **Personalising** learning and education
- Improving **efficiency**
- Fostering **inclusion and equity**
- Enhancing **research and innovation**
- Enhancing the **quality of teaching**
- Making **education more relevant** to modern times (e.g. generative AI apps)



... while mitigating risks and addressing challenges with guardrails

- **Digital divides:** provide equal access
- **Performance of digital tools:** assess the stakes and involve humans
- **New or amplified biases:** ensure not only advantaged students reap the benefits
- **Inefficiencies of a digital ecosystem:** provide what's useful more than just what's possible
- **Privacy and data protection:** cover new possibilities, address new challenges
- **Ethics of AI:** promote adaptive regulation
- **Social acceptance:** communicate benefits while questioning naïve endorsement



Find out more about our work at www.oecd.org/pisa



PISA main reports

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