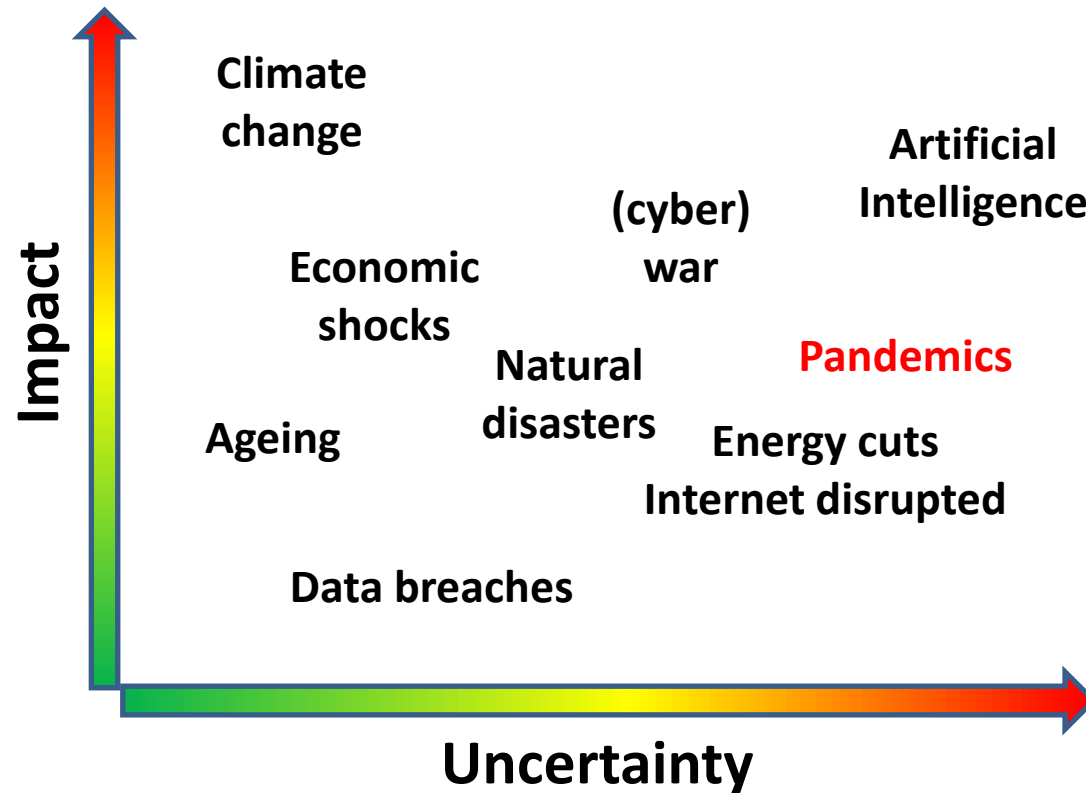


A group of six diverse children, three girls and three boys, are standing behind a large, realistic globe of the Earth. The globe is positioned in the foreground, showing the Americas and parts of Africa and Europe. The children are of various ethnicities and are smiling at the camera. The background is a clear, bright blue sky. The text is overlaid on a semi-transparent grey band across the middle of the image.

# **Family, education and society**

**Nazarbayev Intellectual schools**  
**Andreas Schleicher**

# The future will continue to surprise us!

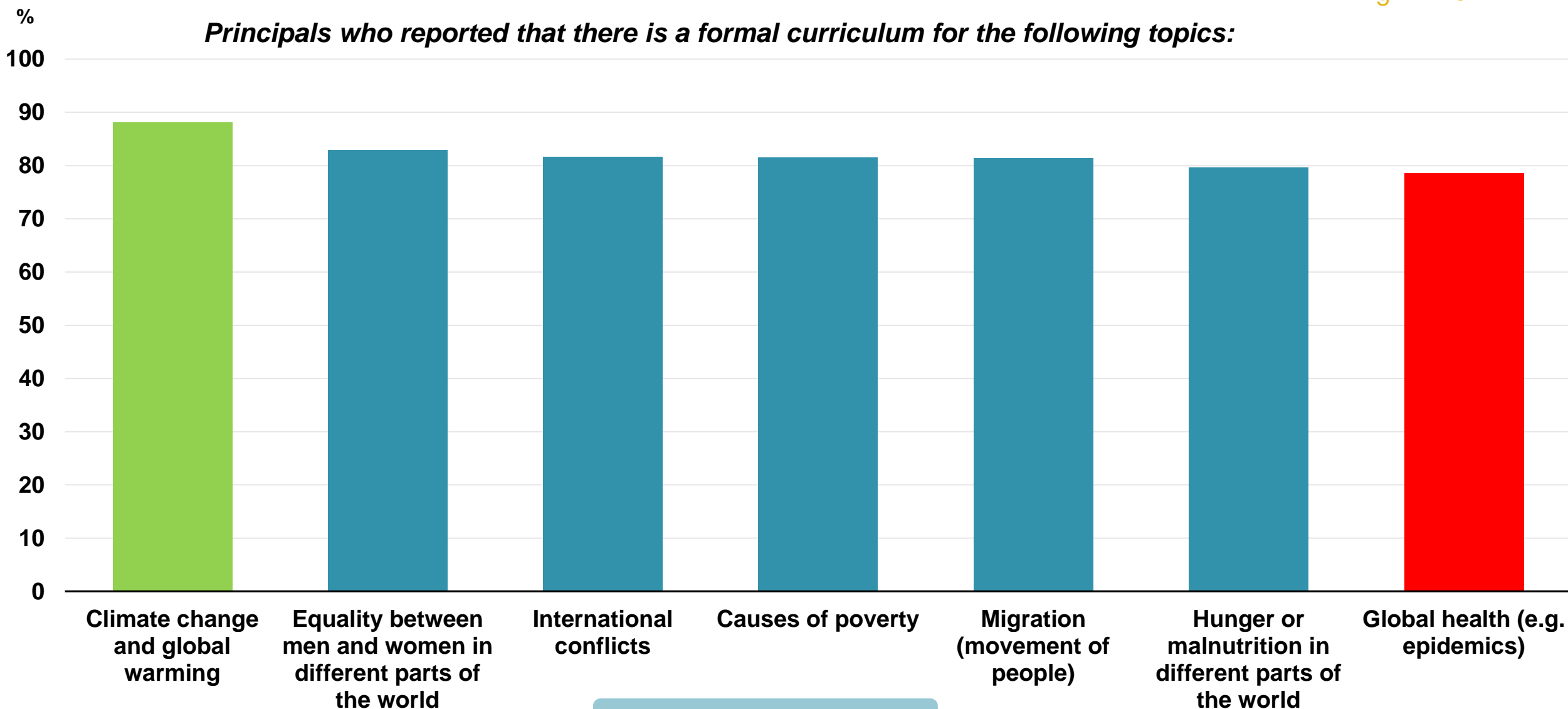




# Sustainability issues covered in the curriculum (PISA, OECD average)

Fig VI.7.8

*Principals who reported that there is a formal curriculum for the following topics:*

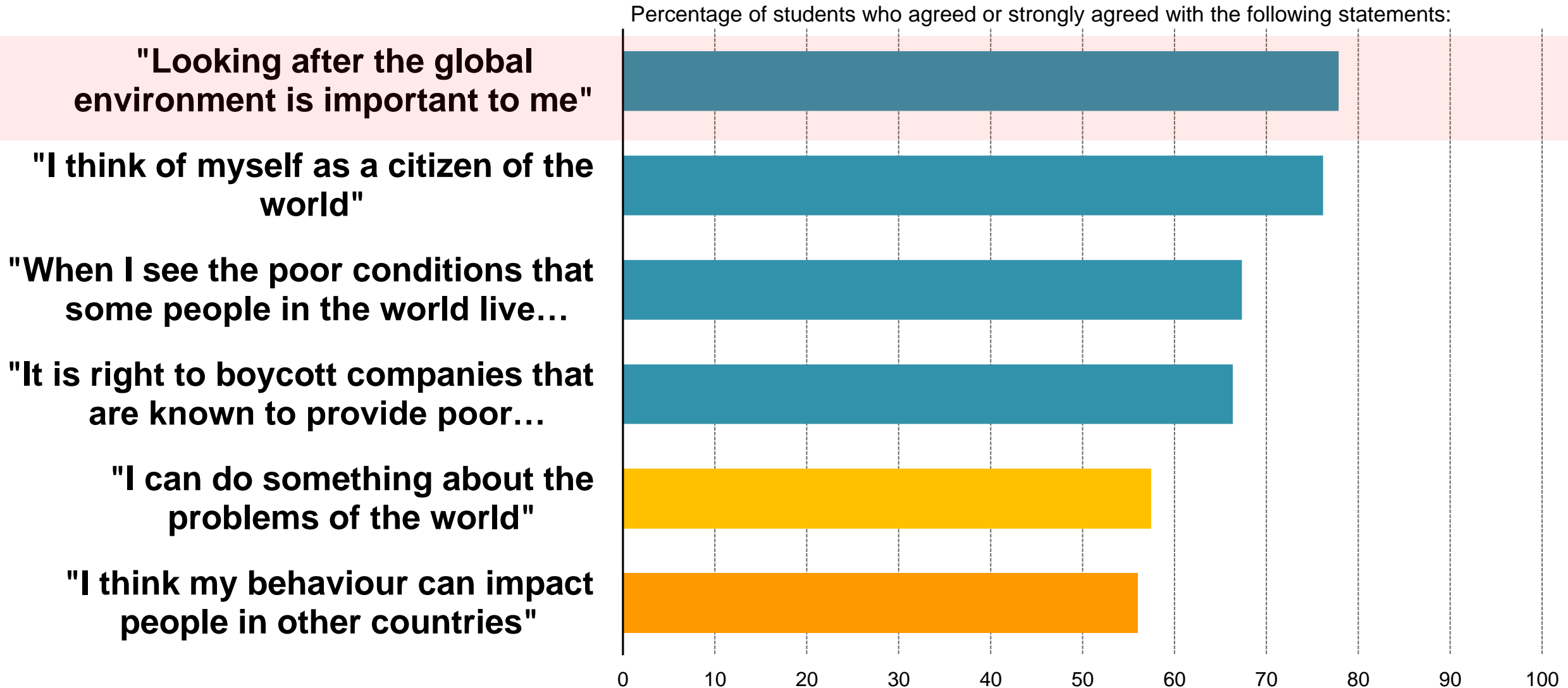


*Based on principals' reports*

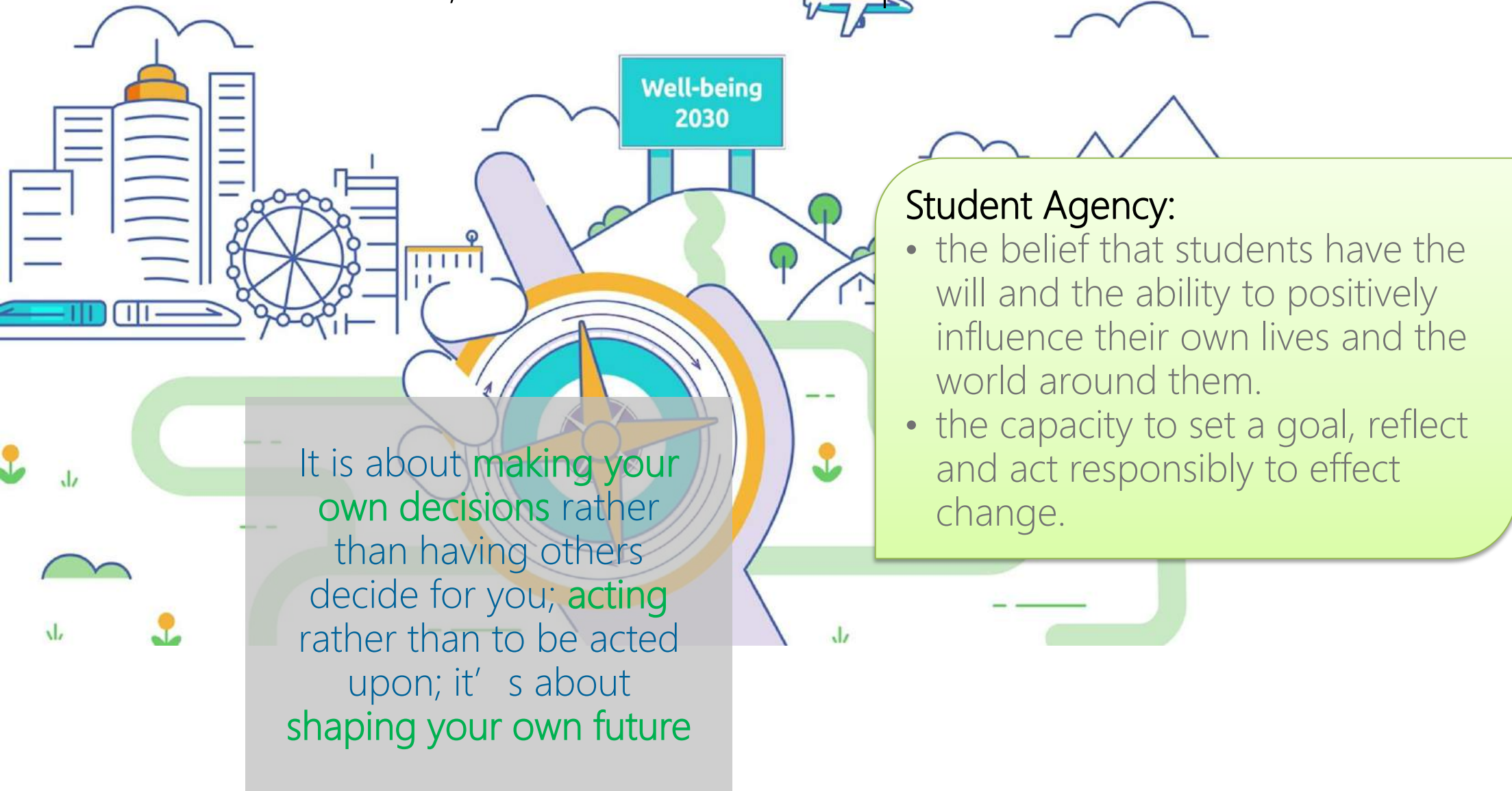


# Students' agency regarding global issues (PISA, OECD average)

Fig VI.5.1a



To thrive in the VUCA world, students need to learn to navigate oneself towards the world of well-being- well-being of oneself, of others and of the planet.



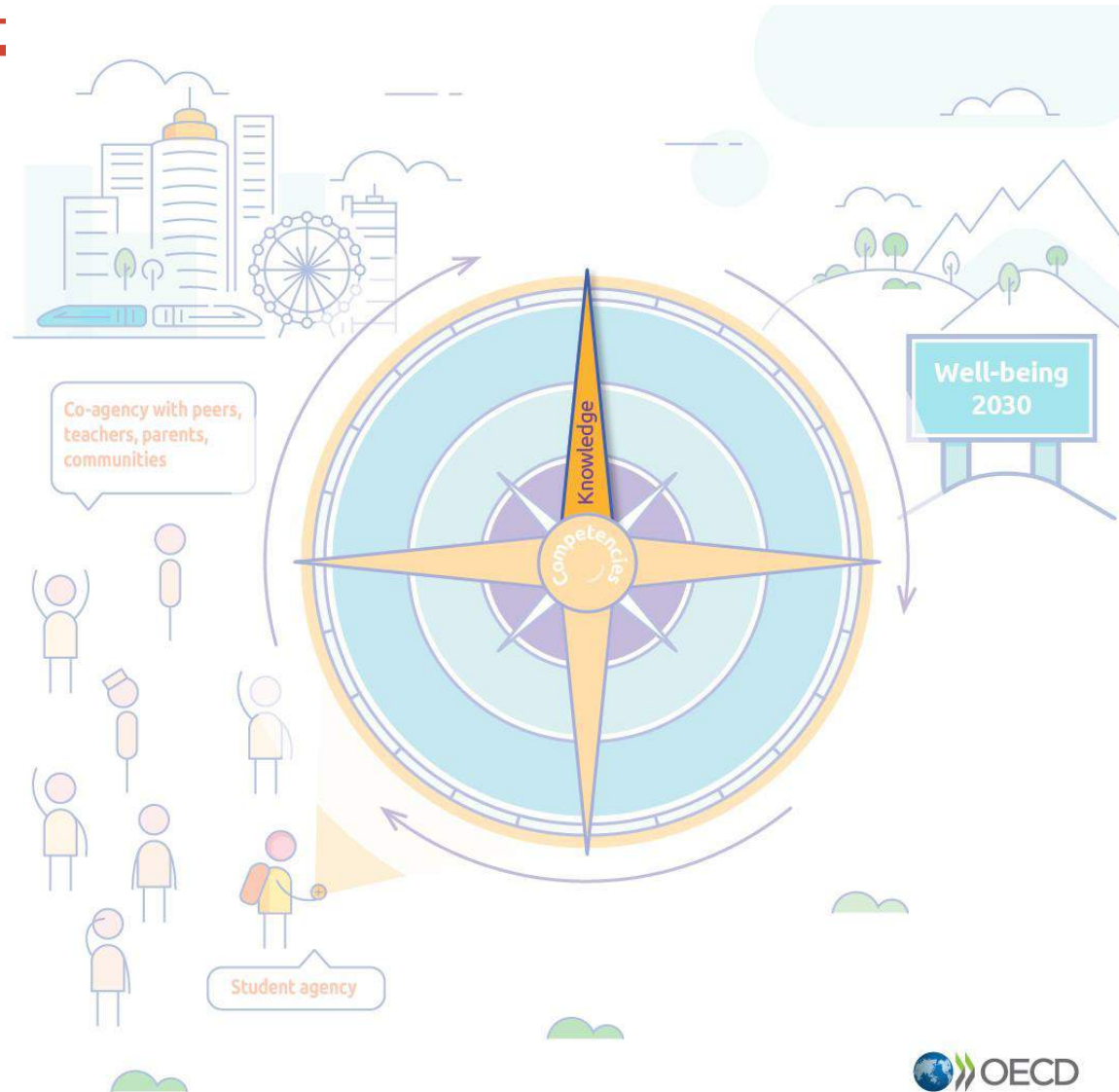
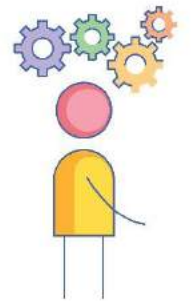
It is about **making your own decisions** rather than having others decide for you; **acting** rather than to be acted upon; it's about **shaping your own future**

### Student Agency:

- the belief that students have the will and the ability to positively influence their own lives and the world around them.
- the capacity to set a goal, reflect and act responsibly to effect change.

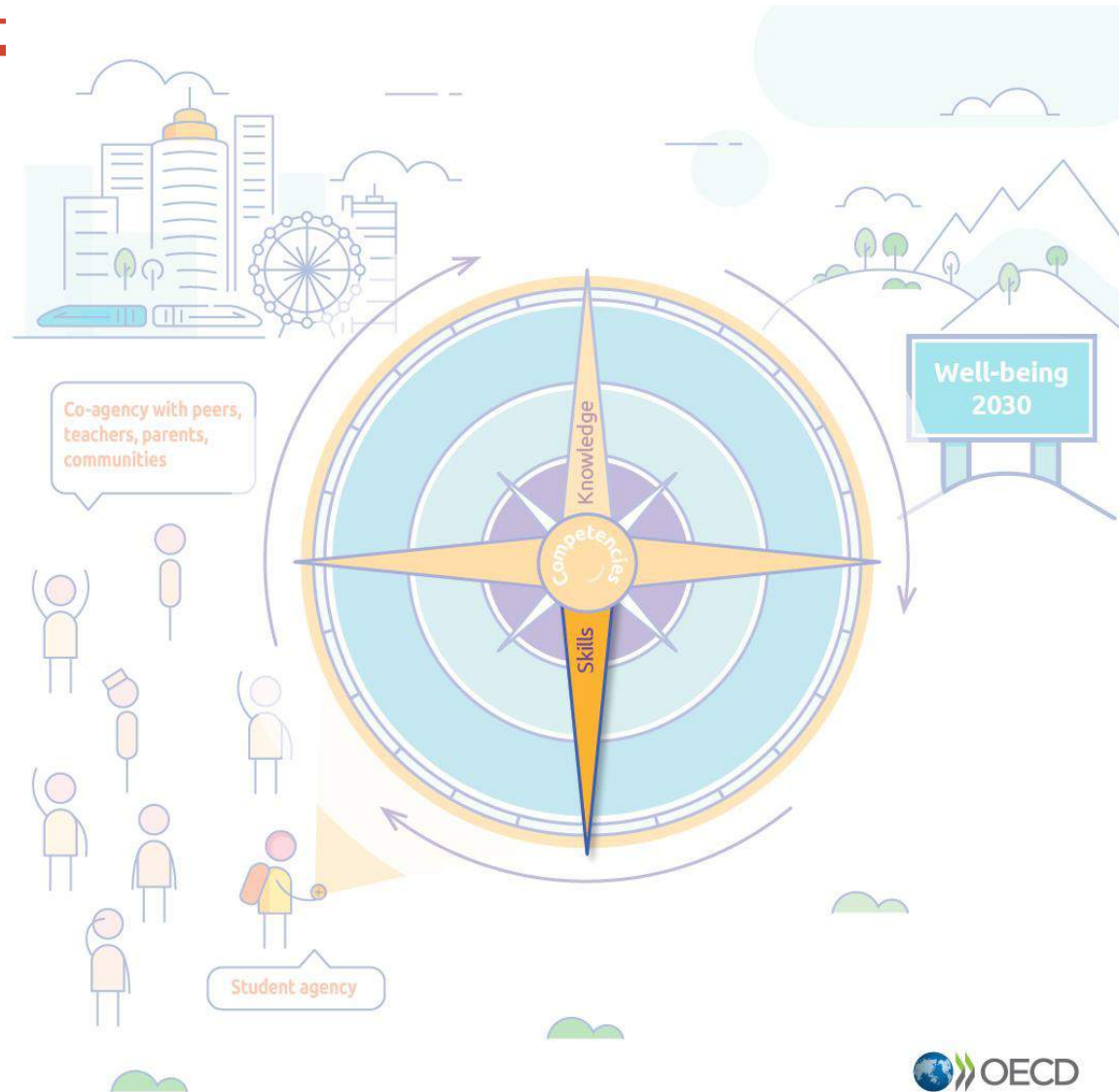
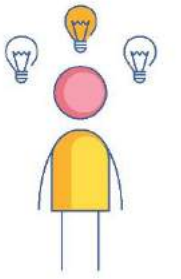


# Learning compass: Knowledge



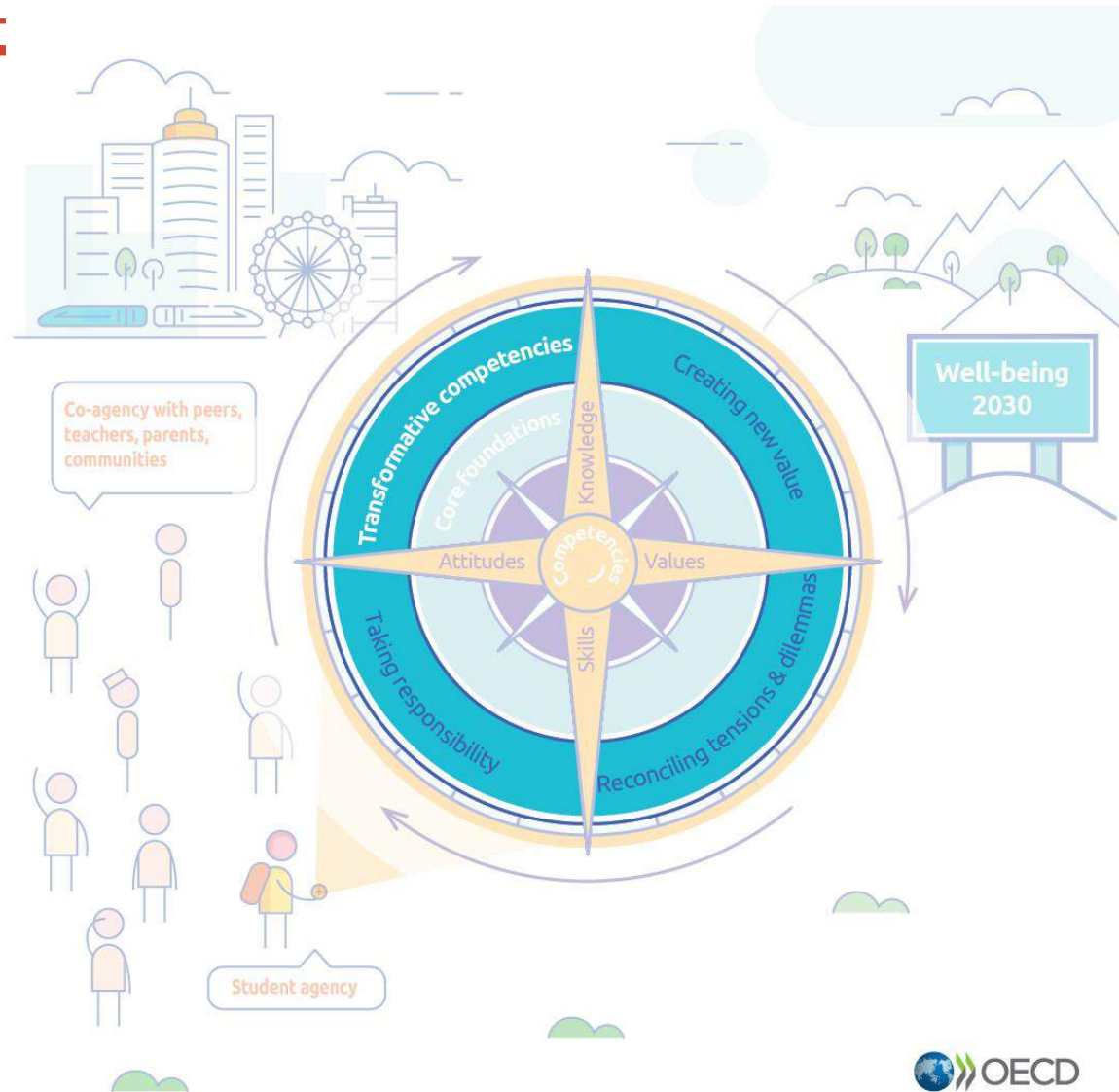
- Disciplinary
- Interdisciplinary
- Epistemic
- Procedural

# Learning compass: Skills



- Cognitive & meta-cognitive
- Social & emotional
- Physical & practical

# Transformative competencies



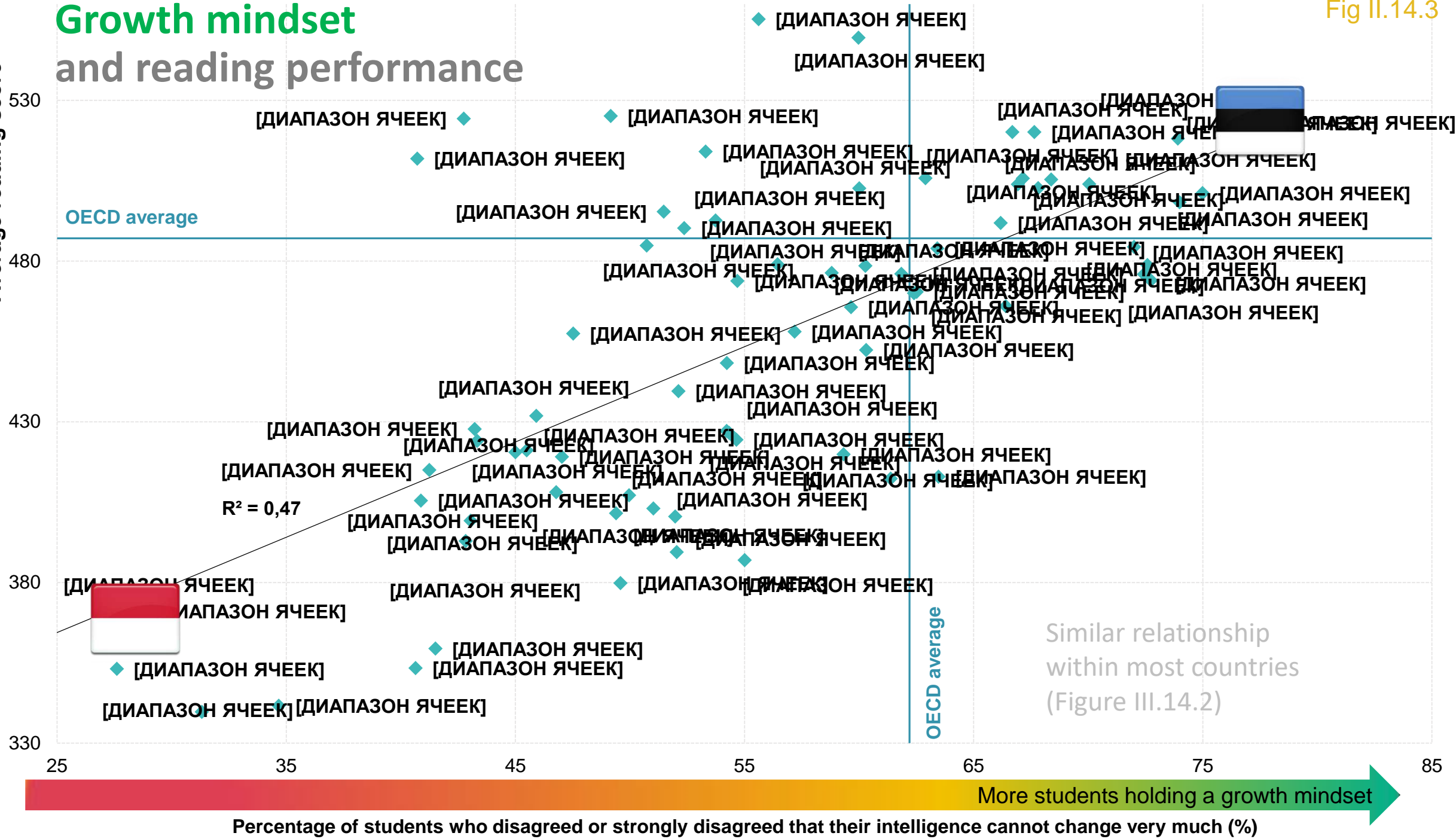
- Creating new value
- Taking responsibility
- Reconciling tensions & dilemmas



# Growth mindset and reading performance



Average reading score

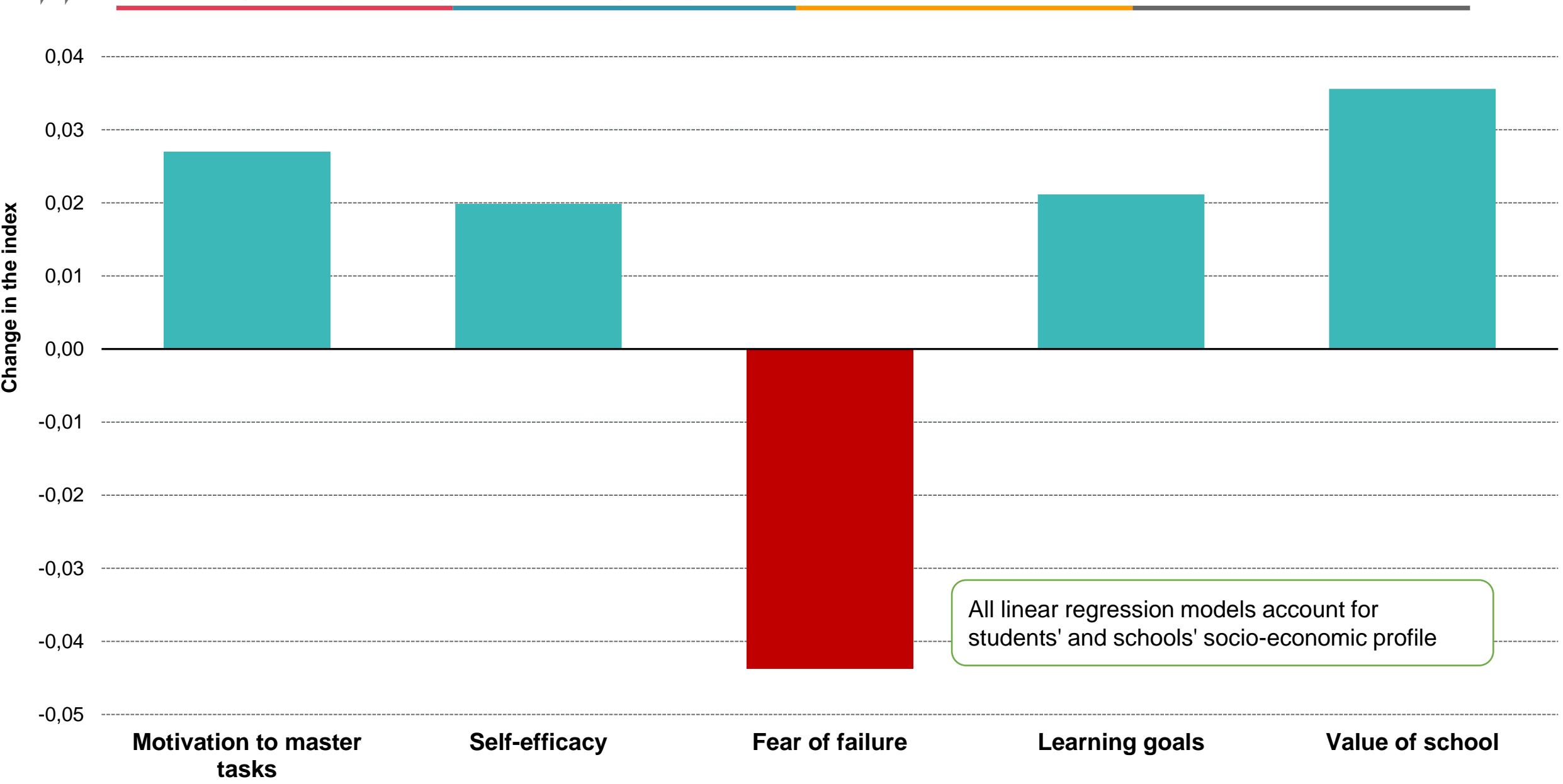




# Growth mindset and student attitudes

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



# 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.

1



**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 through technology

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.

2



**Goals and functions**



**Governance and geopolitics**



**Organisation and structures**



**The teaching workforce**



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

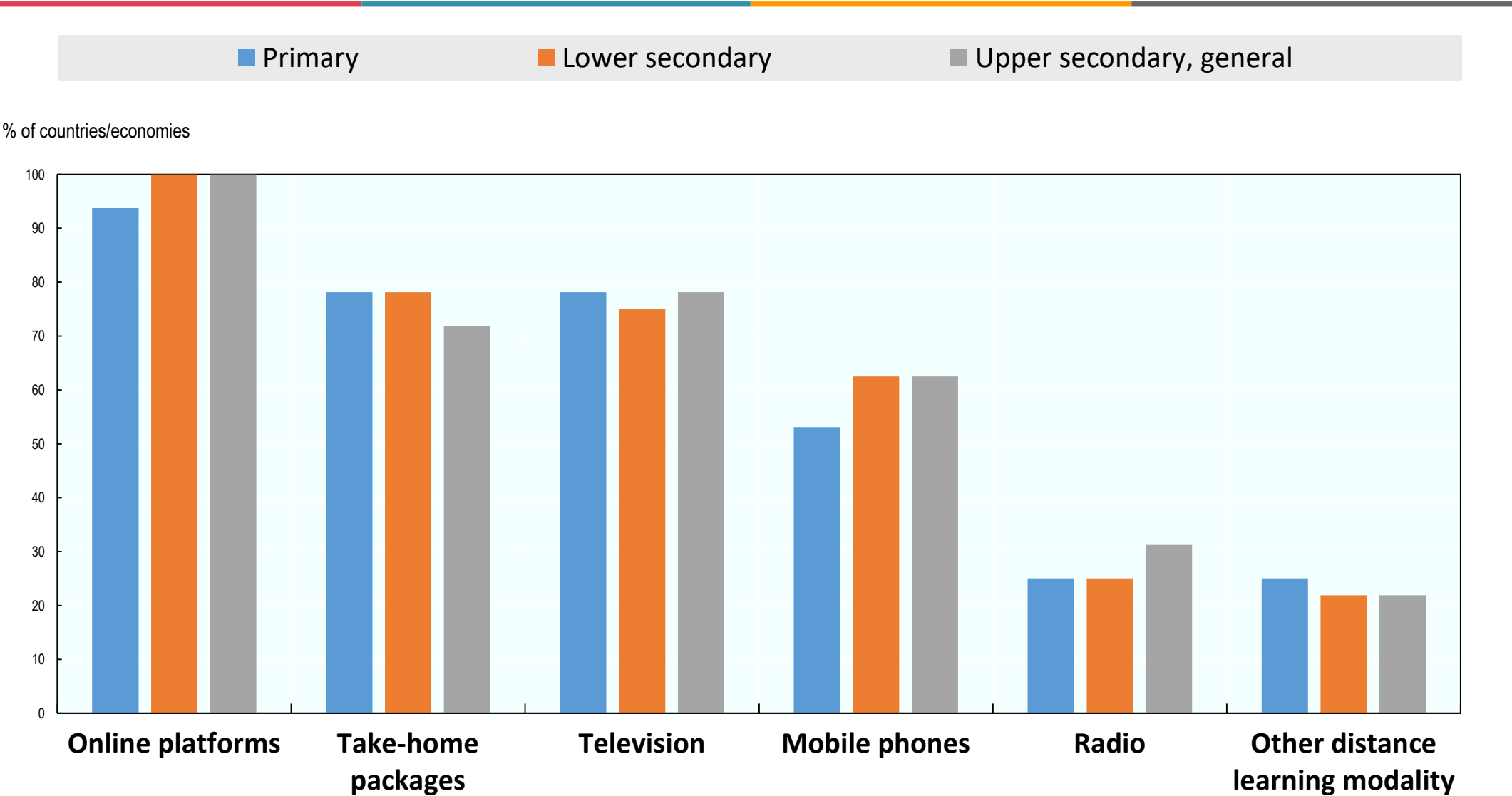


Schooling systems as players in a wider (local, national, global) education market. Diversification of structures: multiple organisational forms available to individuals.



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

# Distance-learning solutions offered during 2020 and/or 2021

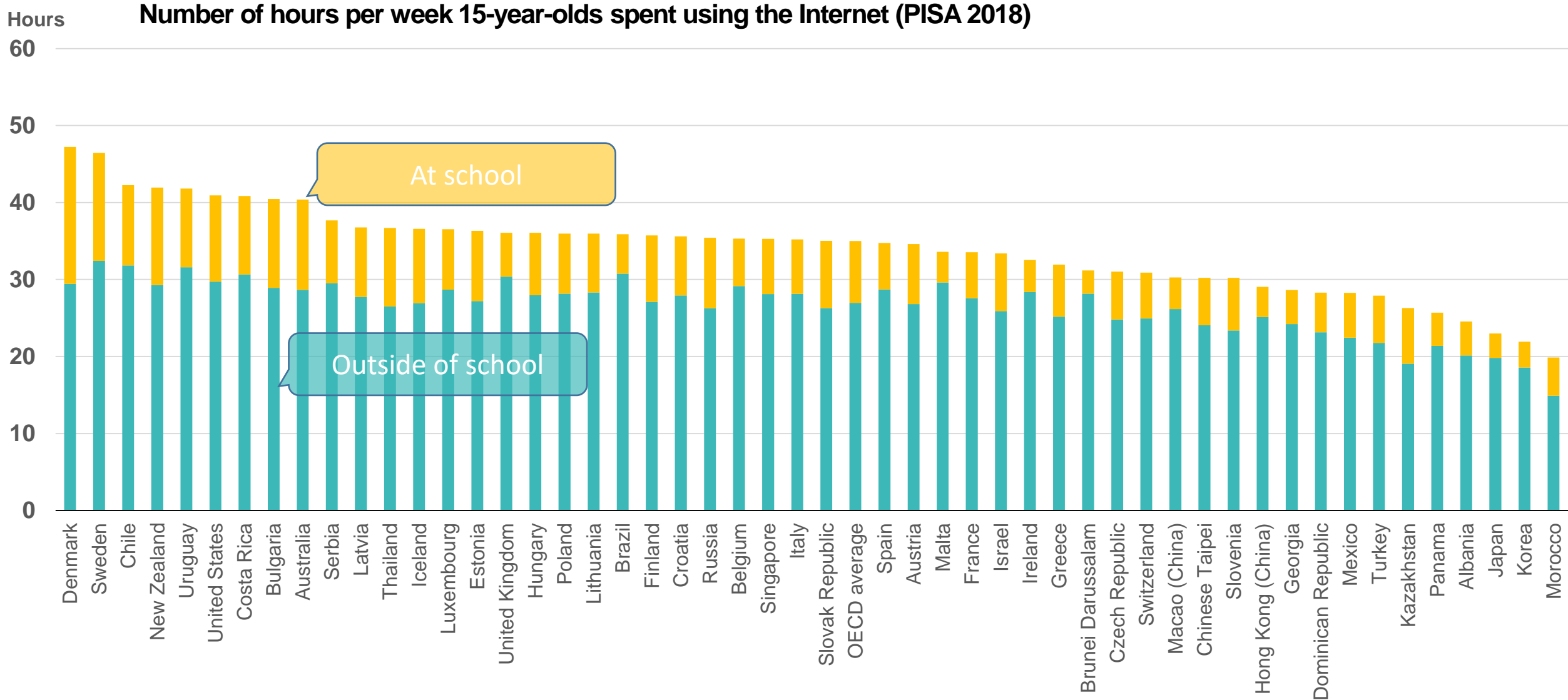


Source: OECD/UIS/UNESCO/UNICEF/WB Special Survey on Covid. March 2021

Figure 2.1



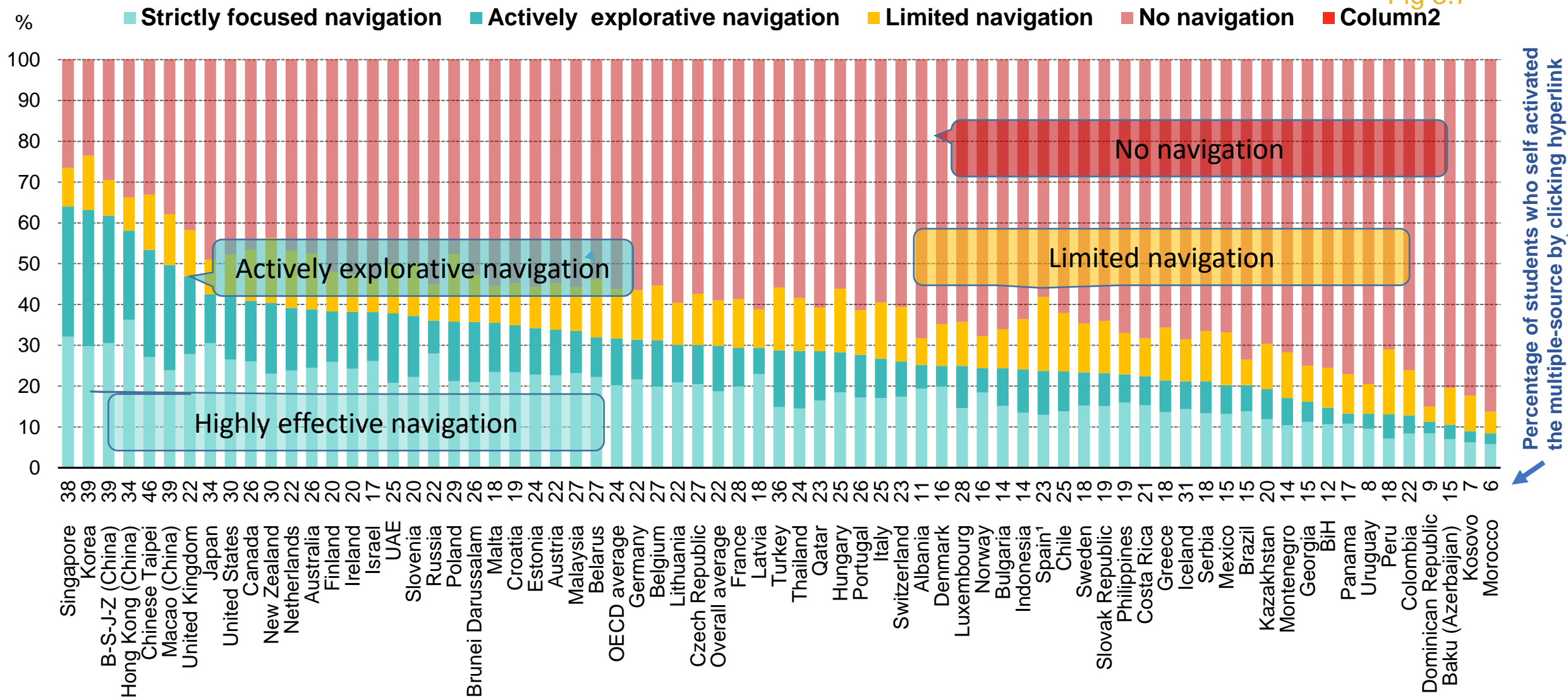
# The digital world has become the real world



# Task-oriented navigation activities (PISA 2018)



Fig 3.7



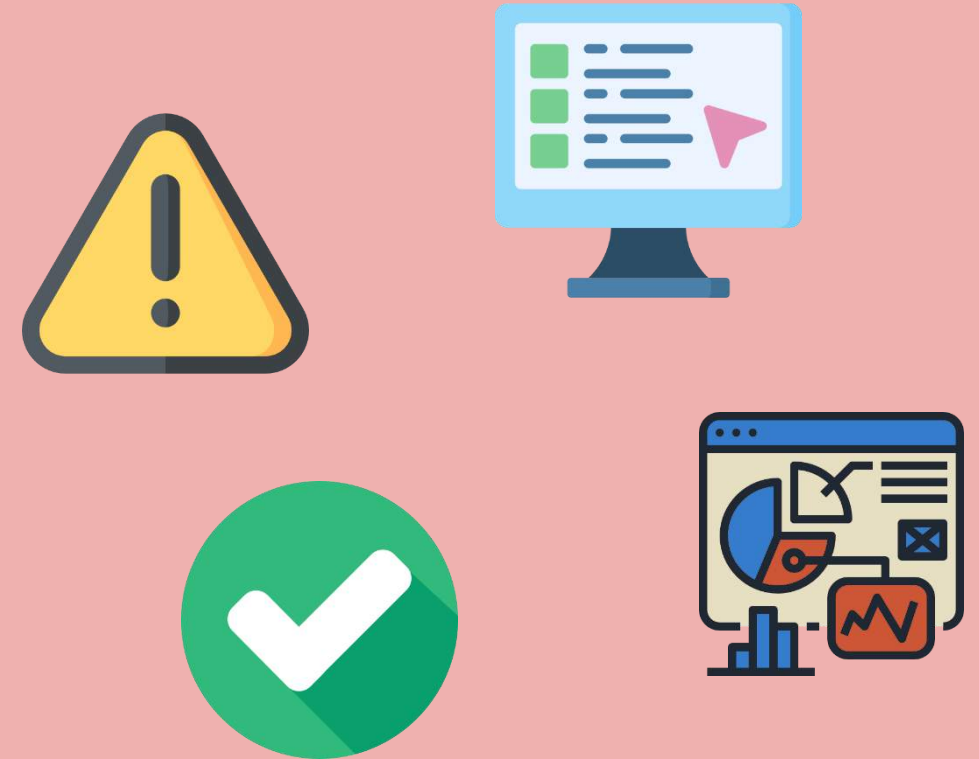
# From digital to data, here's how education truly gets "smart"



## In classrooms



## In education systems





In the classroom

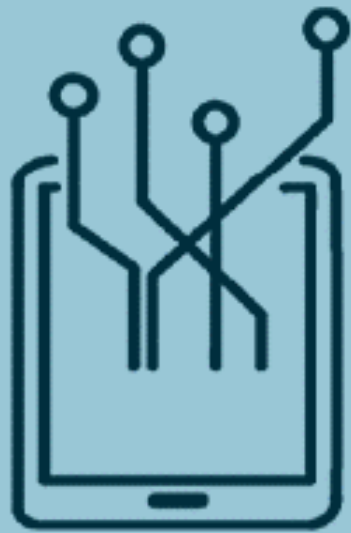


# Using technology to personalise learning

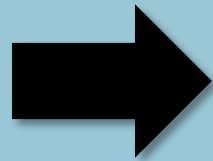




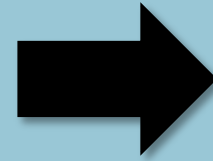
# Detect, diagnose, act



**Detect**

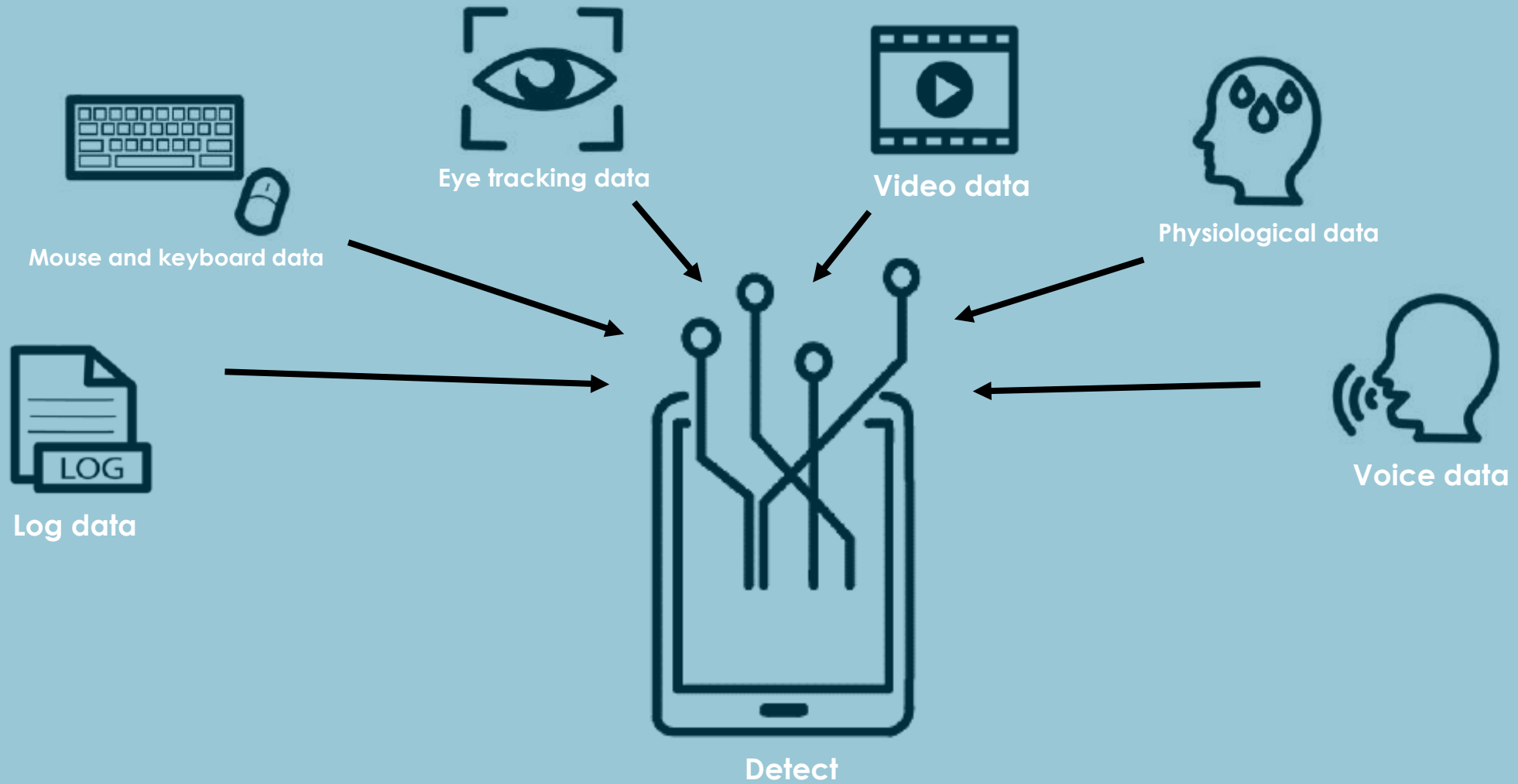


**Diagnose**



**Act**

# Detect



# Diagnose



- Knowledge
- Gaps in development
- Motivation
- Metacognition
- Emotion



Diagnose

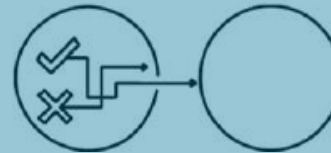
# Act



- Adjusting feedback at the **step** level
- Adjusting feedback at the **task** level
- Adjusting feedback at the **curriculum** level



Step



Task



Curriculum



Act

# Task level and step level



## Snappet



$2\frac{2}{5} + 1\frac{2}{5} = \dots$

1. Tel eerst de **hele** erbij.

$2\frac{2}{5} + \square = \square$

2. Tel daarna het **deel** erbij.

$\square + \frac{2}{5} = \square$

EBC



## MATHia



# Curriculum level



## ALEKS



# Using technology to support students with special needs



- Autism
- Dysgraphia
- Dyslexia and Dyscalculia
- Visual impairment
- Attention deficit hyperactivity disorder (ADHD)



# Classroom analytics: make visible what's invisible

# Classrooms as digital systems



Source: Raca, Kidzinski and Dillenbourg, 2015

Input  
(sensors)



Output  
(dashboard)



A. Regulating teachers' attention using Lantern devices



Source: (Alavi and Dillenbourg, 2012<sup>[22]</sup>)



# What teachers can do with the data



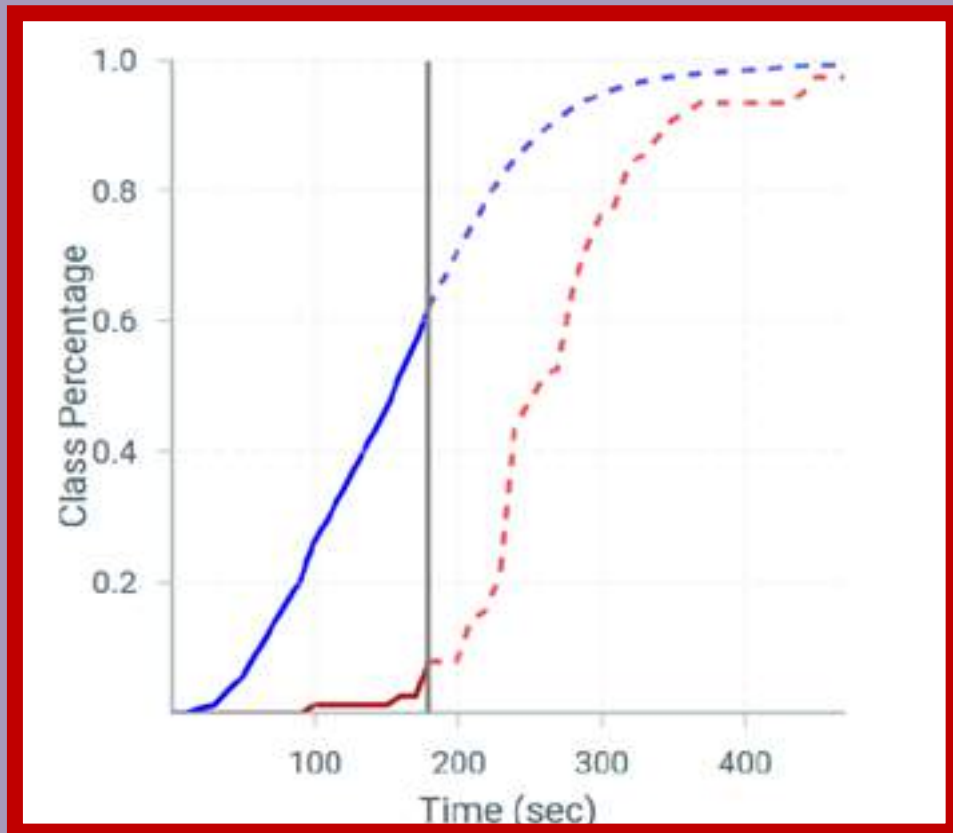
- Monitoring and intervention
- Using and sharing information
- Building teams
- Debriefing
- Timing transitions
- Teacher self-regulation



# Timing transitions and activities

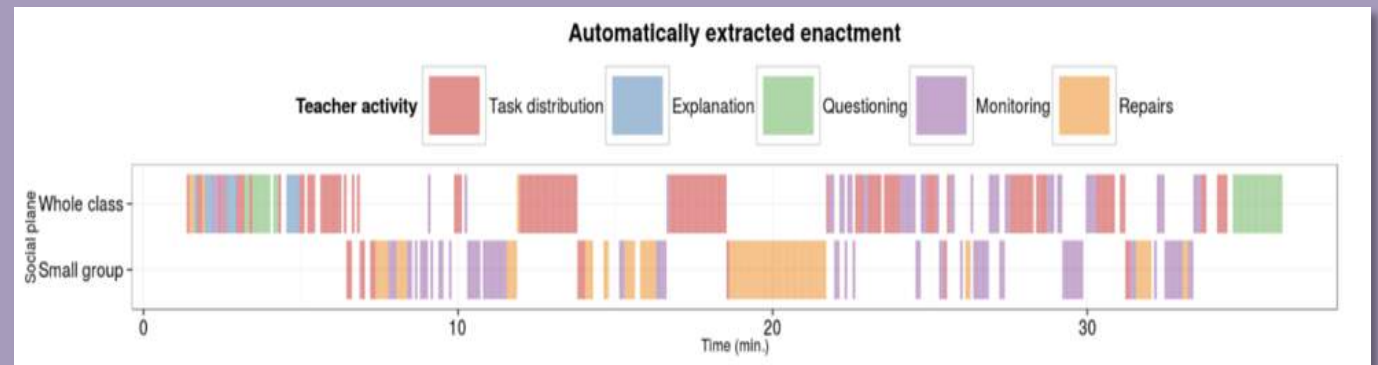
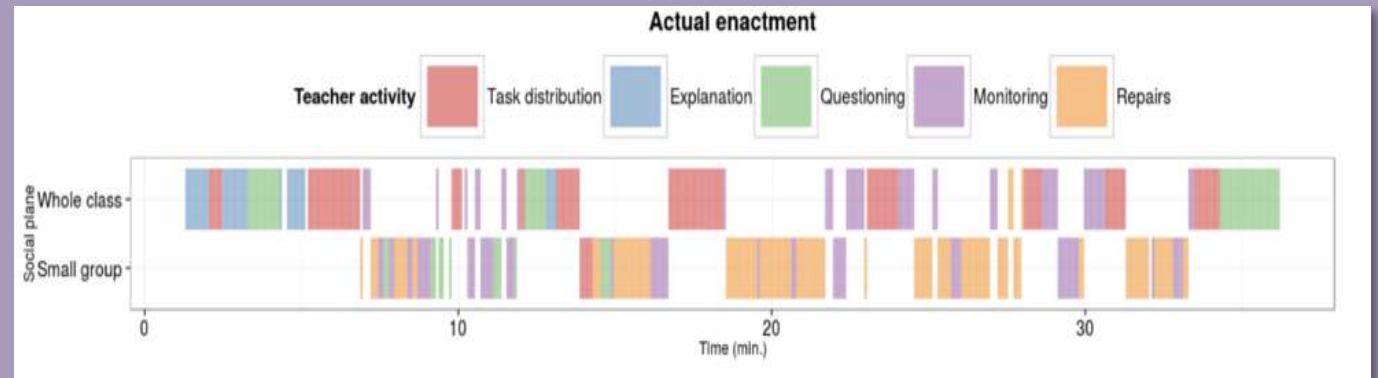


Progression chart of the time extension gain



Source: Faucon et al., 2020

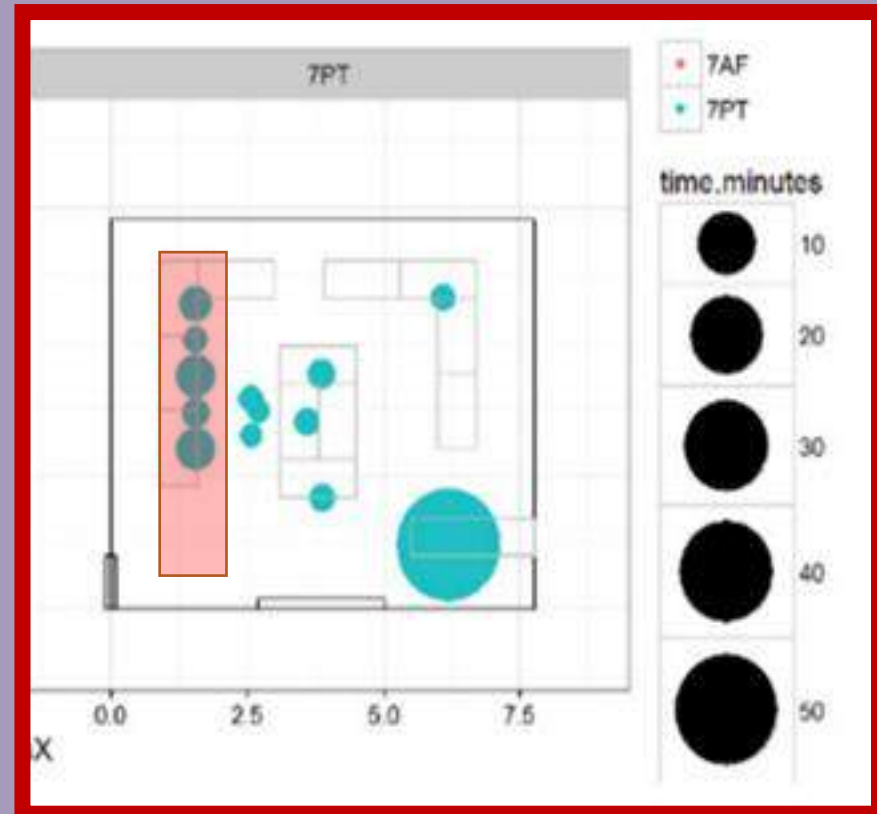
Tracking and timing activities in the classroom



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

# Understanding patterns of dropout



38%: **Jaded dropouts** (don't like school, low and declining grades)

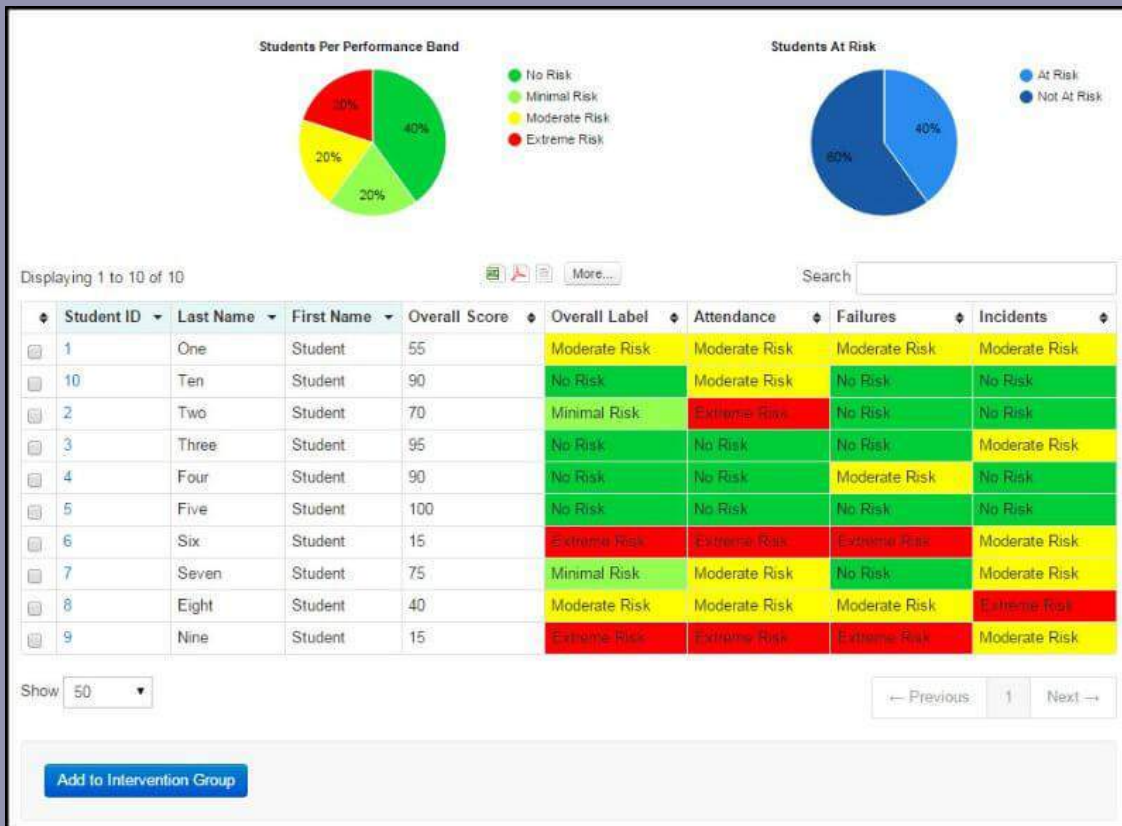


53%: **Quiet dropouts** (like school, low and slowly rising grades)



9%: **Involved dropouts** (like school, high grades, but unexpected need to take an additional course or significant life event)

# Early warning systems



Source: [www.illuminateed.com/blog/2016/01/give-your-teachers-x-ray-vision](http://www.illuminateed.com/blog/2016/01/give-your-teachers-x-ray-vision)

**Advisory Dashboard**

**Advisory Dashboard - Teacher's View**

Student Name	# of F's	Discipline	Attendance	Enrichment	Community Service Hours	GPA Simple Current	GPA Simple Cumulative	Suspension
Akins, Tanesha	2	40	91.92%	0	3	1.84	1.06	4
Albert, Montrell	7	24	97.98%	0	0	0.41	0.76	0
Anderson, Asia	0	18	92.93%	0	44	1.70	2.28	3
Andrews, Kianna	0	3	91.92%	0	5	2.86	3.26	0
Angeles, Meyahuelzin E	0	1	94.95%	0	48	3.56	3.96	0
Armistead, Adrienne	1	29	73.74%	0	2	1.60	2.59	9
Armistead, Sean A	9	65	72.73%	0	0	0.00	0.13	6
Baines, Mario	0	53	74.75%	0	3	2.02	1.55	1
Banks, Devonte	0	4	97.98%	0	10	3.25	2.26	0
Banks, Malachi	1	28	86.87%	0	0	0.78	2.39	6
Barr, Dejah	3	9	66.67%	0	7	0.20	2.34	8
Beck, Tekeyah	0	3	78.79%	0	20	2.94	1.56	0
Bell, Maurice	2	9	91.92%	0	0	1.68	1.64	0
Binion, Tasheina	0	0	95.96%	0	9	3.62	3.41	0
Booker, Isaac	0	16	92.93%	0	3	3.62	2.91	0
Booker, Kendalyn H	0	18	92.93%	0	40	2.62	3.29	0
Bouldin, Glen A	2	9	91.92%	0	3	1.05	0.86	1
Boyd, Freddy	0	13	91.92%	0	2	3.83	3.29	0

**School**  
Legal Prep Charter Academy

**Reporting Term**  
S2

**Show/Hide Dropped Classes**  
(only applies to # of F's Column)  
Current Classes

**Grade**  
(All)

**Home Room**  
(All)

**Special Program**  
(All)

**Sort By**  
Student Name

**Sort Order**  
Ascending

Source: [www.puredata.io](http://www.puredata.io)

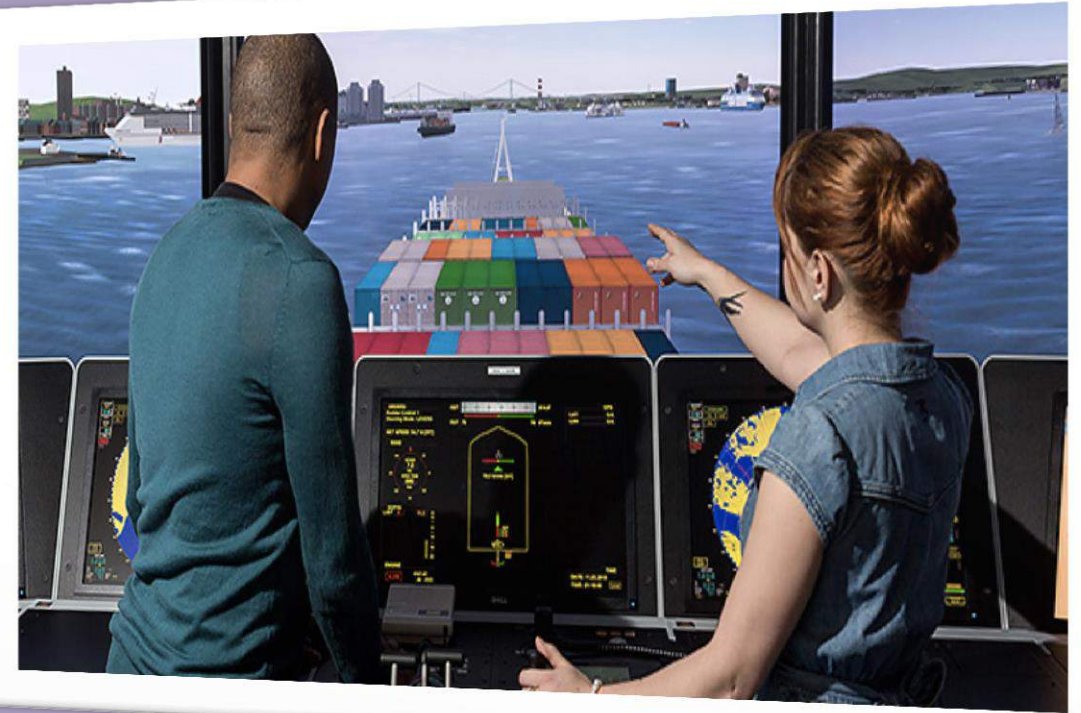


# Game-based standardised assessment

# Games can elicit evidence of how people reason and solve problems



VS



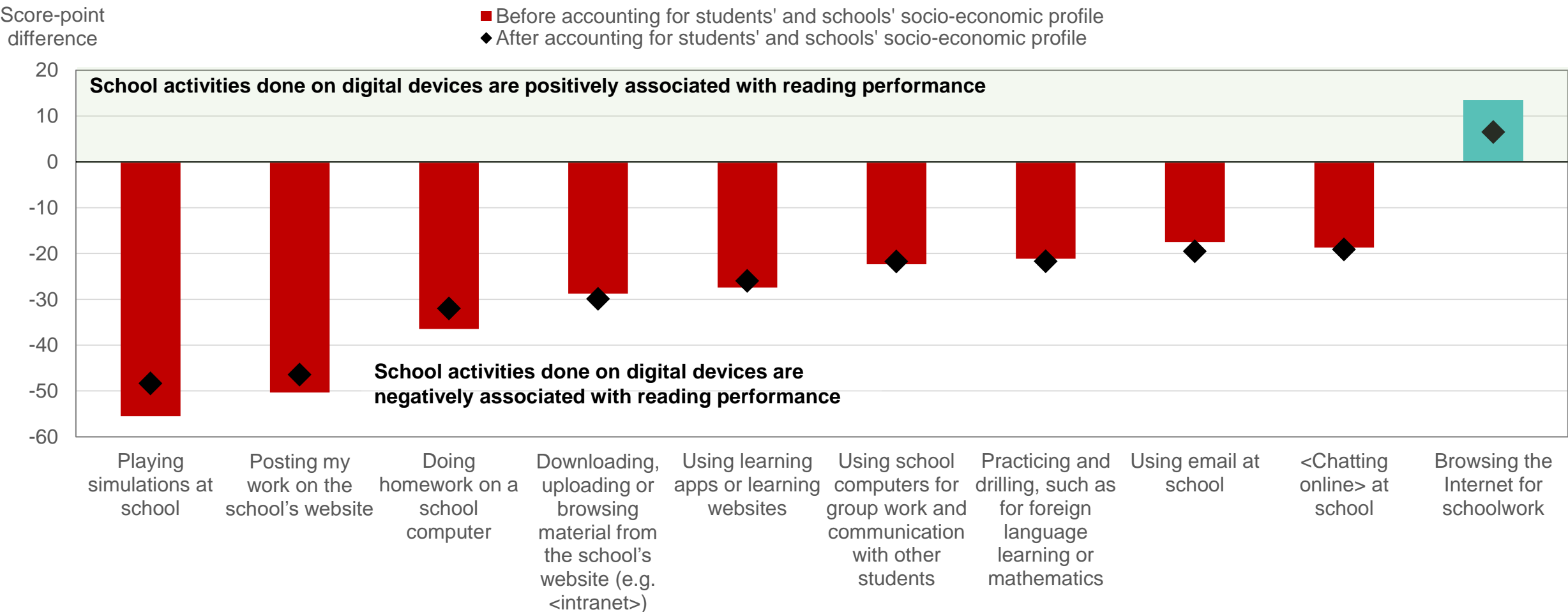


# Relationship between reading performance and the type of school activities done on digital devices (PISA 2018)

Score-point difference in reading between students who reported using digital devices for the following activities at school compared to those who reported that never did, OECD average



Fig 6.13





# 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: 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.

3



**Goals and functions**



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



**Governance and geopolitics**



Flexible schooling arrangements permit greater personalisation and community involvement.



**Organisation and structures**



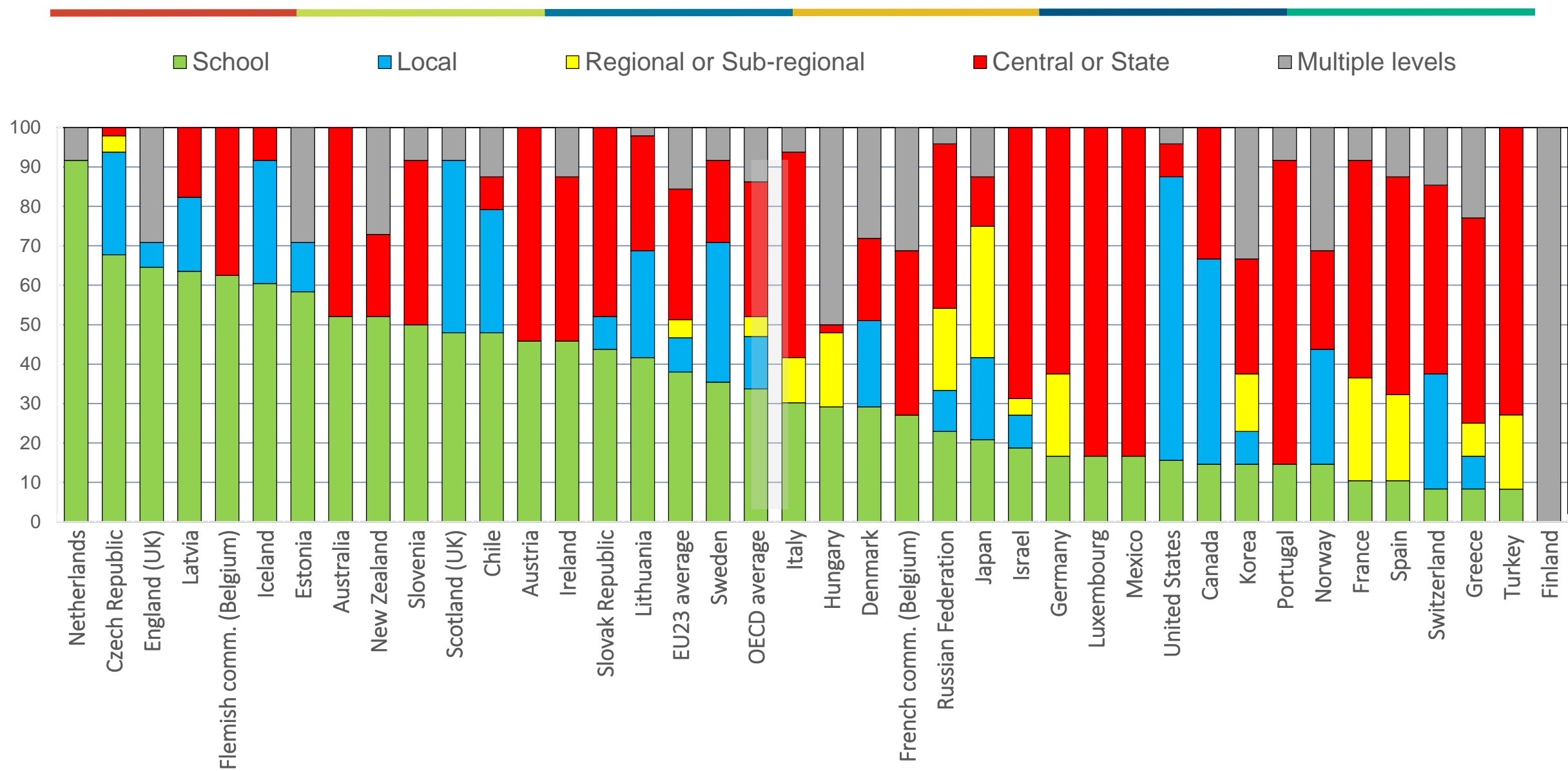
**The teaching workforce**



Professional teachers as nodes of wider networks of flexible expertise.

# Who decides?

Percentage of decisions taken at each level of government in public lower secondary education (2017)



# Scenario 4: 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.

4



**Goals and functions**



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



**Governance and geopolitics**



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



**Organisation and structures**



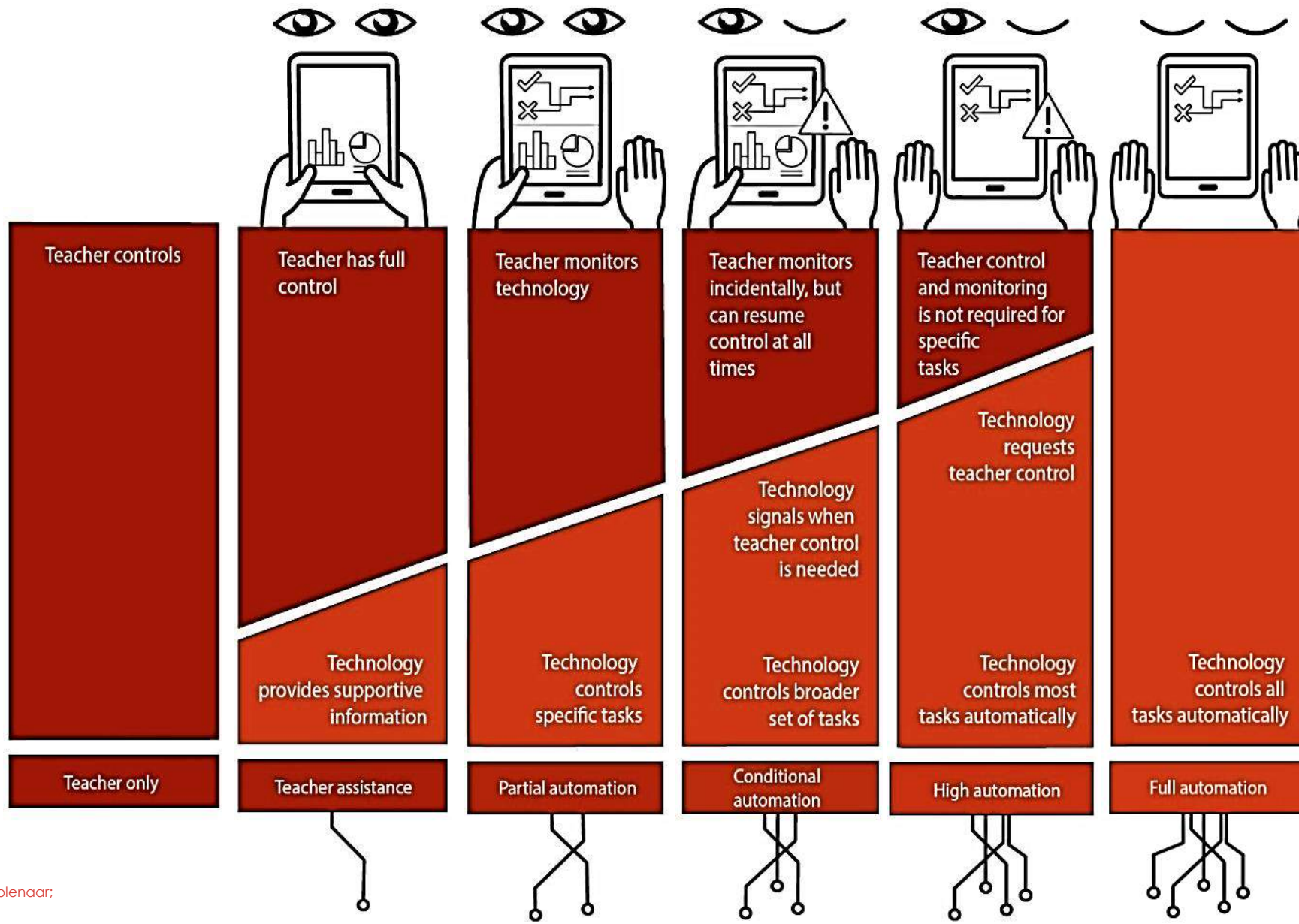
**The teaching workforce**



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

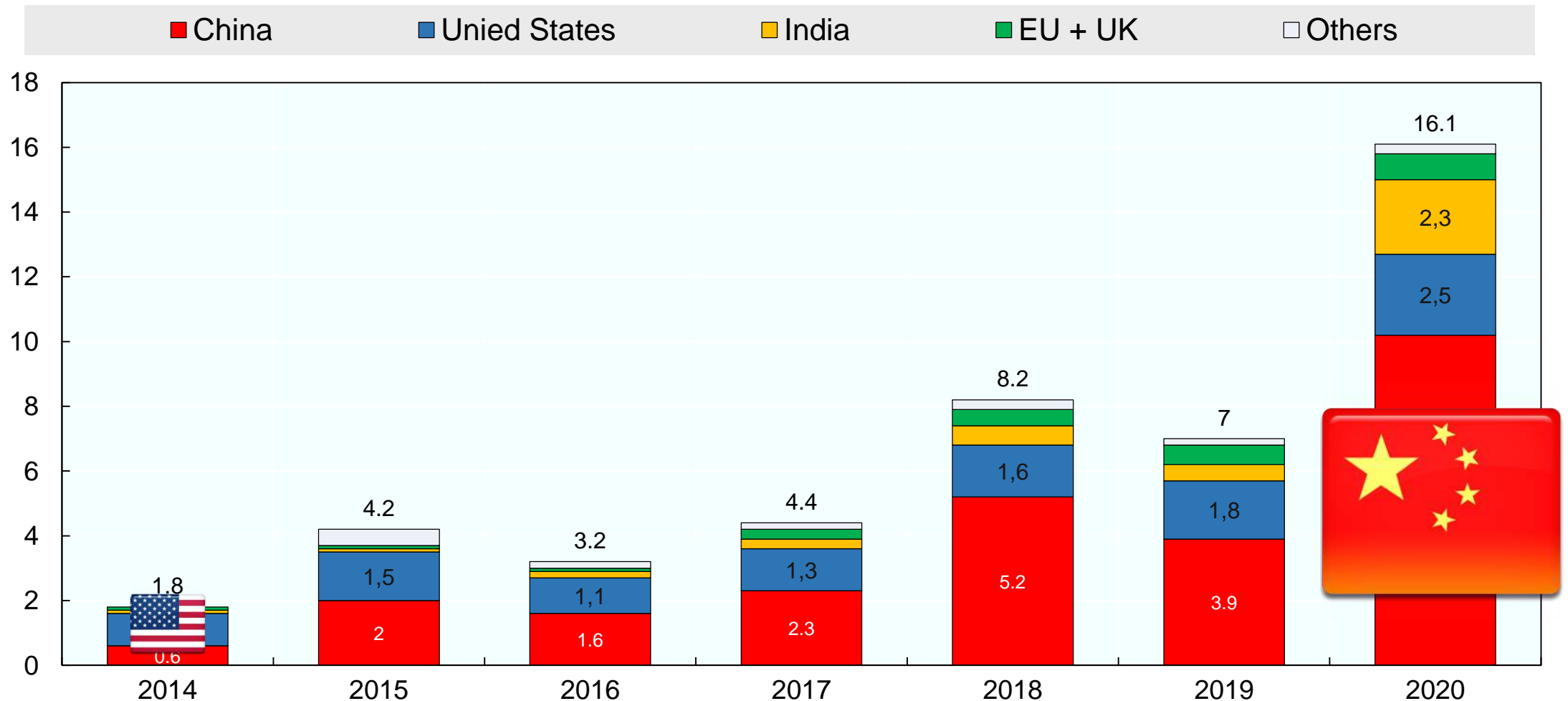











# Finding a balance that puts humans at the centre



# Global education venture capital

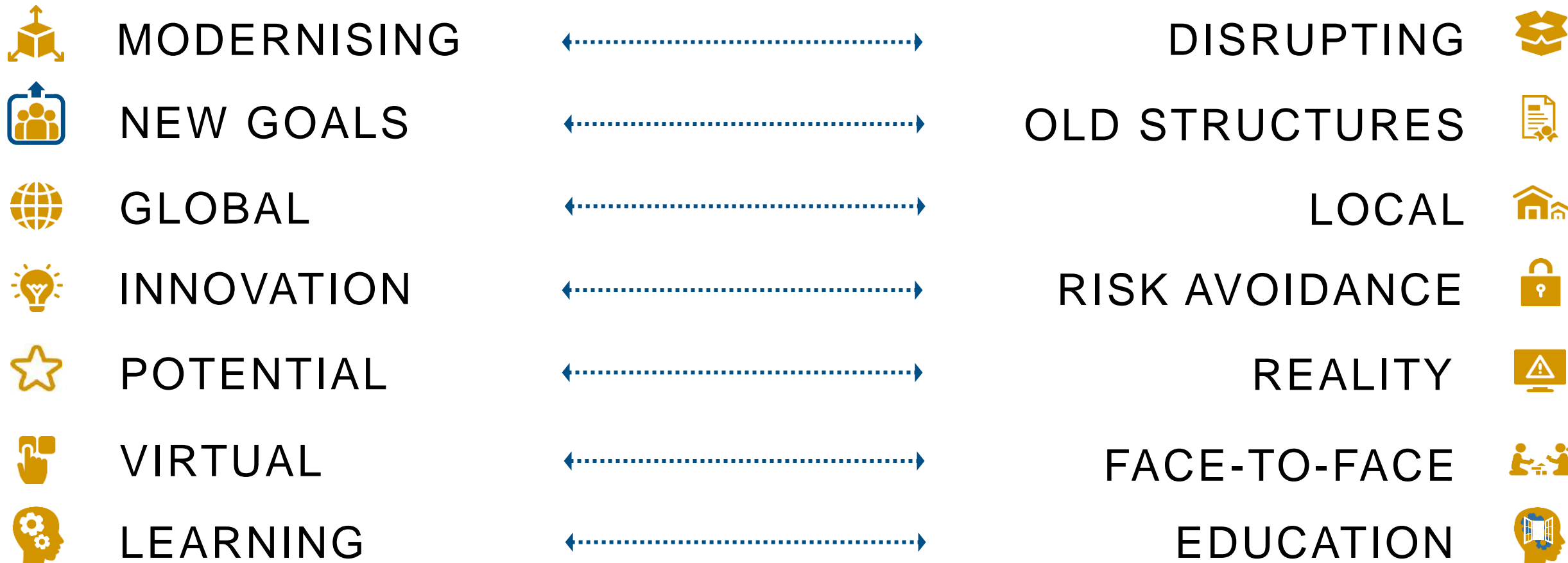
**Venture capitalists** have invested USD 16B\$ in 2020, up from USD 2B in 2014



<div>OECD</div> <div>Scenarios for the Future of Schooling</div>	<div></div> <div>Goals and functions</div>	<div></div> <div>Organisation and structures</div>	<div></div> <div>The teaching workforce</div>	<div></div> <div>Governance and geopolitics</div>	<div></div> <div>Challenges for public authorities</div>
<div>Scenario 1</div> <div></div> <div>Schooling extended</div>	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.
<div>Scenario 2</div> <div></div> <div>Education outsourced</div>	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.
<div>Scenario 3</div> <div></div> <div>Schools as learning hubs</div>	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.
<div>Scenario 4</div> <div></div> <div>Learn-as-you-go</div>	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.

# Assessing risks, leveraging opportunities

Tensions and paradoxes require smart responses







# Thank you

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**Find out more about our work at [www.oecd.org/pisa](http://www.oecd.org/pisa)**

- **PISA 2018: *Insights and Implications***
- **PISA 2018 Results (Volume I): *What Students Know and Can Do***
- **PISA 2018 Results (Volume II): *Where All Students Can Succeed***
- **PISA 2018 Results (Volume III): *What School Life Means for Students' Lives***

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**PISA indicators on Education GPS: <http://gpseducation.oecd.org>**

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**Email: [Andreas.Schleicher@OECD.org](mailto:Andreas.Schleicher@OECD.org)**