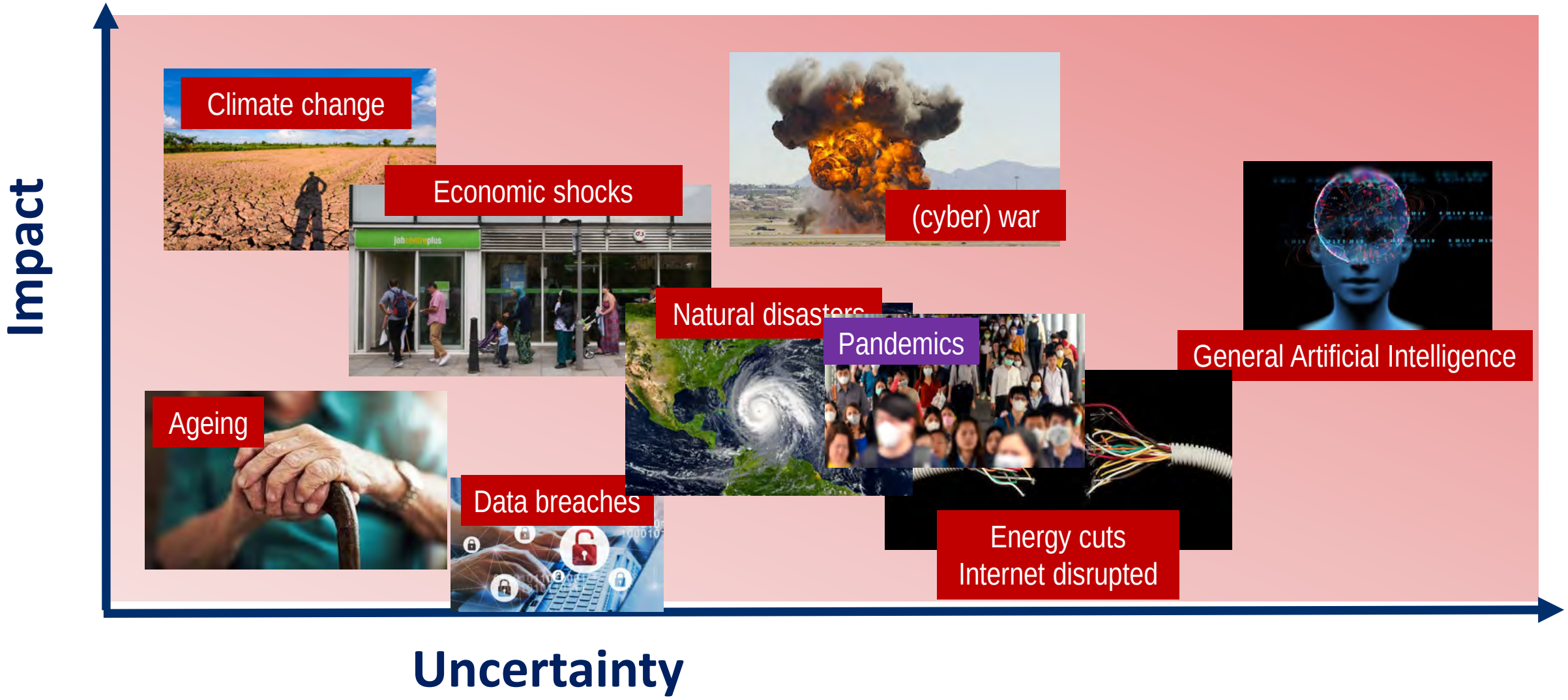
The future of education in the digital era

OECD Japan Seminar

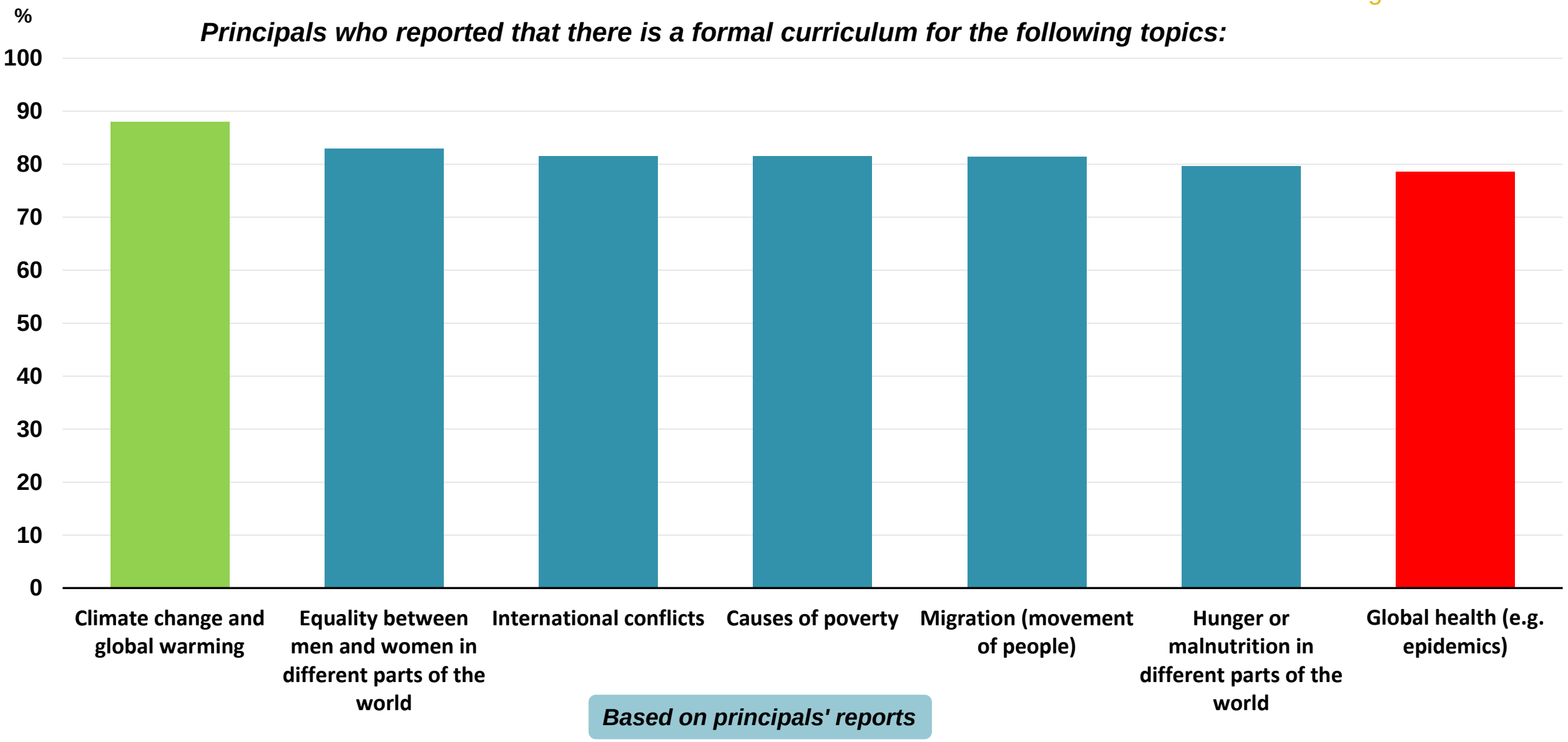
Andreas Schleicher

The future will always surprise us



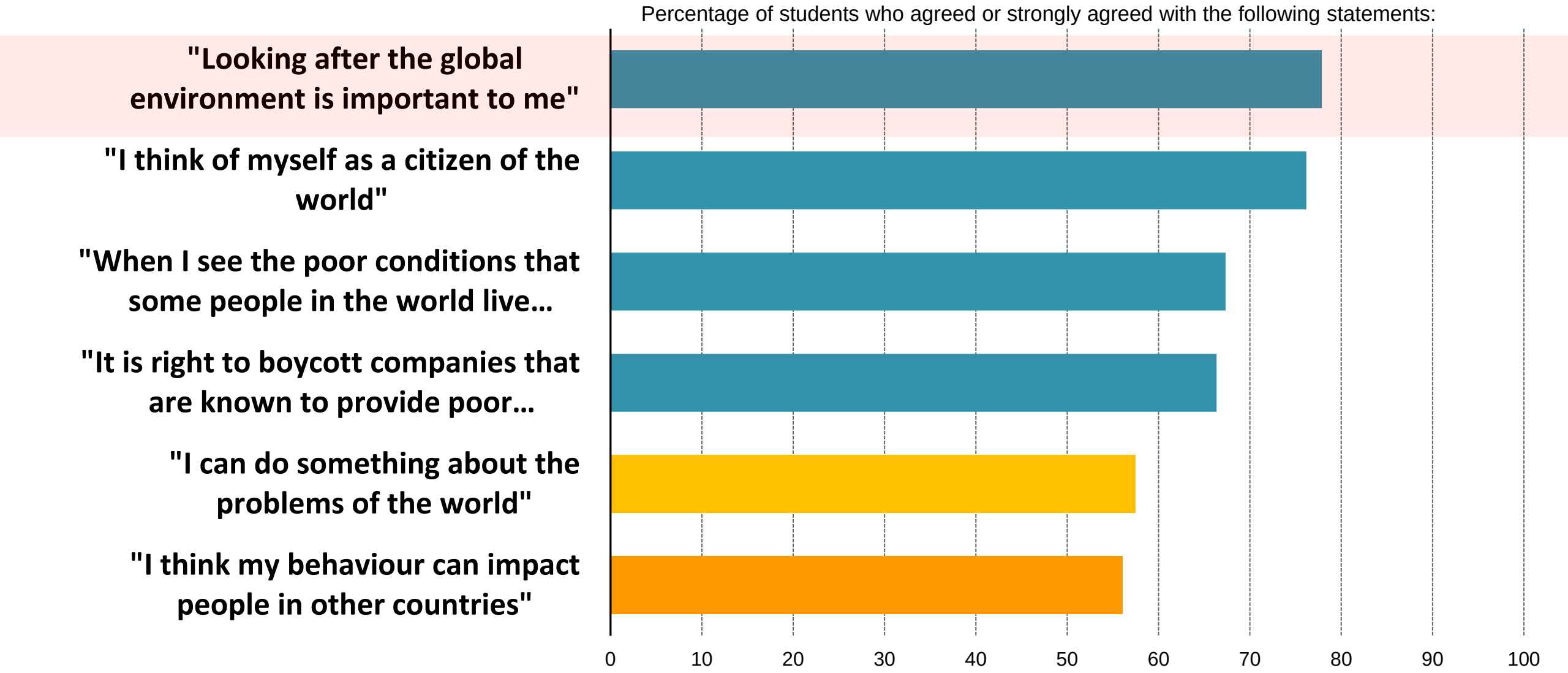
Sustainability issues covered in the curriculum (PISA, OECD average)

Fig VI.7.8



Students' agency regarding global issues (PISA, OECD average)

Fig VI.5.1a



A holistic approach to student agency

→ Students learn and develop their **agency** in interactions with others e.g. peers and friends, teachers, parents, siblings, others from any communities they belong to etc. (**co-agency**), and also in dynamics of a group (**collective agency**).

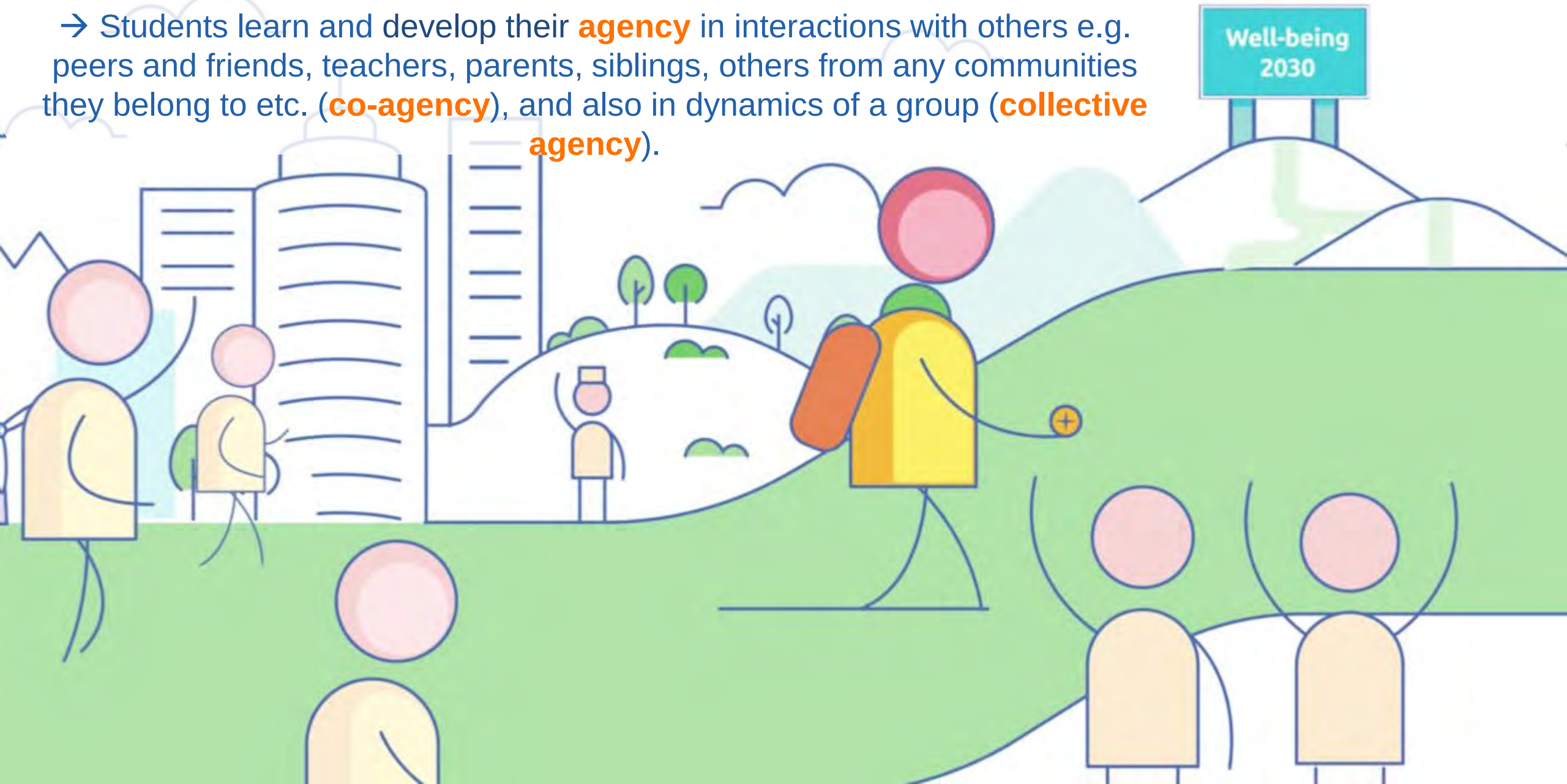
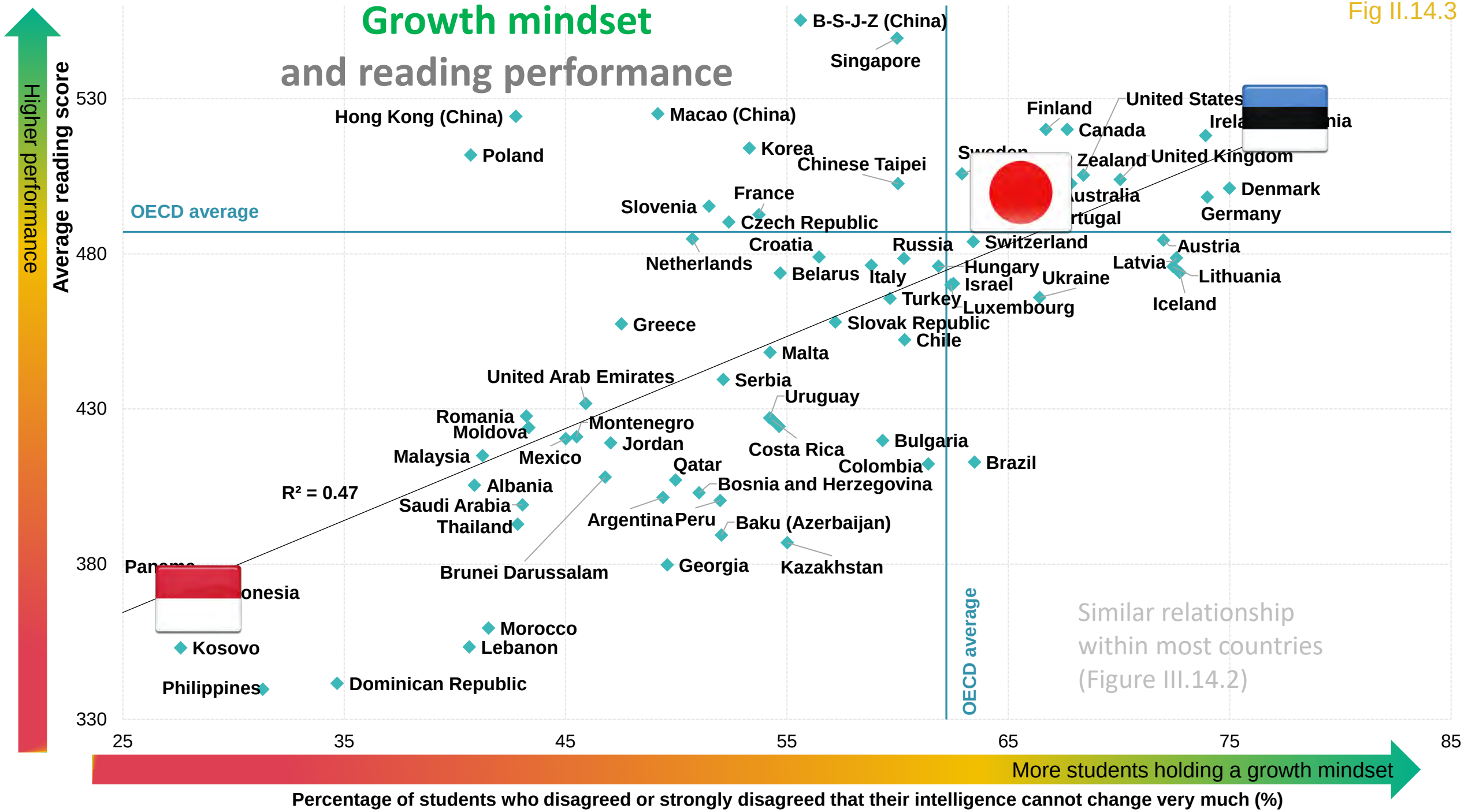


Fig II.14.3

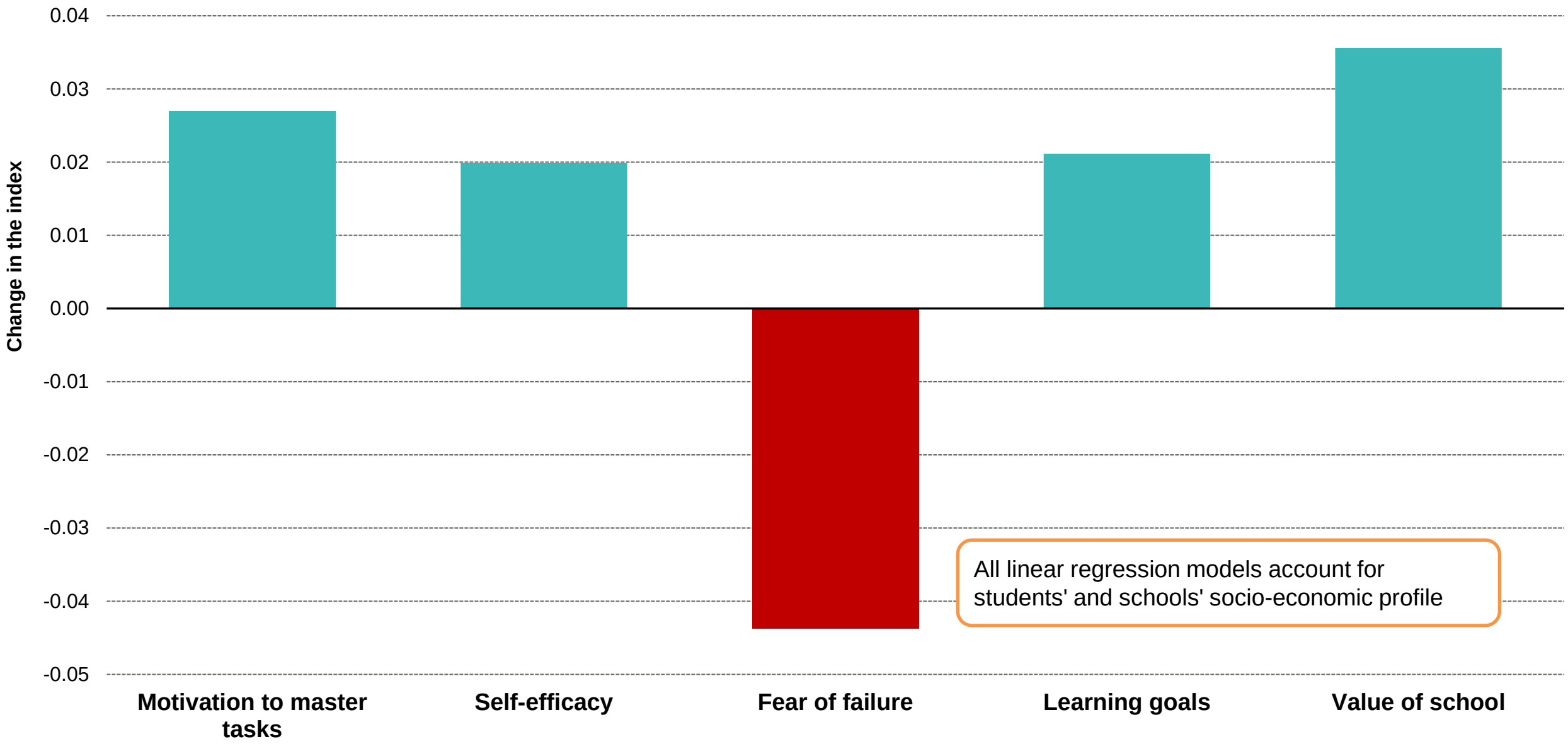
Growth mindset and reading performance



Growth mindset and student attitudes

Change in the following indices when students disagreed or strongly disagreed that "your intelligence is something about you that you can't change very much":

Fig III.14.5

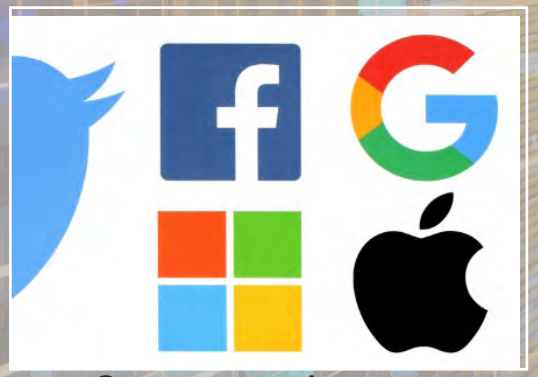


Digitalisation

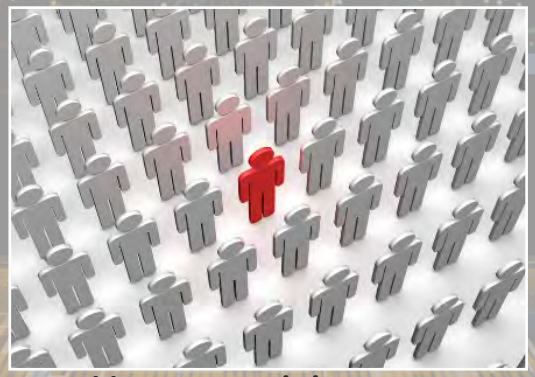
Democratizing

Particularizing

Empowering



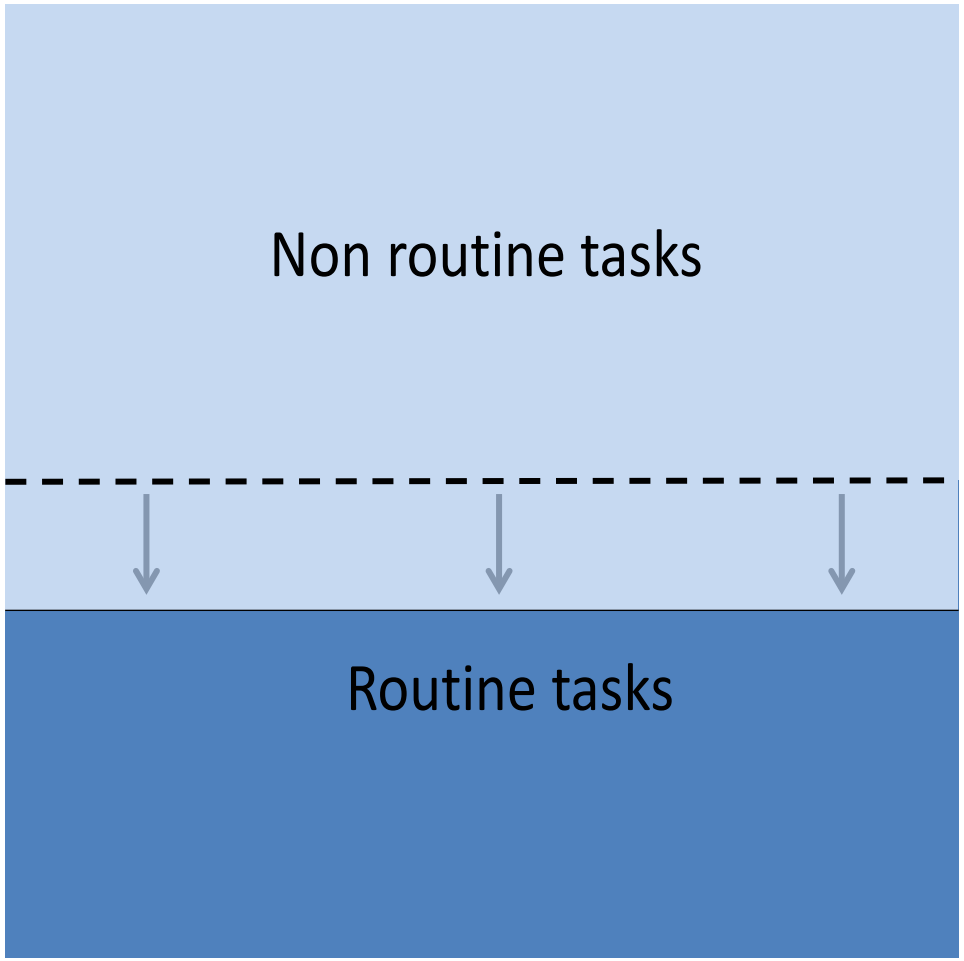
Concentrating

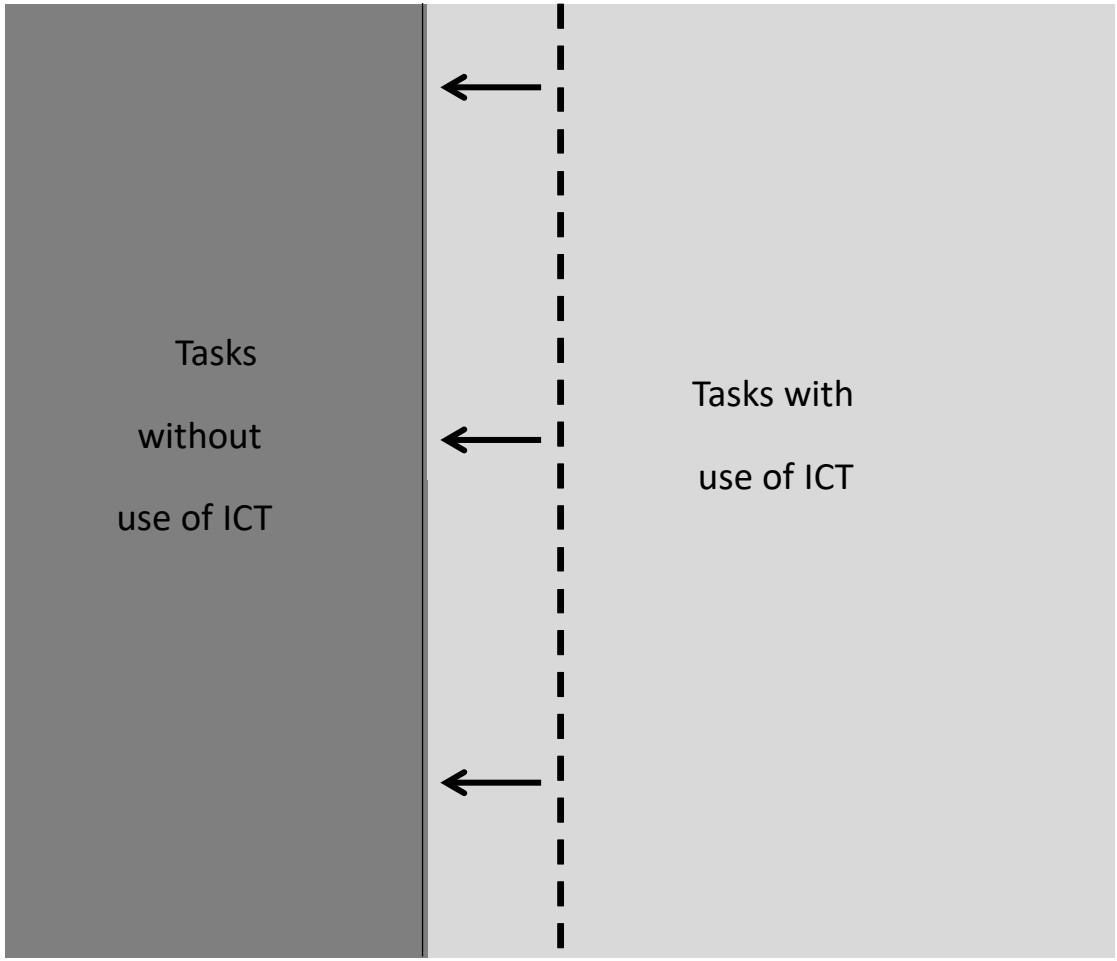


Homogenizing

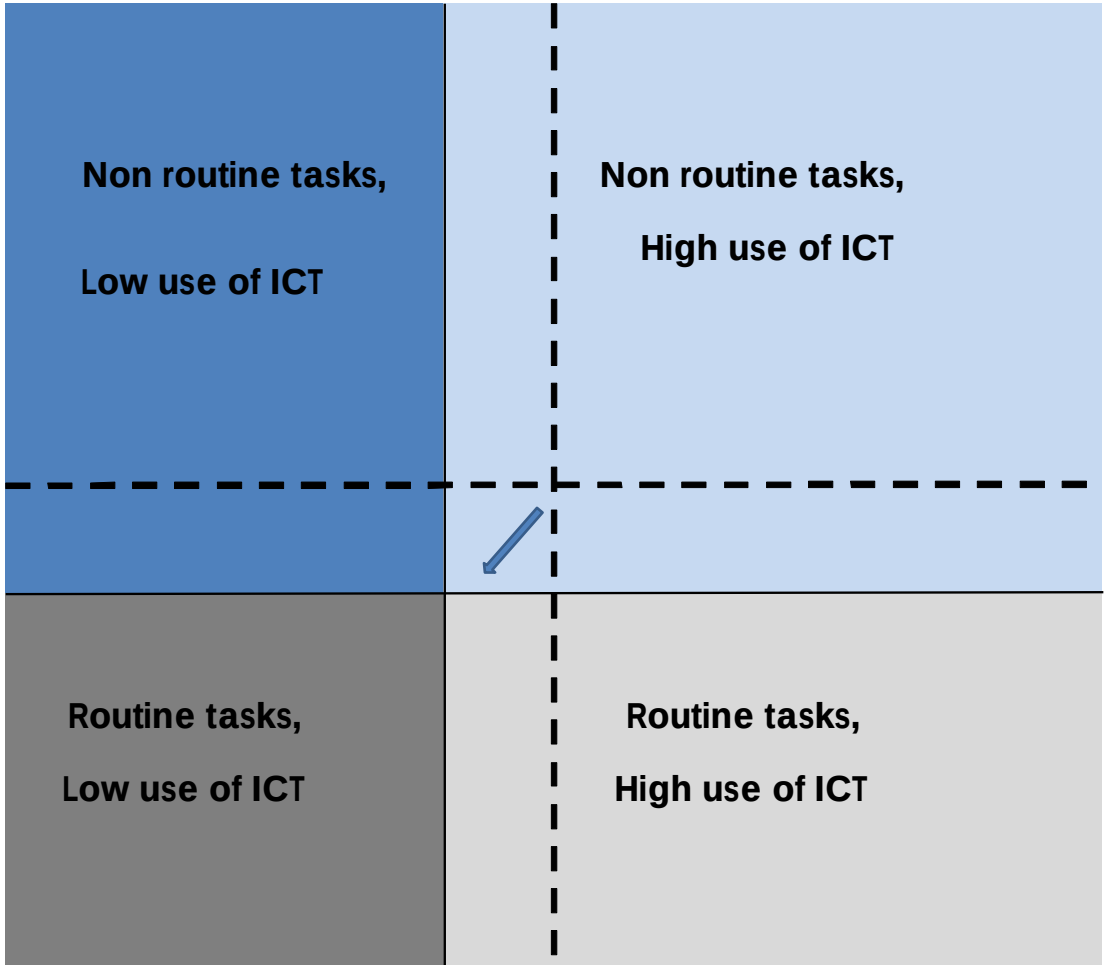
Disempowering

The kinds of things that are easy to teach and test…

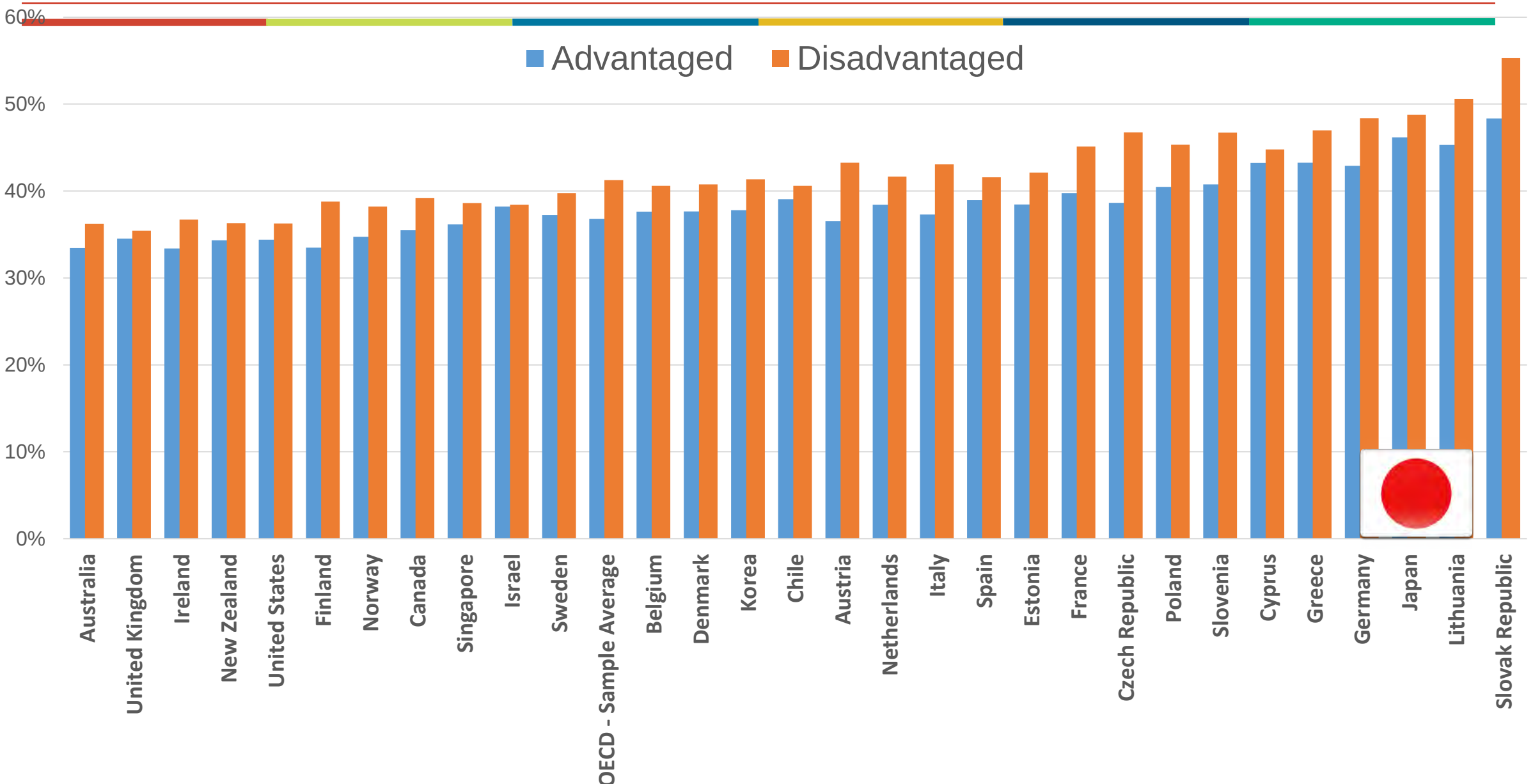




…have become easy to digitise and automate

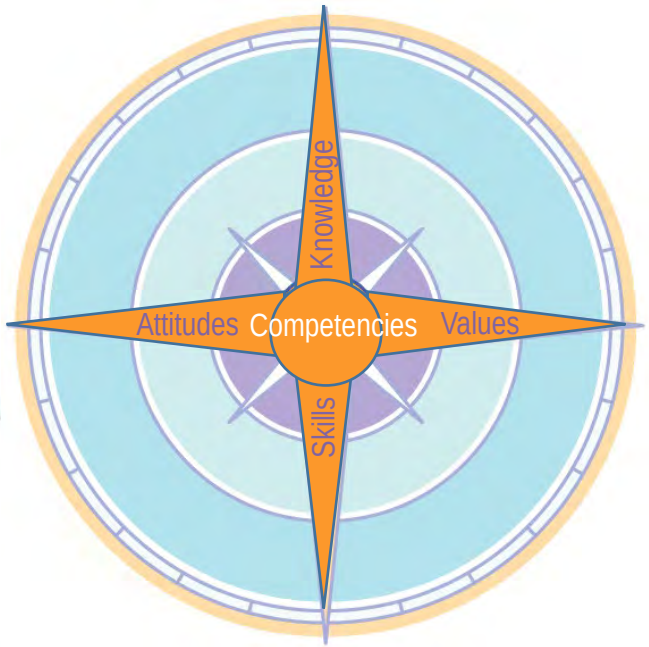


Yet, many teenagers aspire to jobs that are at high risk of automation (PISA)

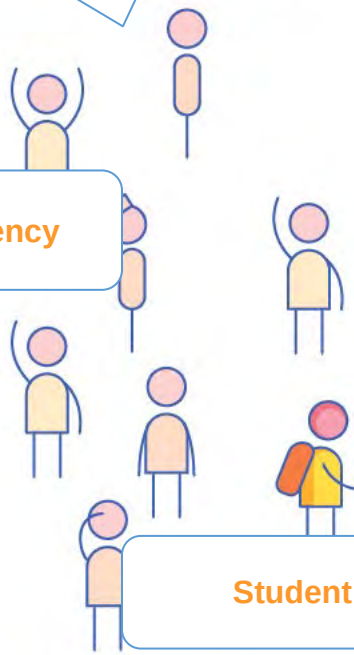


A holistic approach to defining a “competency“

Co-Agency
with peers, teachers, parents, communities



Collective Agency

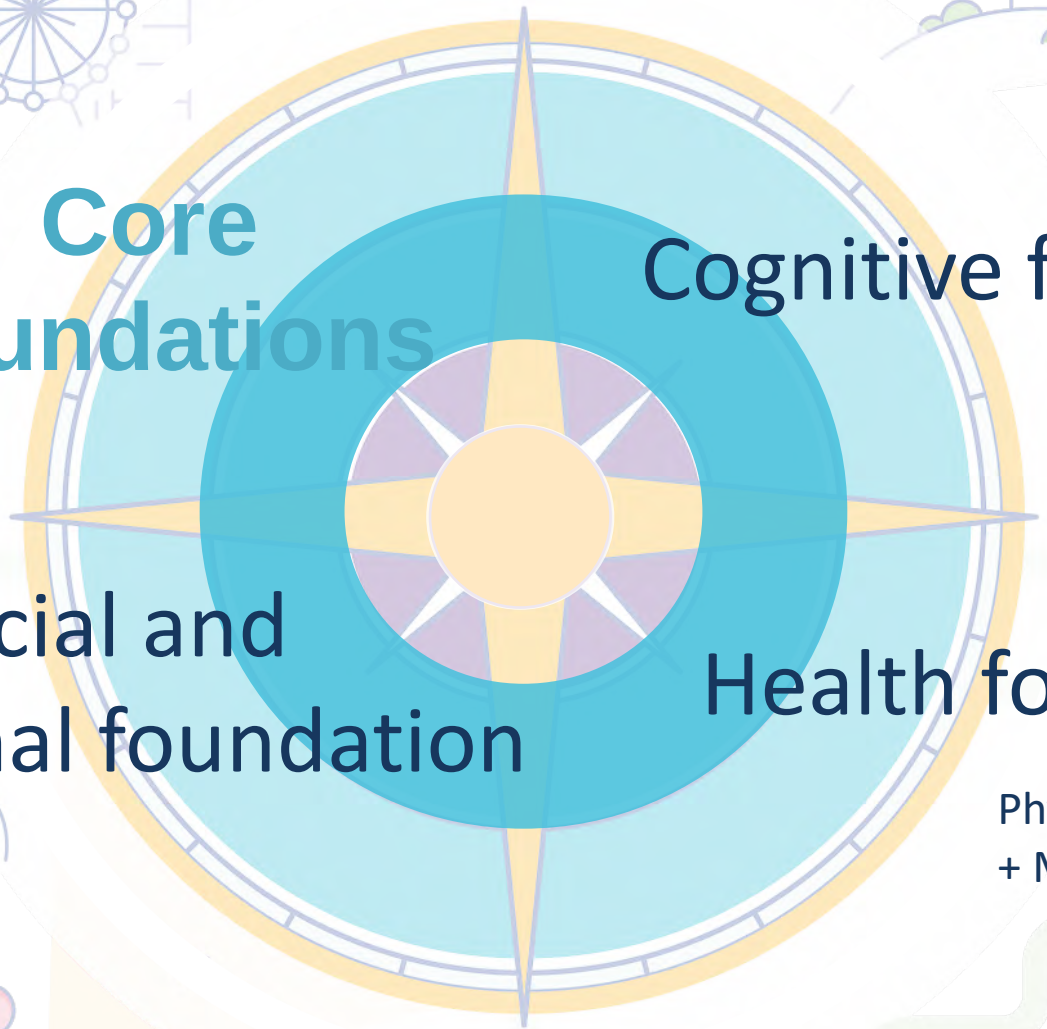


Student Agency

Competencies -
Interconnected nature of

- **Knowledge**
- **Skills**
- **Attitudes & values**

A holistic approach to core foundations of whole child development



Core Foundations

Cognitive foundation

Literacy, Numeracy
+ Digital literacy, Data literacy

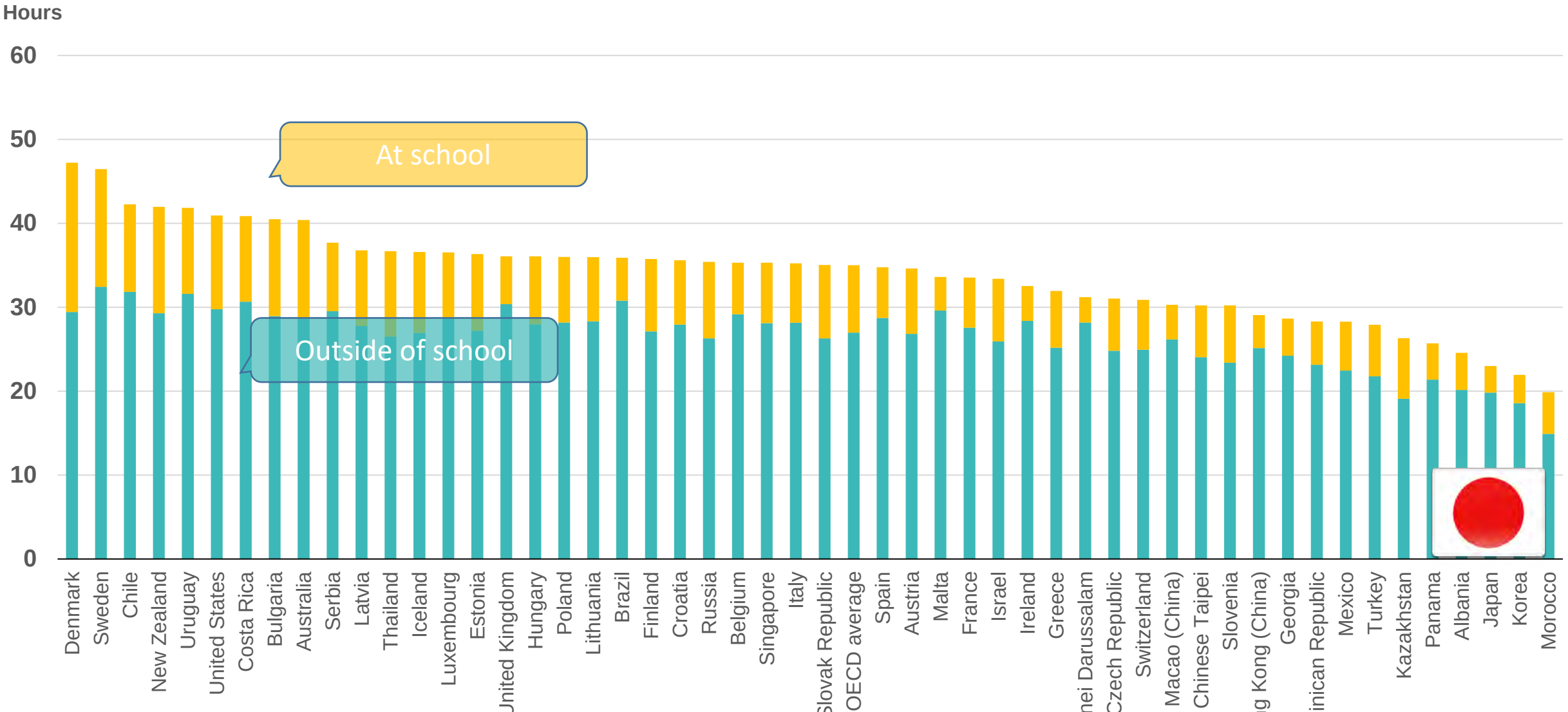
Social and emotional foundation

Health foundation

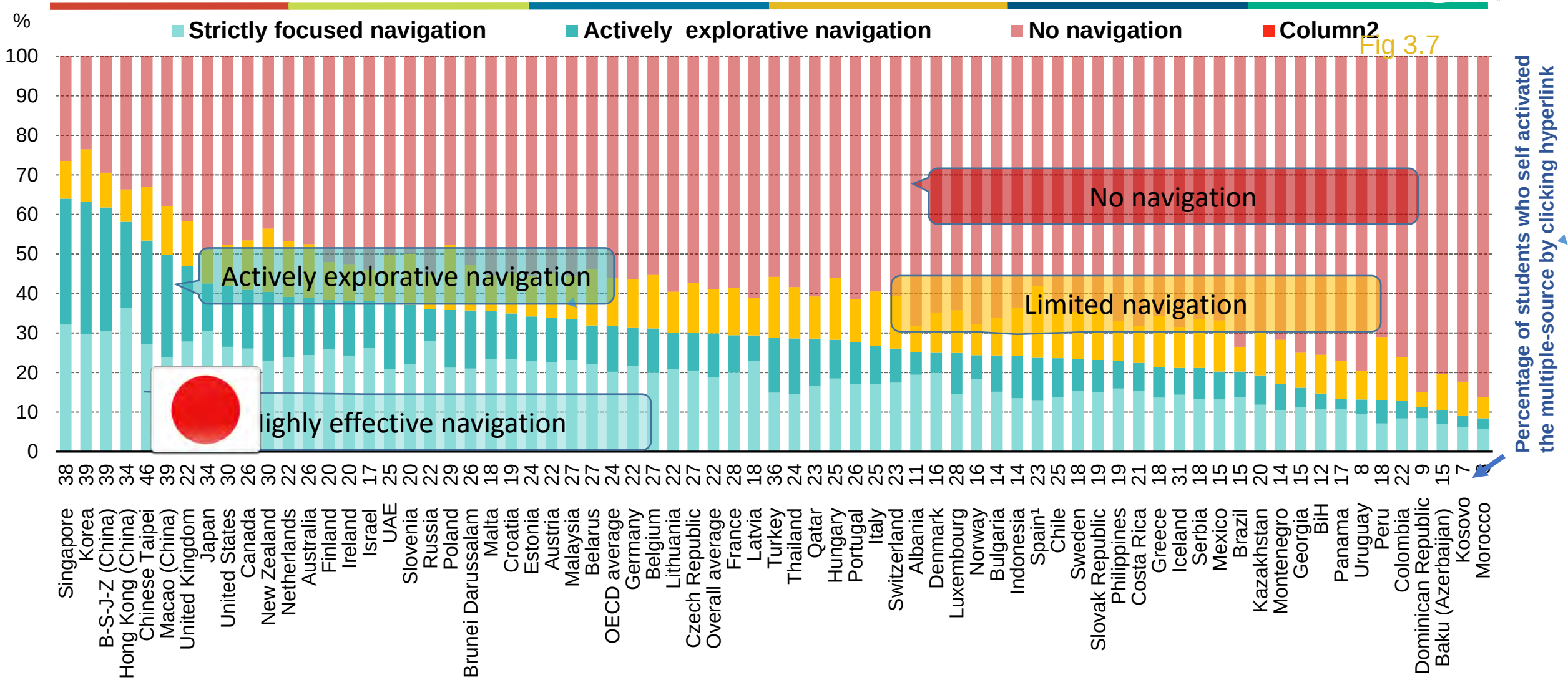
Physical health
+ Mental/ psychological health

The digital world has become the real world

Number of hours per week 15-year-olds spent using the Internet (PISA 2018)



Digital navigation skills (PISA 2018)



15-year-olds report lower creativity than 10-year-olds

Age gaps in creativity

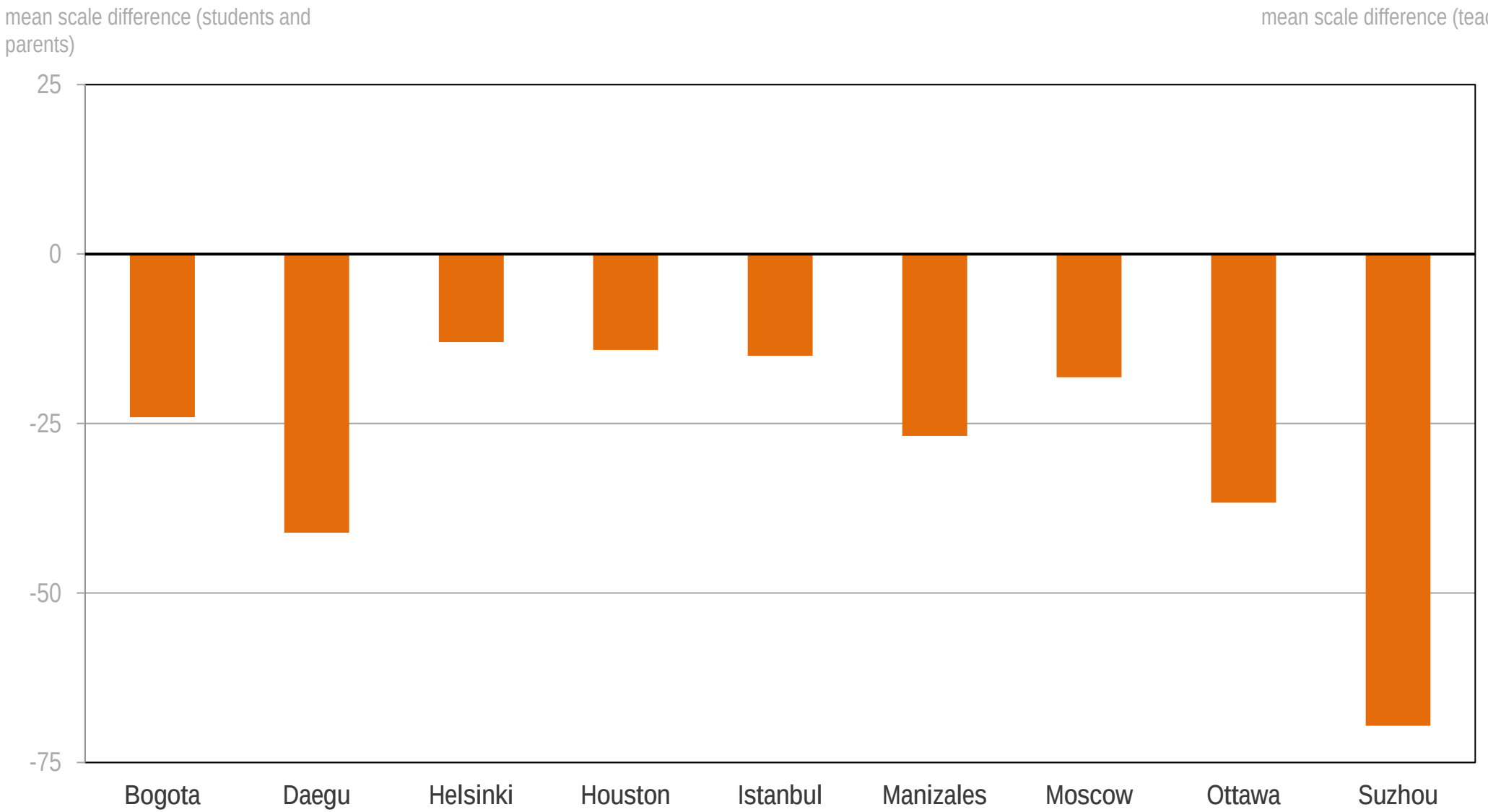


Figure 4.3

Students participating in art activities reported higher levels of creativity and curiosity

Difference in skill scores, by participation in sports and arts activities, accounting for socio-economic status and gender

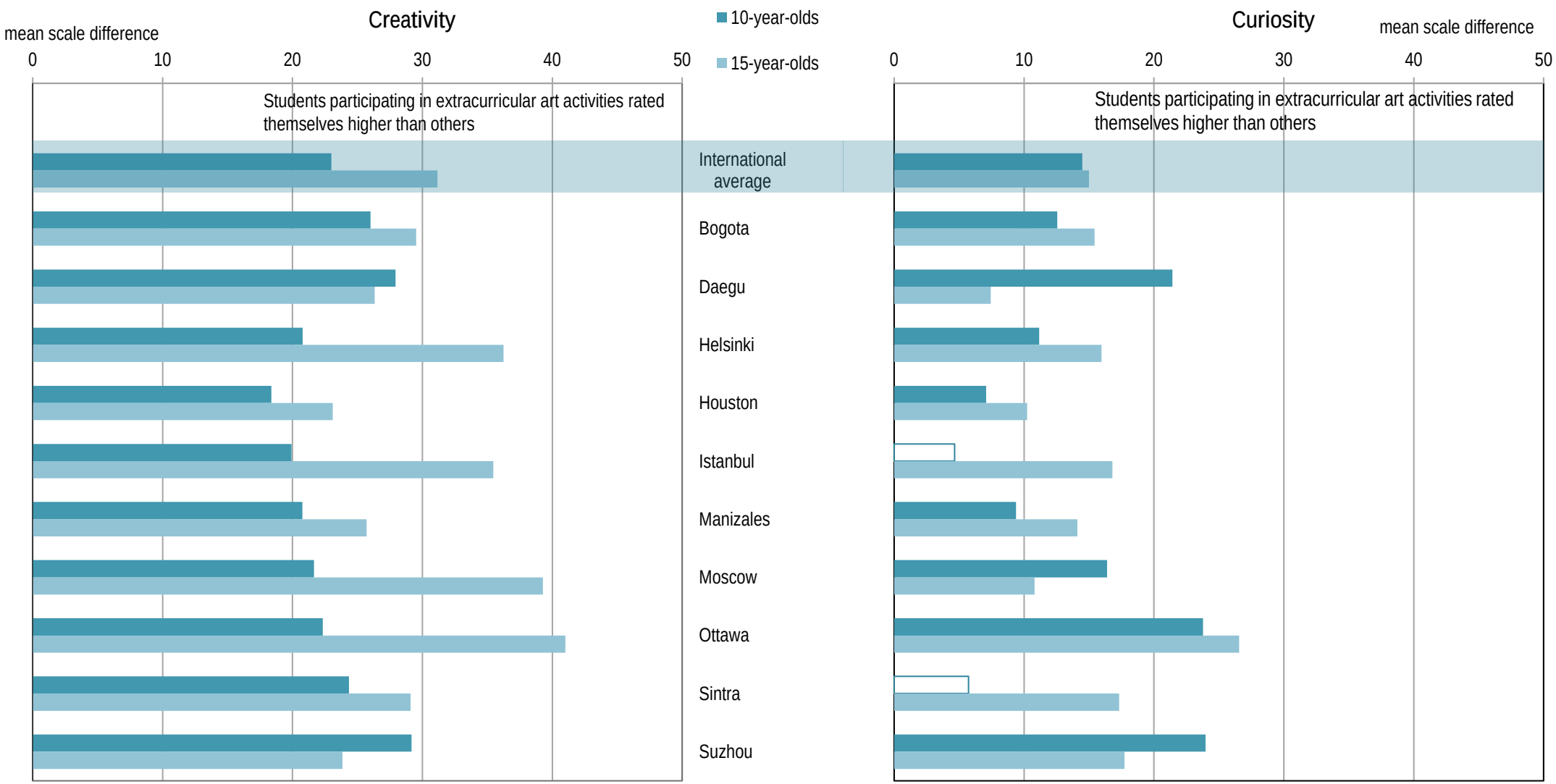


Figure 4.8

Little participation in sports and arts outside school low

Share of students participating in sports and arts activities outside of school, among 10- and 15-year-olds

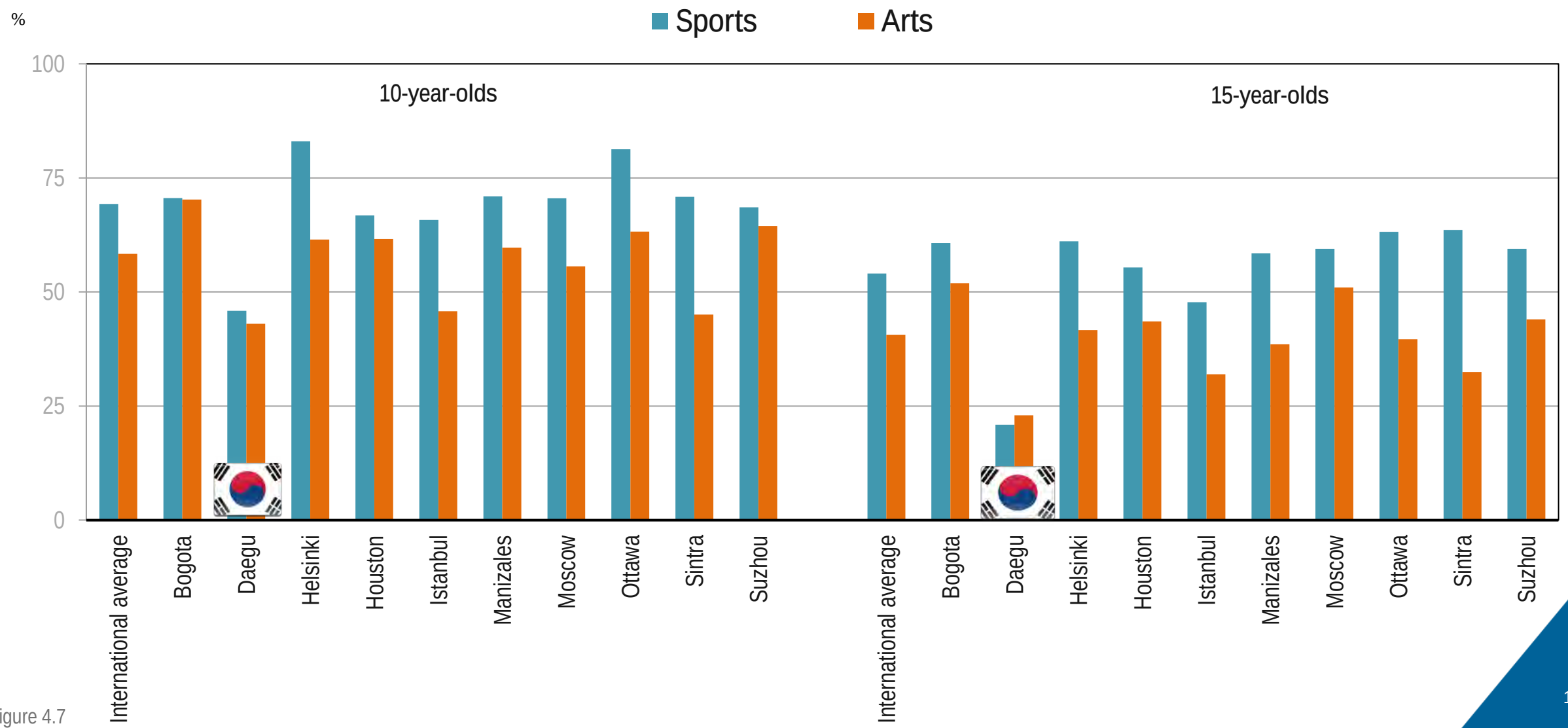
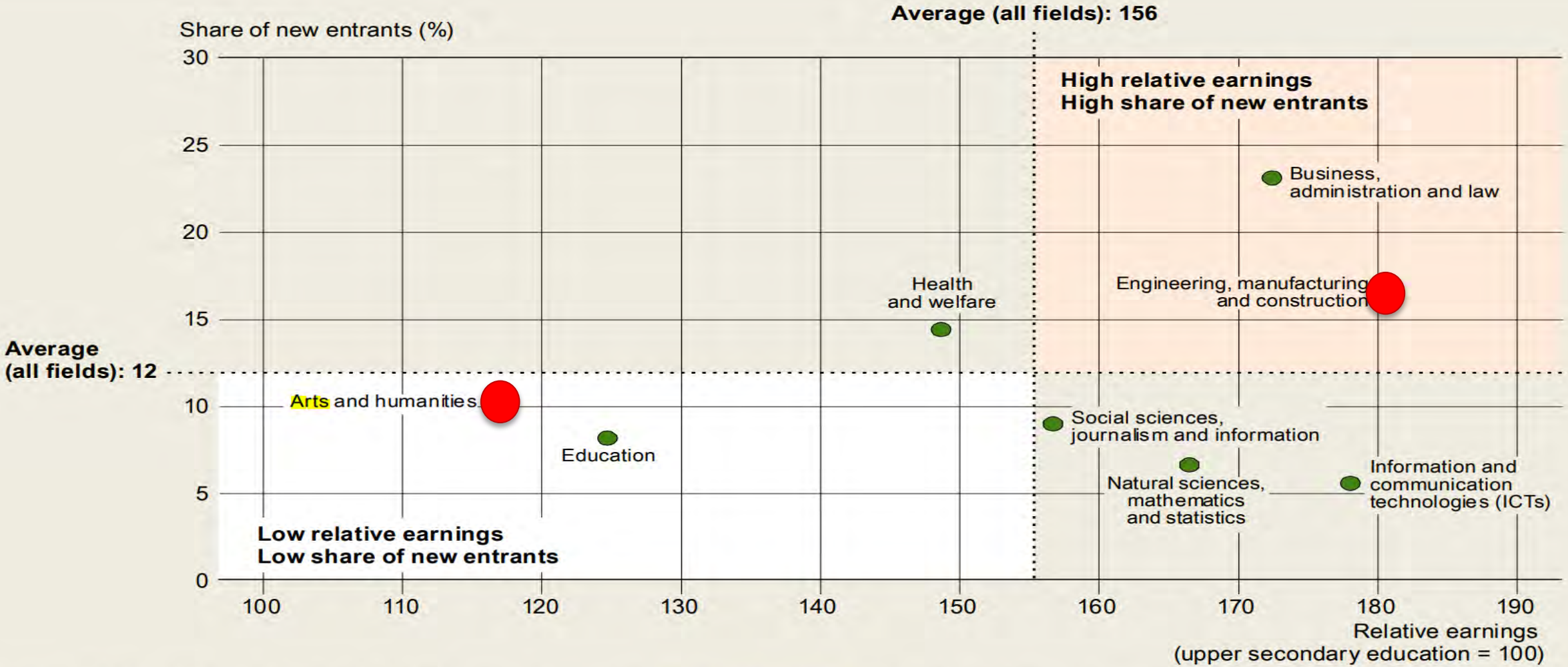


Figure 4.7

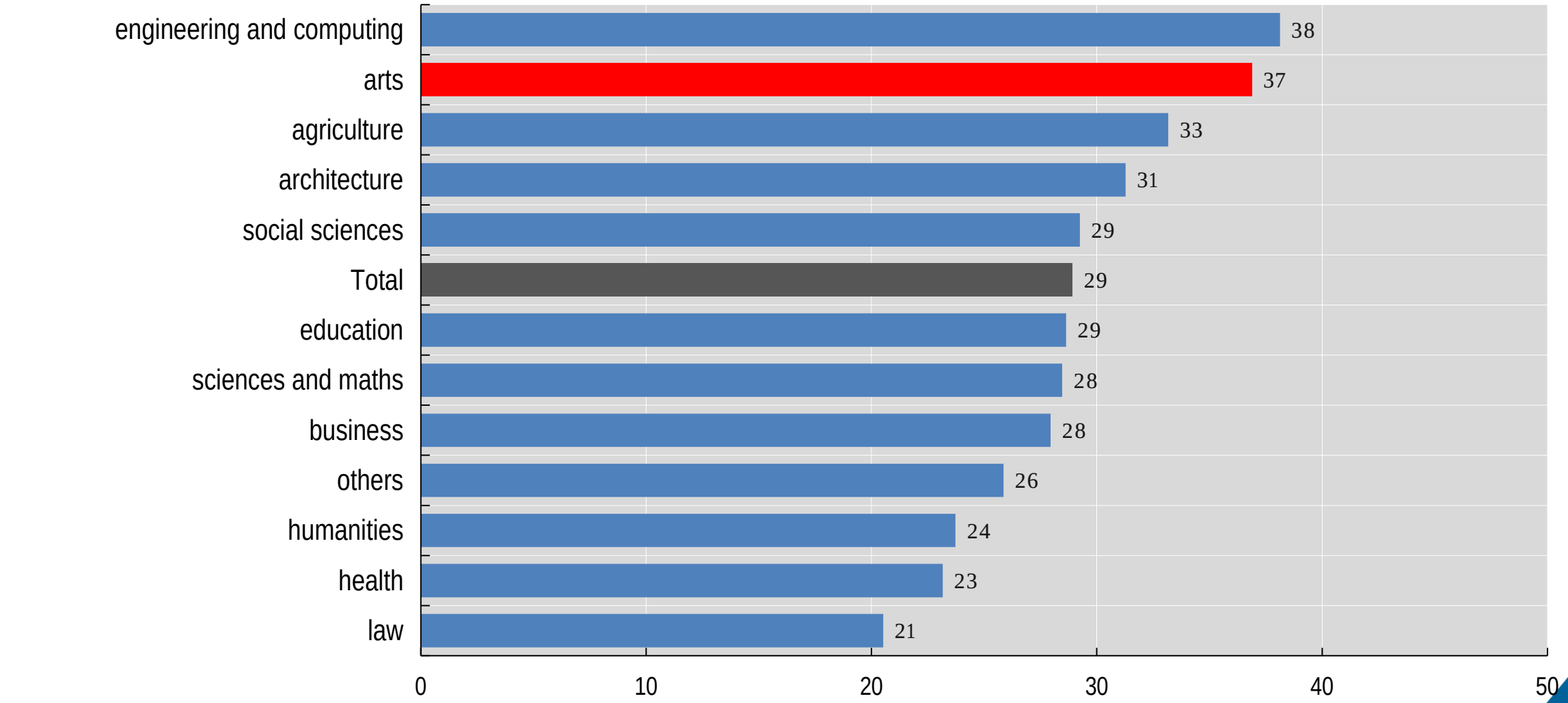
Figure A4.5. Relationship between the share of tertiary new entrants and relative earnings, by field of study (2017)

Average across OECD countries with available data



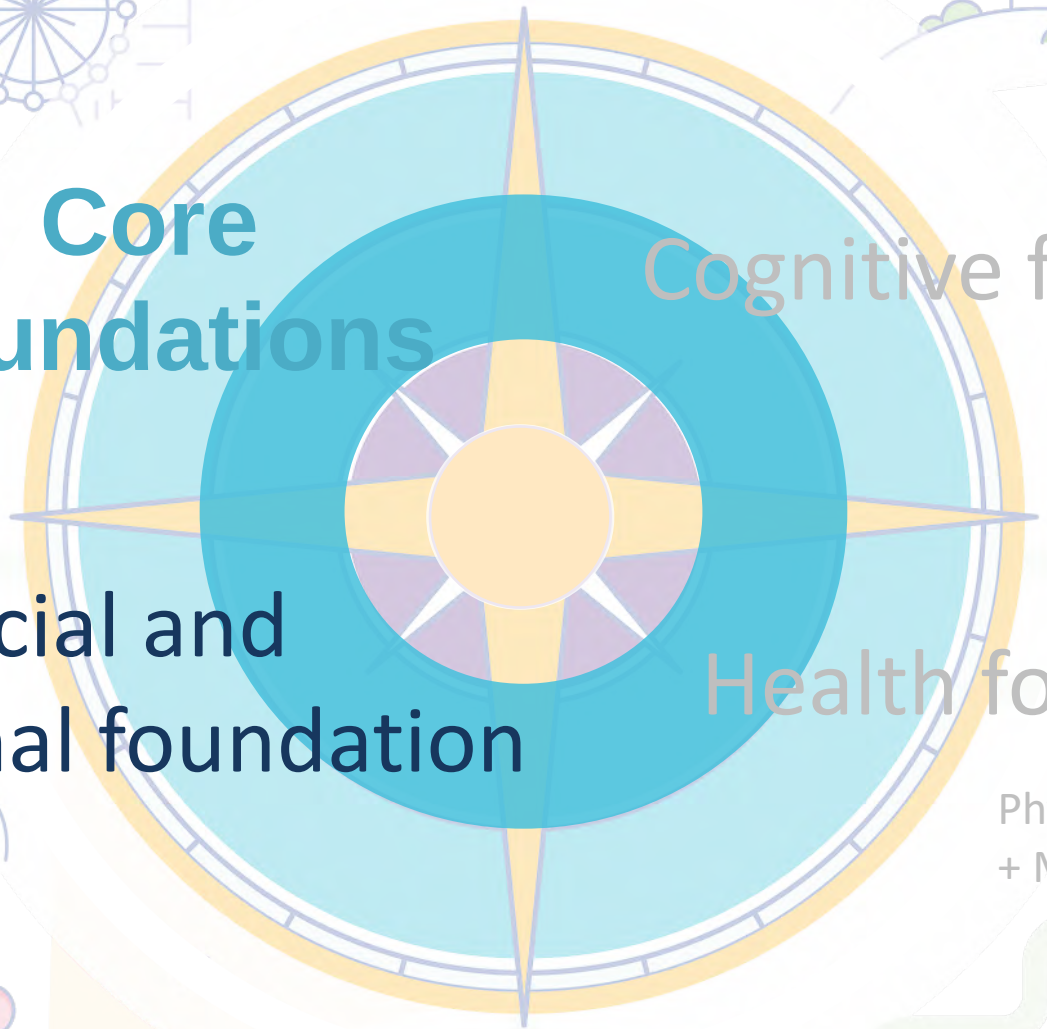
Source: OECD (2020). Education at a Glance Database, http://stats.oecd.org/. See Source section for more information and Annex 3 for notes (https://doi.org/10.1787/f8d7880d-en).

Share of graduates having a highly innovative job (Product /service innovation)



Source: OECD, based on REFLEX and HEGESCO data

A holistic approach to core foundations of whole child development



Core Foundations

Cognitive foundation

Literacy, Numeracy
+ Digital literacy, Data literacy

Social and emotional foundation

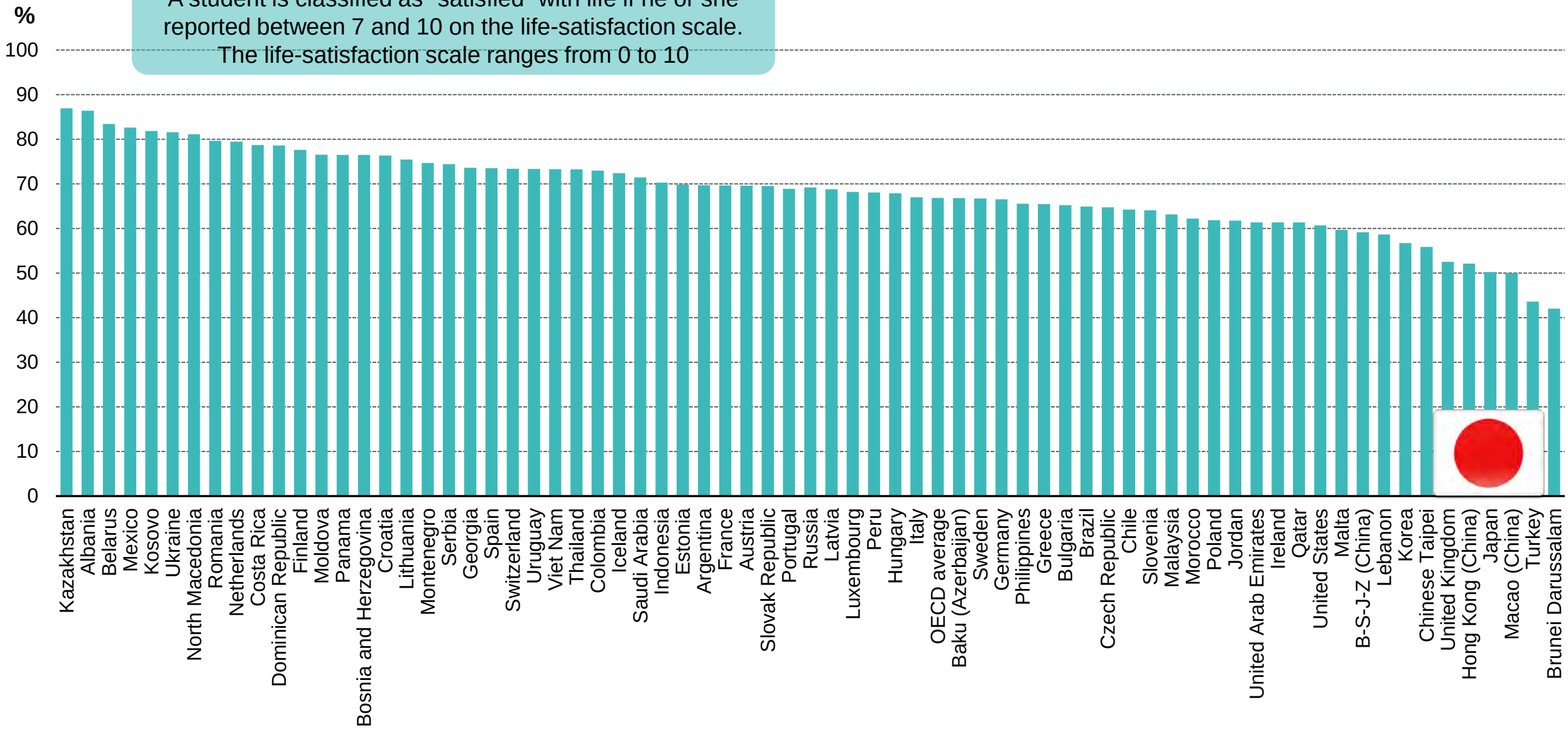
Health foundation

Physical health
+ Mental/ psychological health

Students who are satisfied with life

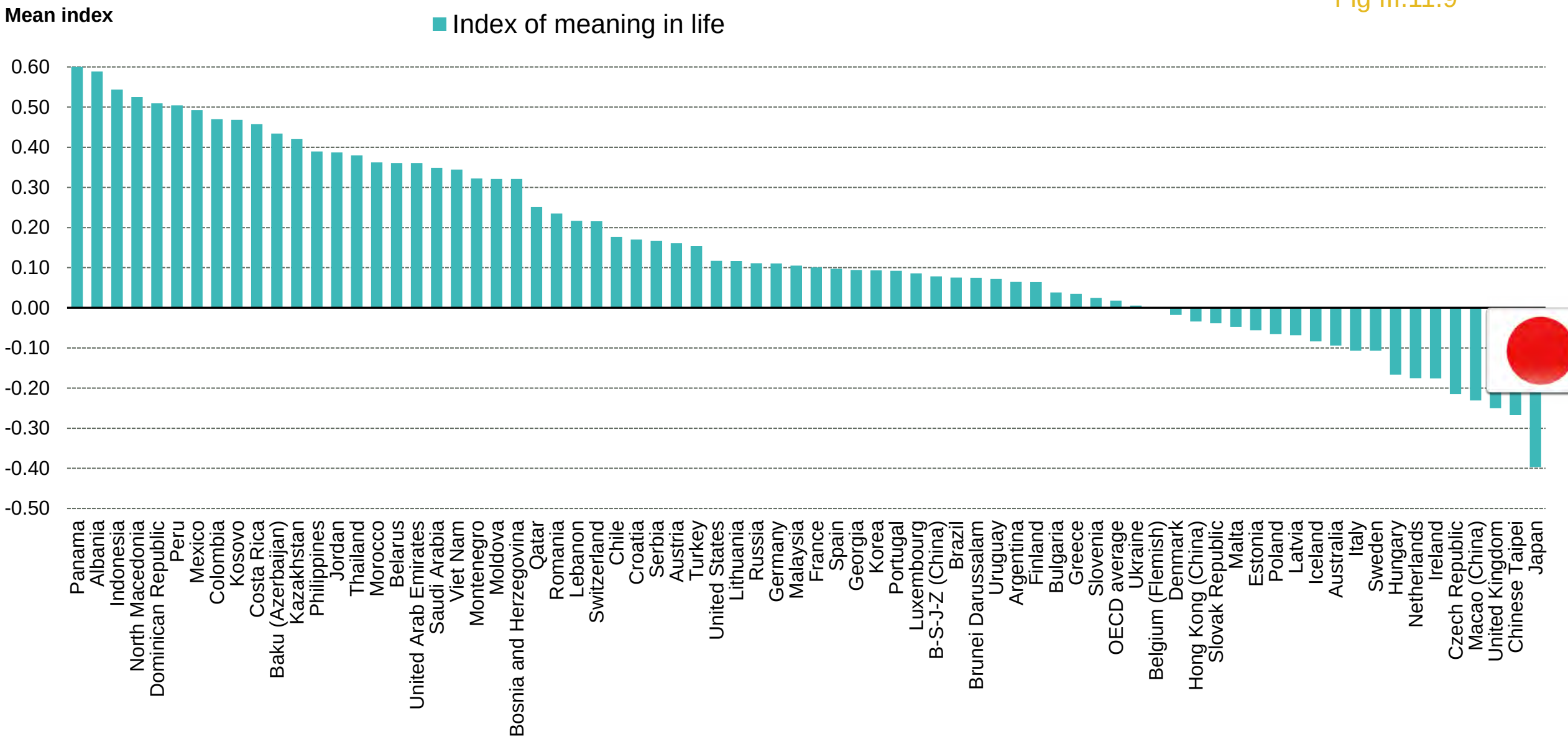
Fig III.11.2

A student is classified as "satisfied" with life if he or she reported between 7 and 10 on the life-satisfaction scale. The life-satisfaction scale ranges from 0 to 10



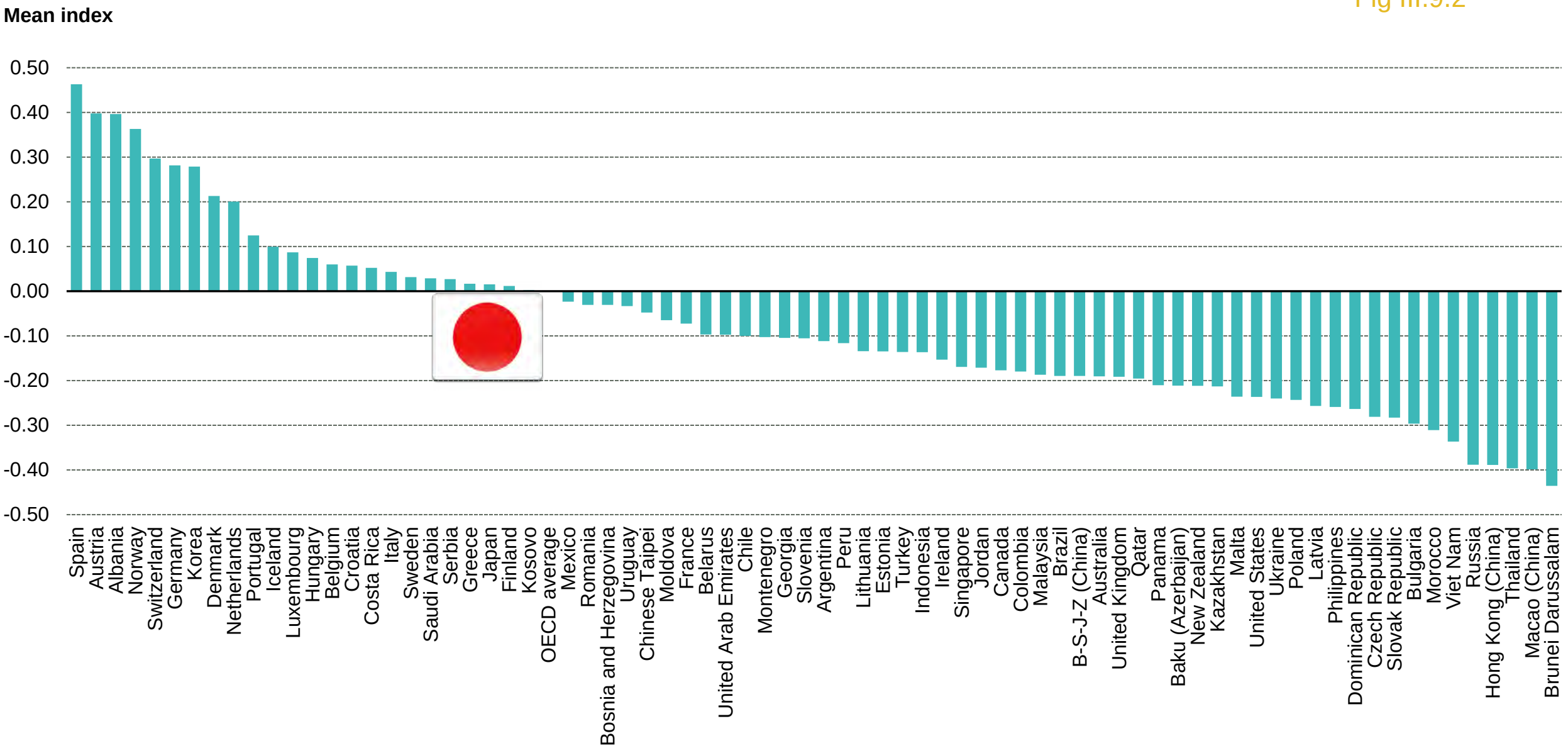
Students' sense of meaning in life

Fig III.11.9



Index of sense of belonging

Fig III.9.2



Transformative Competencies

Creating new value

Taking responsibility

Reconciling tensions, dilemmas, navigating ambiguity

Empowered learners, adaptive pedagogies and sustained supports

They have the knowledge, skills and attitudes required to **adapt to the different worlds** they inhabit

They are learning to have a **positive impact** on the environment around them.

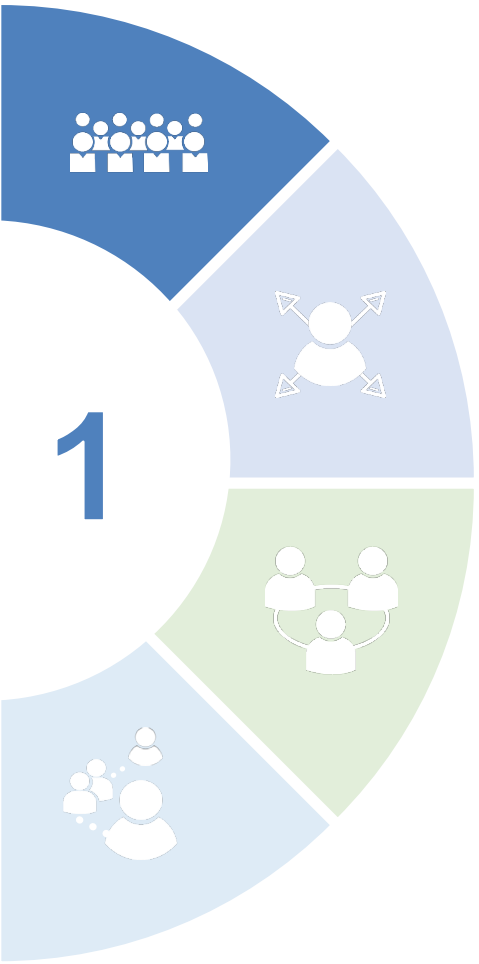
They **articulate their experiences** and views well and are listened to.

They connect experiences from their different worlds to **create new opportunities** for learning – alone or with their peers.

They are **supported to overcome their challenges** and supports are adjusted to need.

They see **change as an opportunity** for learning and growth.

Scenario 1: Schooling Extended



Participation in formal education continues to expand. International collaboration and technological advances support more individualised learning. The structures and processes of schooling remain.

Goals and functions

Governance and geopolitics

Organisation and structures

The teaching workforce

Educational monopolies remain: Schools are key actors in socialisation, qualification, care and credentialing.

International collaboration and digital technologies power more personalised teaching and learning practices.

Distinct teacher corps remain, although with new divisions of tasks and greater economies of scale.

Scenario 2: Education Outsourced

Traditional schooling systems break down as society becomes more directly involved in educating its citizens. Learning takes place through more diverse, possibly privatised and flexible arrangements, with digital technology a key driver.

Goals and functions

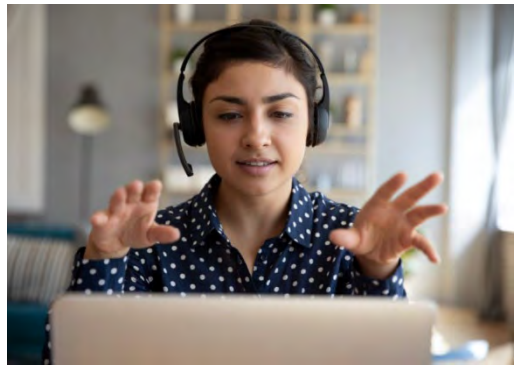
Fragmentation of demand with self-reliant "clients" looking for flexible services.

Governance and geopolitics

Schooling systems as players in a wider (local, national, global) education market. Diversification of structures: multiple organisational forms available to individuals.

Organisation and structures

The teaching workforce



Diversity of instructional roles and teaching status operating within and outside of schools.


In the classroom

Using technology to personalise learning

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Detect, diagnose, act

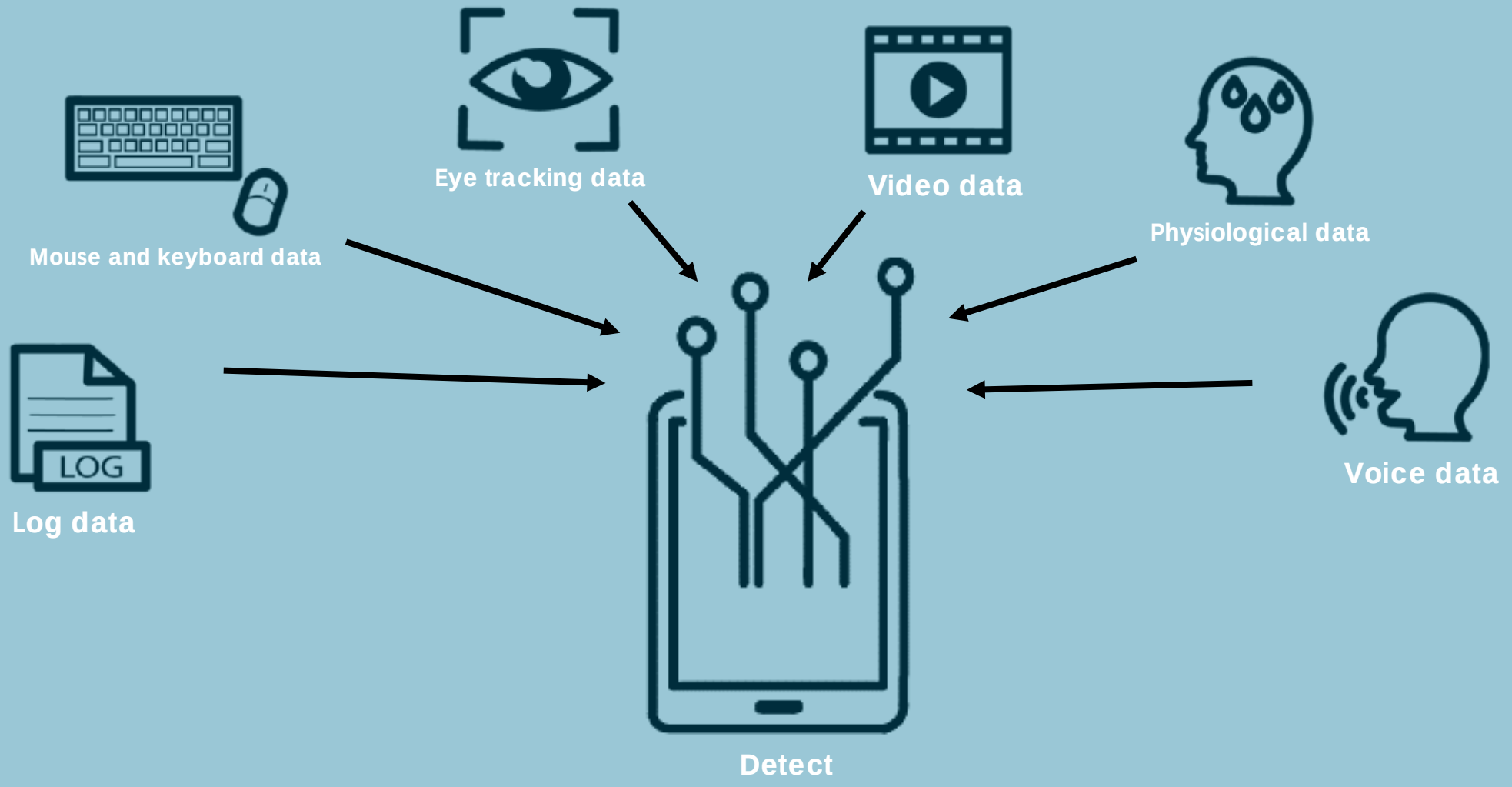
Detect

Diagnose

Act

Source: Illustration: Anne Horvers and Inge Molenaar; Source: Adaptive Learning Lab

Detect



Source: Illustration: Anne Horvers and Inge Molenaar; Source: Adaptive Learning Lab

Liking vs learning

Classroom analytics: make visible what's invisble

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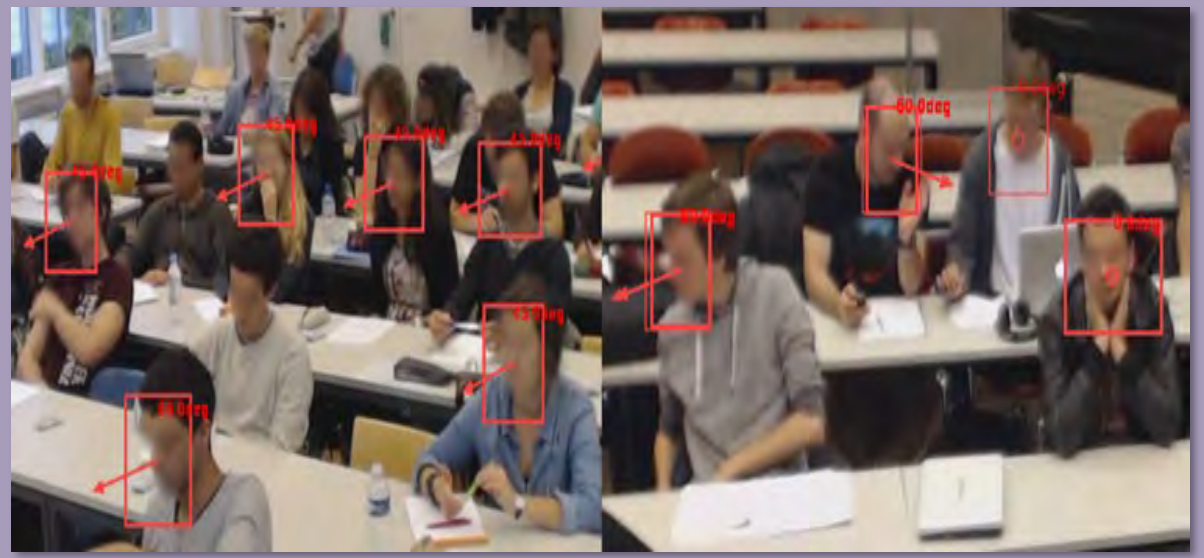
BETTER POLICIES FOR BETTER LIVES

Classrooms as digital systems

Source: Raca, Kidzinski and Dillenbourg, 2015

Input
(sensors)



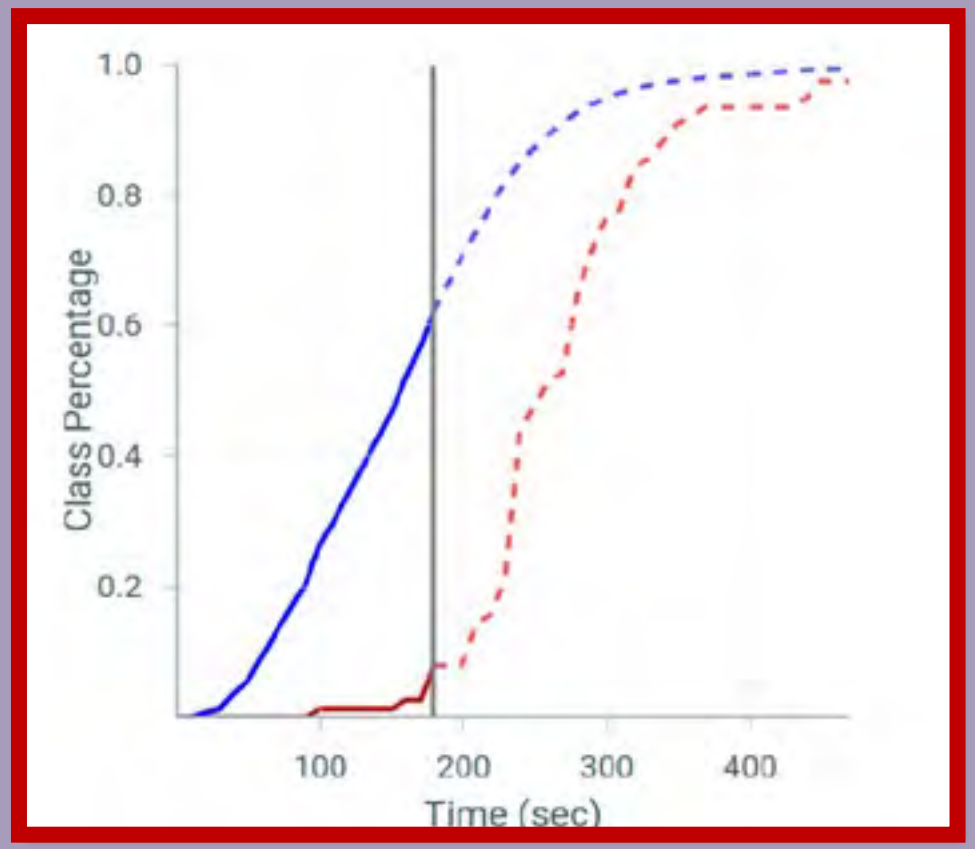
Output
(dashboard)

What teachers can do with the data

- Monitoring and intervention
- Using and sharing information
- Building teams
- Debriefing
- Timing transitions
- Teacher self-regulation

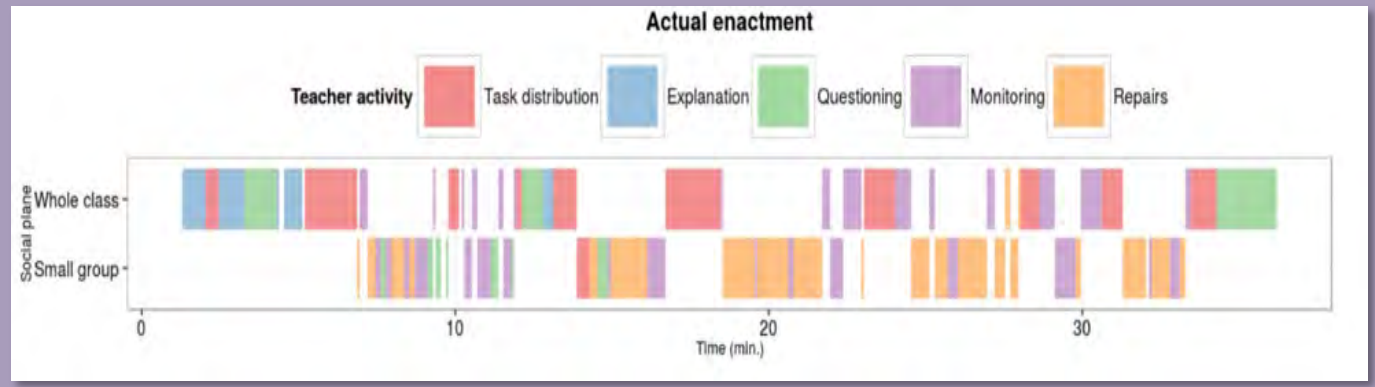
Timing transitions and activities

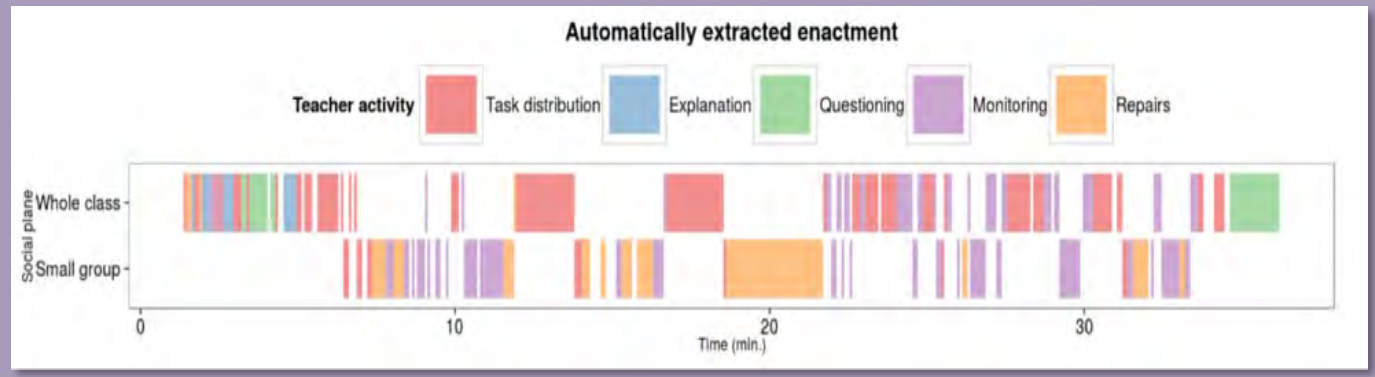
Progression chart of the time extension gain



Source: Faucon et al., 2020

Tracking and timing activities in the classroom

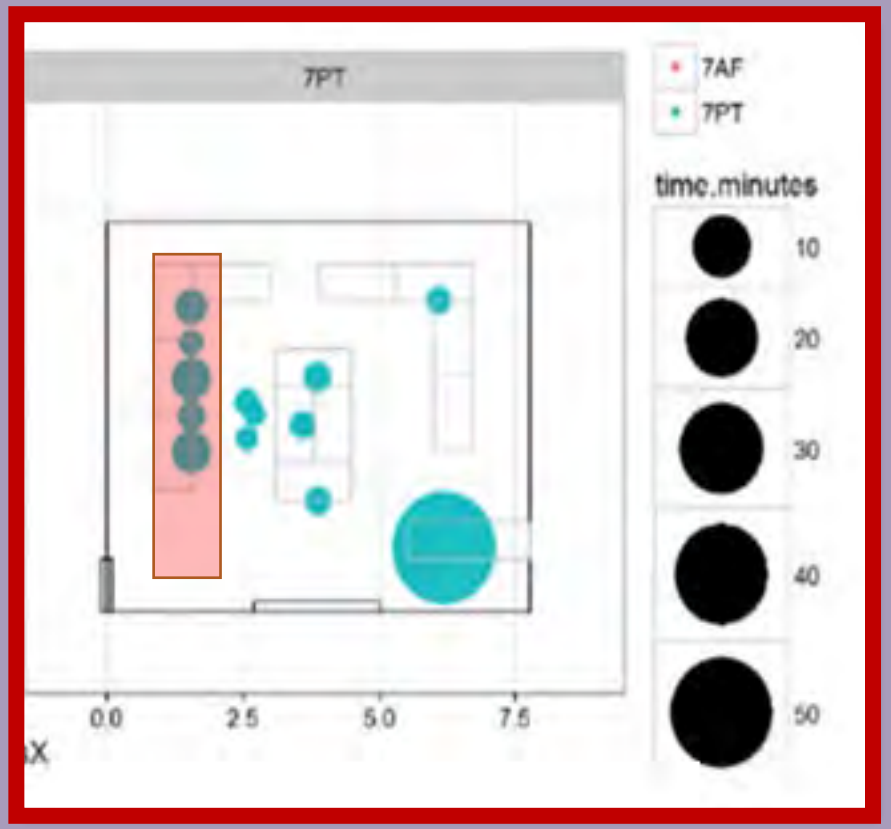




Source: Prieto et al., 2016

Teacher feedback for self-regulation

Showing teachers where the spend time in the classroom



Source: Prieto et al., 2017

A role for robots as educators?

More attention, better compliance, greater motivation and persistence

Robo-tutors

A student completes a language lesson with the help of a robotic tutor

Source: Vogt et al., 2019

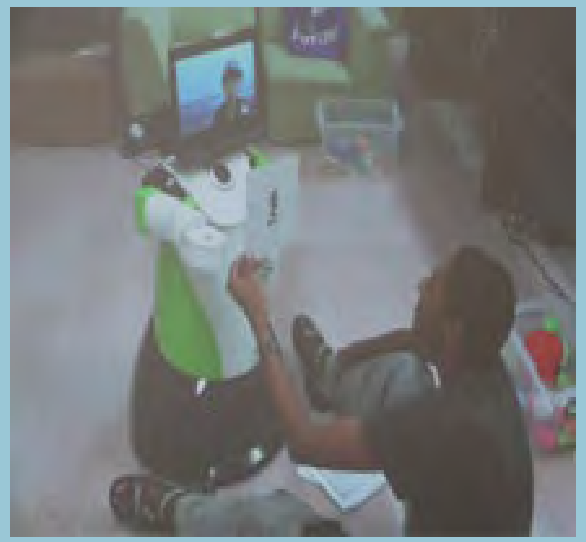
Students teaching robots?

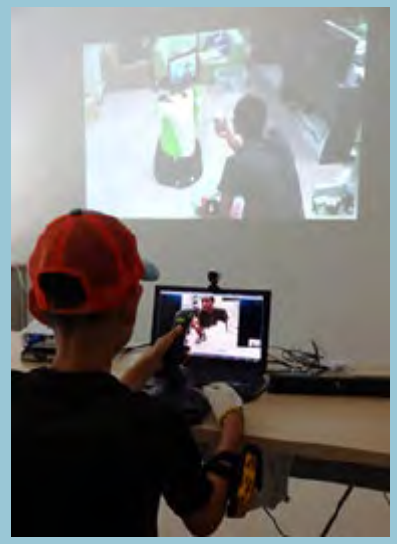
Using robots for “telepresence”

Students in Japan interact with an avatar robot controlled by the teacher

Source: Tanaka et al., 2013

A language class is delivered via a telepresence robot





Source: Tanaka et al., 2014

Game-based standardised assessment

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Games can elicit evidence of how people reason and solve problems

VS

Pedagogy needs to be at the centre

- Increasing **integration** of pedagogical approaches
- Increasing **compatibility** between the different technologies used in education
- Increasing **attention paid** to the learning activity than to the learning technology
- Evolution of **hardware**

Devices more present but less visible

- **Adopt** a more holistic development of smart systems
- **Create** smart systems for all
- **Blend** human and artificial intelligence
- **Encode** in-depth adaptivity and personalization
- **Encode** disability-level customisation, school-level customisation, and child-level customisation

Scenario 3: Learn-as-you-go

Education takes place everywhere, anytime. Distinctions between formal and informal learning are no longer valid as society turns itself entirely to the power of the machine.

Goals and functions

Governance and geopolitics

Organisation and structures

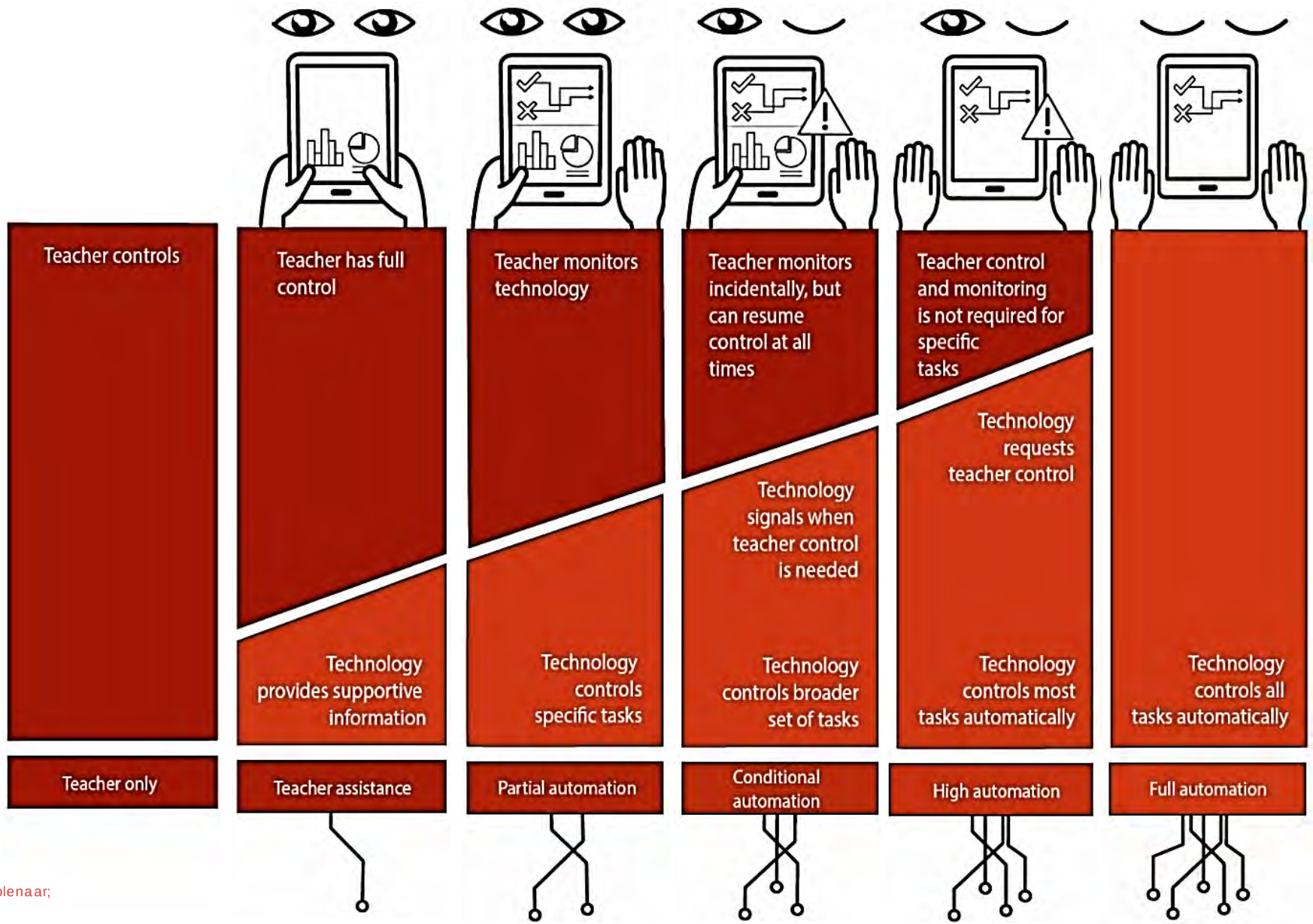
The teaching workforce

Traditional goals and functions of schooling are overwritten by technology. Dismantling of schooling as a social institution.

Open market of “prosumers” with a central role for communities of practice (local, national, global).

(Global) governance of data and digital technologies becomes key.

Finding a balance that puts humans at the centre



Source: Illustration: Anne Horvers and Inge Molenaar;
Source: Adaptive Learning Lab

Scenario 4: Schools as Learning Hubs

Schools remain, but diversity and experimentation have become the norm. Opening the “school walls” connects schools to their communities, favouring ever-changing forms of learning, civic engagement and social innovation.

Goals and functions

Governance and geopolitics

Organisation and structures

The teaching workforce

Strong focus on local decisions; self-organising units in diverse partnerships. Schools as hubs function to organise multiple configurations of local-global resources.

Flexible schooling arrangements permit greater personalisation and community involvement.

Professional teachers as nodes of wider networks of flexible expertise.

Psychological well-being of 10-year-olds

Percentage of 10-year-old students who reported feeling like this “most of the time” or “all of the time” (international average)

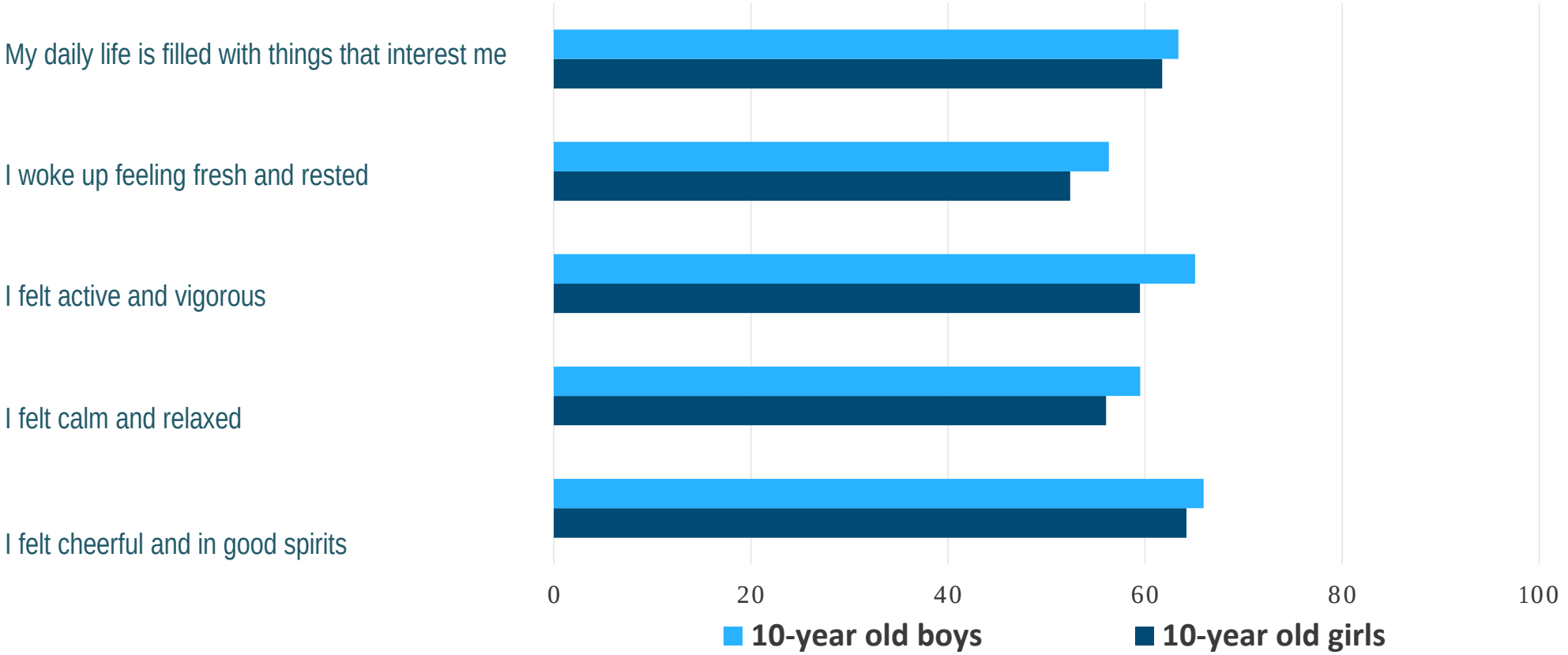


Figure 3.2

Psychological well-being dips in adolescence, especially for girls

Percentage of 15-year-old students who reported feeling like this “most of the time” or “all of the time” (international average)

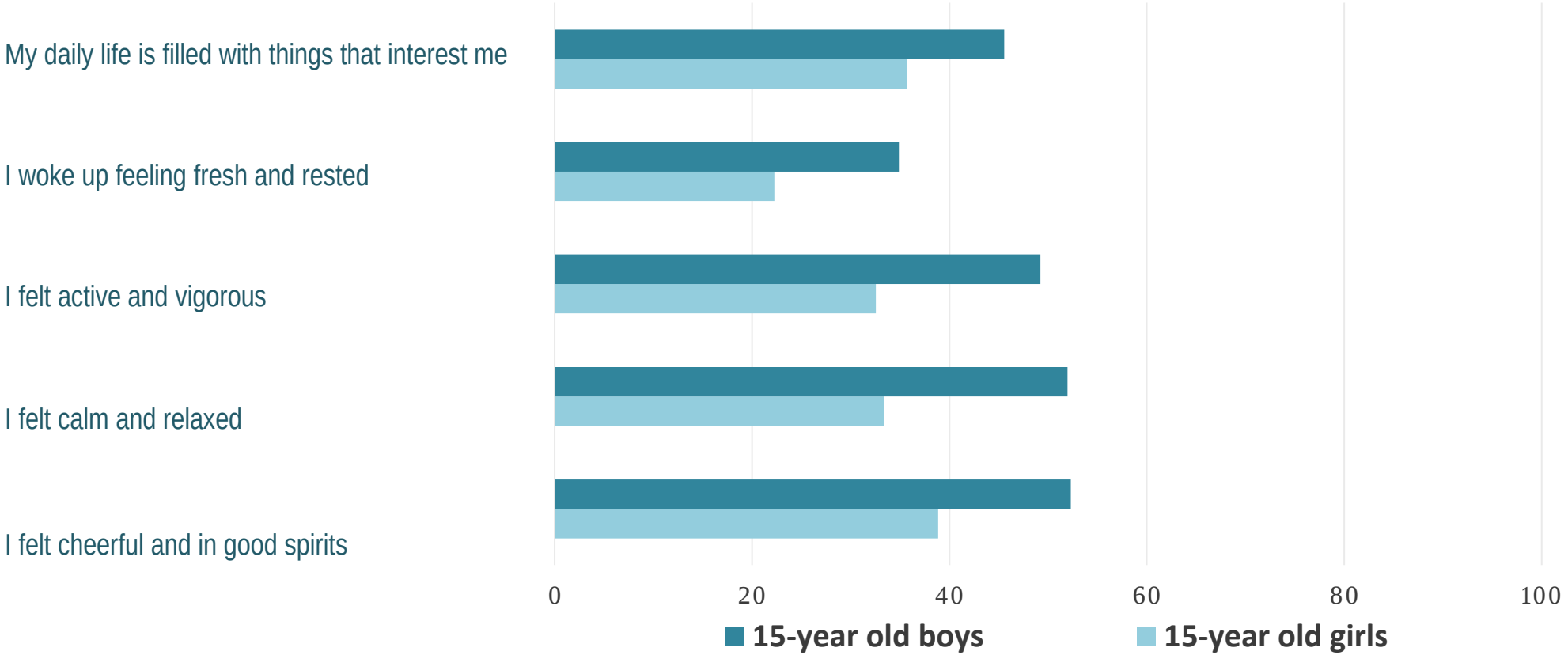


Figure 3.2

Learner resilience: Predictors of well-being and test anxiety

Relationships between the three measures of psychological well-being and a perceived competitive school climate, and high expectations from parents and teachers

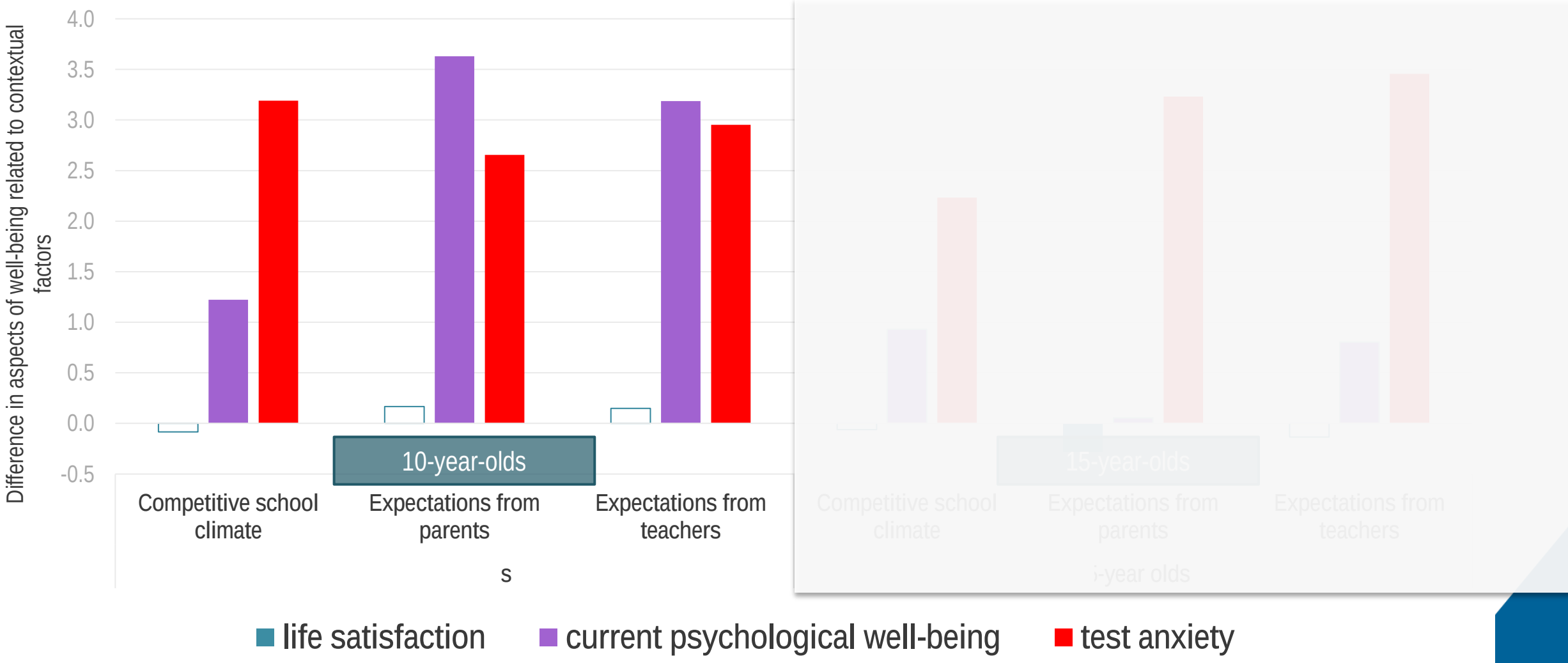


Figure 3.11

Learner resilience: test anxiety and psychological well-being

Means of current psychological well-being index and test anxiety index mapped for all cities

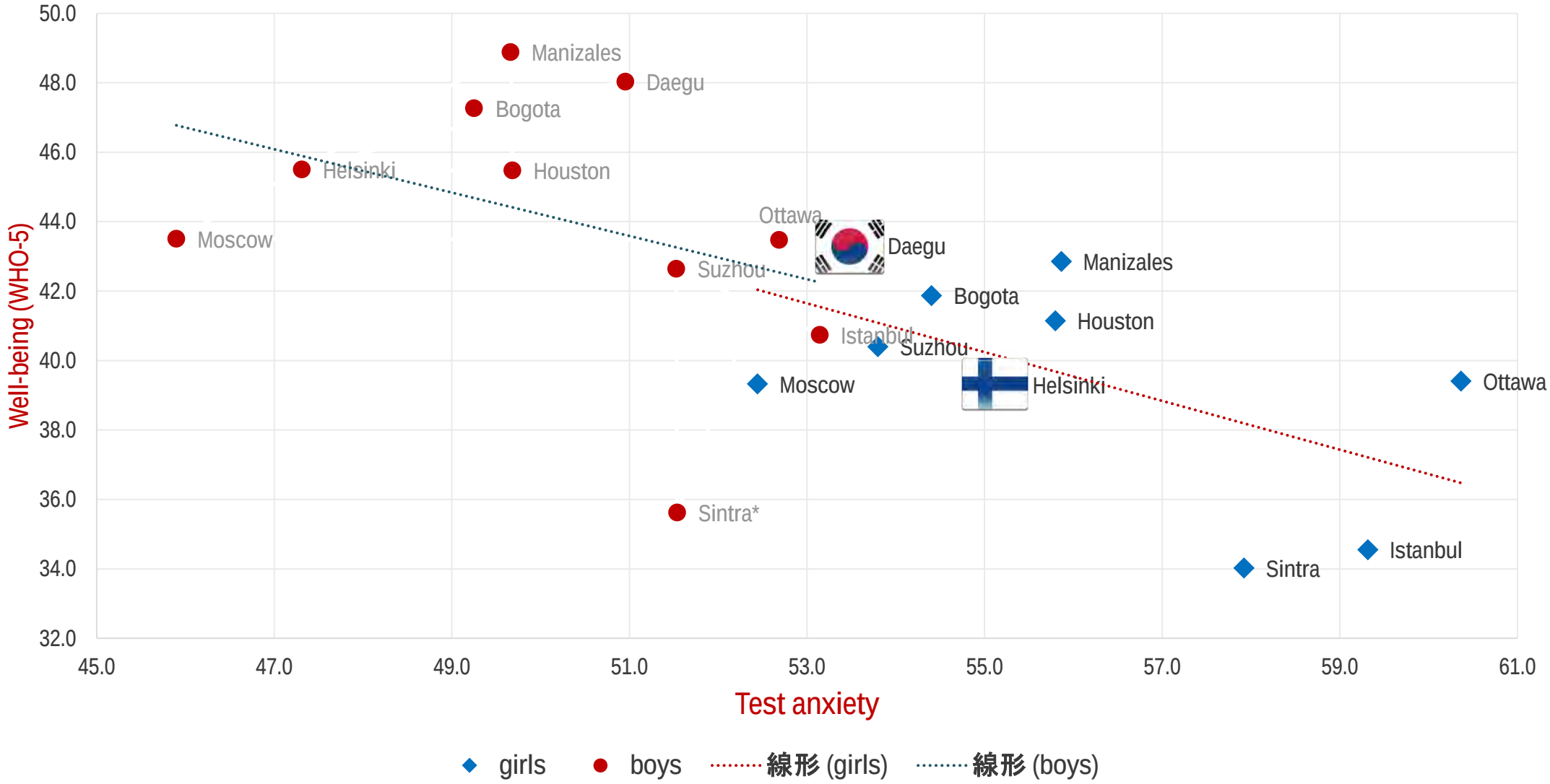


Figure 3.4

Students who are more stress resistant, optimistic and energetic indicated higher current psychological well-being amongst 15-year-olds

Social and emotional skills most strongly associated with current psychological well-being, by city

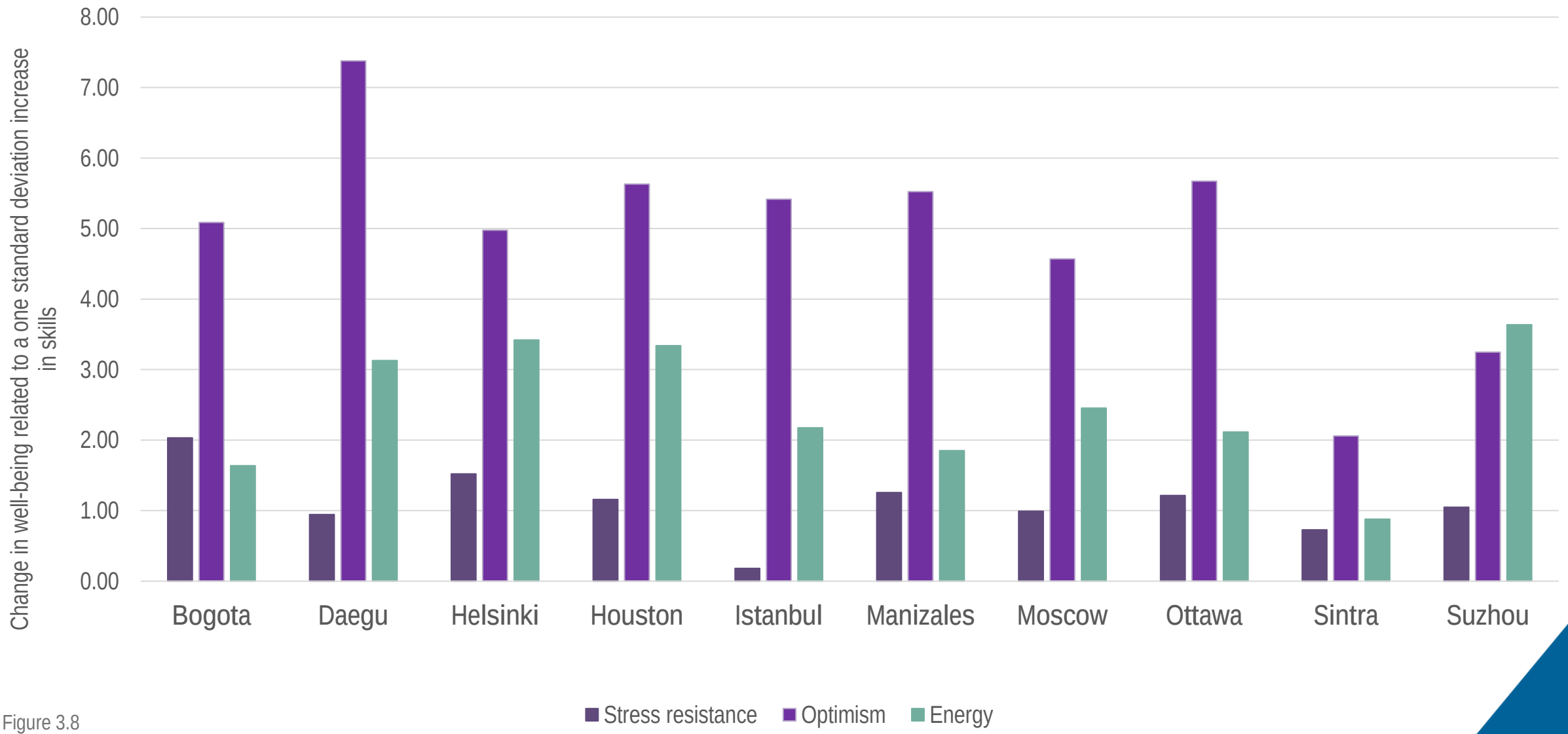


Figure 3.8

Better student-teacher relations are linked with improved social and emotional skills

Relations between student-teacher relations and social and emotional skills, 15-year-olds

Figure 5.9

OECD Scenarios for the Future of Schooling	Goals and functions	Organisation and structures	The teaching workforce	Governance and geopolitics	Challenges for public authorities
Scenario 1  **Schooling extended**	Schools are key actors in socialisation, qualification, care and credentialing.	Educational monopolies retain all traditional functions of schooling systems.	Teachers in monopolies, with potential new economies of scale and division of tasks.	Strong role for traditional administration and emphasis on international collaboration.	Accommodating diversity and ensuring quality across a common system. Potential trade-off between consensus and innovation.
Scenario 2  **Education outsourced**	Fragmentation of demand with self-reliant “clients” looking for flexible services.	Diversification of structures: multiple organisational forms available to individuals.	Diversity of roles and status operating within and outside of schools.	Schooling systems as players in a wider (local, national, global) education market.	Supporting access and quality, fixing “market failures”. Competing with other providers and ensuring information flows.
Scenario 3  **Schools as learning hubs**	Flexible schooling arrangements permit greater personalisation and community involvement.	Schools as hubs function to organise multiple configurations of local-global resources.	Professional teachers as nodes of wider networks of flexible expertise.	Strong focus on local decisions. Self-organising units in diverse partnerships.	Diverse interests and power dynamics; potential conflict between local and systemic goals. Large variation in local capacity.
Scenario 4  **Learn-as-you-go**	Traditional goals and functions of schooling are overwritten by technology.	Dismantling of schooling as a social institution.	Open market of “prosumers” with a central role for communities of practice (local, national, global).	(Global) governance of data and digital technologies becomes key.	Potential for high interventionism (state, corporate) impacts democratic control and individual rights. Risk of high social fragmentation.

Education is a constant balancing act

URGENT	IMPORTANT
MODERNISING	DISRUPTING
NEW GOALS	OLD STRUCTURES
GLOBAL	LOCAL
INNOVATION	RISK AVOIDANCE
POTENTIAL	REALITY
VIRTUAL	FACE-TO-FACE
LEARNING	EDUCATION

OECD (2020), *Back to the Future: Four OECD Scenarios for Schooling*