FUTURE OF EDUCATION AND SKILLS: 2030 – IMPLICATIONS FOR AUSTRALIAN EDUCATORS

Andreas Schleicher

Director for the Directorate of Education and Skills, Organisation for Economic Cooperation and Development (OECD)

Preparing learners for their future, not our past

IEA, Adelaide
Andreas Schleicher

Trends in science performance (PISA)

Student performance

- 570
- 550
- 530
- 510
- 490
- 470
- 450

OECD average

2006 2009 2012 2015

Trends in science performance (**PISA**)

OECD average

570
550
530
510
490
450

2006
2009
2012
2015

Figure II.6.2

Money is necessary but not sufficient
Spending per student from the age of 6 to 15 and science performance

Figure II.6.23

Learning time and science performance (PISA)

Changing education can be like moving graveyards

- The status quo has many protectors
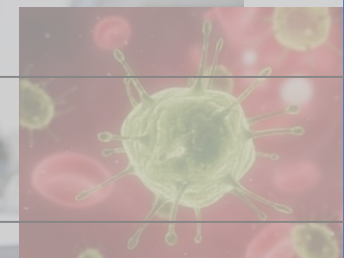 - Everyone supports reform – except for their own children
  - Even those who promote reforms often change their mind when they understand what change entails for them
- The frogs rarely clear the swamp
  - The loss of privilege is pervasive because of the extent of vested interests
- Asymmetry of costs and benefits of educational reform
  - Costs are certain and immediate, benefits are uncertain and long-term
- Lack of supportive ecosystems
  - Lack of an 'education industry' that pushes innovation and absorbs risks
  - A research sector that is often disengaged from the real needs of real classrooms
- You can lose an election but you don't win one over education
  - Complexity and length of reform trajectory that extend electoral cycles
  - A substantial gap between the time when the cost of reform is incurred, and the time when benefits materialise

When fast gets really fast, being slow to adapt makes education really slow

Industrial systems		World class systems
Some students learn at high levels	Student inclusion	**All** students need to learn at high levels
Routine cognitive skills	Curriculum, instruction and assessment	Complex ways of thinking and working
Standardisation and compliance	Teacher education	High-level professional knowledge workers
'Tayloristic', industrial	Work organisation	Flat, collegial, entrepreneurial
Primarily to authorities	Accountability	Primarily to peers and stakeholders

Some learn at high levels

All learn at high levels

Poverty need not be destiny:

PISA math performance by decile of social background (2012)

PISA mathematics performance

High math performance

Low math performance

Mathematics performance
of the 10% most privileged
American 15-year-olds (~Japan)

Mathematics performance
of the 10% most disadvantaged
American 15-year-olds (~Mexico)

Aligning resources with needs

Average class size in <9th grade>, by quarter of school socio-economic profile

Aligning resources with needs

Science teachers without a university major in science, by school socio-economic profile (OECD Average)

Variation in science performance between and within schools

Figure I.6.11

Total variation as a proportion of the OECD average

Public and private schools, and students' science performance

Figure II.4.14

Table II.6.51

Attendance at pre-primary school
by schools' socio-economic profile

Number of years in pre-primary education among students attending socio-economically …

● Disadvantaged schools   ◆ Advantaged schools

Reproducing knowledge

Creating knowledge

Think for yourself and work with others

The rise of the global middle class

Within the next decade the majority of the world population will consist of the middle class

Estimates of the size of the global middle class, percentage of the world population (left axis) and headcount (right axis)

Source: Kharas, H. (2017), The unprecedented expansion of the global middle class, an update, https://www.brookings.edu/wp-content/uploads/2017/02/global_20170228_global-middle-class.pdf. Kharas, H. (2010), The emerging middle class in developing countries, https://www.oecd.org/dev/44457738.pdf.

Figure 1.2

Growing unequal

Income gaps continues to grow

Trends in real household incomes by percentile, OECD average, 1985-2015

Source: OECD (2018), *A Broken Social Elevator? How to Promote Social Mobility*, https://doi.org/10.1787/9789264301085-en.

Figure 2.1

More people on the move

Estimates of international migrant stock by region of destination, 1990-2017

Source: United Nations (2017), "International migrant stock: The 2017 revision" (database), www.un.org/en/development/desa/population/migration/data/.

Figure 1.5

Rising volatility

Household savings and debt

Household savings (% of disposable income, left axis) and household debt (% of disposable income, right axis), OECD average, 1970-2016

Source: OECD (2018), *OECD National Accounts Statistics* (database), https://stats.oecd.org/.

Figure 3.9

Access to Access

Number of mobile broadband subscriptions per 100 inhabitants, OECD average, 2009-2017

Source: OECD (2018), "Mobile broadband subscriptions" (indicator), https://doi.org/10.1787/1277ddc6-en.

Figure 5.1

The growth in AI technologies…

…pushes us to think harder about what makes us truly human

Number of patents in artificial intelligence technologies, 1991-2015

Figure 1.10

Digitalisation

Participating

Particularizing

Empowering

Concentrating

Homogenizing

Disempowering

The post-truth world where reality becomes fungible

- Virality seems privileged over quality
  in the distribution of information

- Truth and fact are losing currency

Scarcity of attention and abundance of information

- Algorithms sort us into groups of like-minded
  individuals create echo chambers that amplify our
  views, leave us uninformed of opposing arguments,
  and polarise our societies

15-year-olds feeling bad if not connected to the Internet (PISA)

%

■ Boys ◆ Girls

Country	Value
Chinese Taipei	-2
Sweden	-9
France	-5
Portugal	
Greece	-2
Singapore	
Thailand	-7
Macao (China)	-2
Brazil	
Spain	
United Kingdom	
Bulgaria	
Hong Kong (China)	-7
Korea	-4
Belgium	-4
Denmark	-5
Croatia	-10
Israel	-4
New Zealand	-3
Netherlands	
Uruguay	4
Hungary	
Australia	-3
OECD average	
Dominican Republic	-7
Ireland	-3
Poland	3
Costa Rica	
Lithuania	-5
Japan	
Mexico	-8
Russia	
Czech Republic	
Italy	
Peru	4
Colombia	-6
Finland	
Chile	
Latvia	
Slovak Republic	11
B-S-J-G (China)	
Switzerland	-3
Austria	
Luxembourg	
Iceland	
Germany	
Estonia	
Slovenia	

Students are using more time online outside school on a typical school day (PISA)

Figure III.13.3

Minutes per day

Legend: ■ 2015   ◆ 2012

Percentage of High Internet Users (spending 2 to 6 hours on line per day), during weekdays

Country	Percentage
Chile	39
Sweden	56
Uruguay	33
Costa Rica	31
Spain	44
Italy	40
Australia	52
Estonia	50
New Zealand	51
Hungary	43
Russia	42
Netherlands	48
Denmark	55
Slovak Republic	40
Czech Republic	43
Austria	42
Latvia	46
Singapore	45
Belgium	44
Poland	46
Iceland	51
OECD average-27	43
Ireland	48
Croatia	40
Portugal	42
Finland	48
Israel	34
Macao (China)	45
Switzerland	40
Greece	41
Hong Kong (China)	39
Mexico	30
Slovenia	37
Japan	31
Korea	20

TWO EFFECTS OF DIGITALISATION

TWO EFFECTS OF DIGITALISATION

Non routine tasks, Low use of ICT	Non routine tasks, High use of ICT
Routine tasks, Low use of ICT	Routine tasks, High use of ICT

The kind of things that are easy to teach are now easy to automate, digitize or outsource

Mean task input in percentiles of 1960 task distribution

- Routine manual
- Nonroutine manual
- Routine cognitive
- Nonroutine analytic
- Nonroutine interpersonal

Education won the race with **technology** throughout history, but there is no automaticity it will do so in the future

Prosperity

Digital revolution

Social pain

Prosperity

Industrial revolution

Social pain

Universal public schooling

Technology

Education

Inspired by "The race between technology and education"
Pr. Goldin & Katz (Harvard)

The **OECD** Learning Framework 2030

Well-Being 2030
Individual & Societal

Parents

Teachers

Knowledge
Disciplinary
Interdisciplinary
Epistemic
Procedural

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

Attitudes and Values
Personal
Local
Societal
Global

Competencies

Anticipation

Creating New Value

Taking Responsibility

Literacy Numeracy

Digital Literacy Data Literacy

Students

Health Literacy

Reconciling Tensions & Dilemmas

Reflection

Action

Communities

Peers

Well-Being 2030
Individual & Societal

Parents

Teachers

Anticipation

Creating
New Value

Taking
Responsibility

Literacy
Numeracy
Data Literacy
Digital Literacy
Health Literacy
Students

Action

Reflection

Reconciling
Tensions & Dilemmas

Communities

Peers

Creating new value connotes processes of creating, making, bringing into being and formulating; and outcomes that are innovative, fresh and original, contributing something of intrinsic positive worth. The constructs that underpin the competence are creativity/ creative thinking/ inventive thinking, curiosity, global mind-set, …

.

In a structurally imbalanced world, the imperative of reconciling diverse perspectives and interests, in local settings with sometimes global implications, will require young people to become adept in handling tensions, dilemmas and trade-offs. Underlying constructs are empathy, resilience/stress resistance trust, …

Dealing with novelty, change, diversity and ambiguity assumes that individuals can think for themselves and work with others. This suggests a sense of responsibility, and moral and intellectual maturity, with which a person can reflect upon and evaluate their actions in the light of their experiences and personal and societal goals; what they have been taught and told; and what is right or wrong Underlying constructs include critical thinking skills, meta-learning skills (including learning to learn skills), mindfulness, problem solving skills, responsibility, …

Well-Being 2030
Individual & Societal

Creating New Value

Taking Responsibility

Reconciling Tensions & Dilemmas

Literacy   Numeracy
Digital Literacy   Data Literacy
Students
Health Literacy

Anticipation mobilises cognitive skills, such as analytical or critical thinking, to foresee what may be needed in the future or how actions taken today might have consequences for the future

Reflective practice is the ability to take a critical stance when deciding, choosing and acting, by stepping back from what is known or assumed and looking at a situation from other, different perspectives

Both reflective practice and anticipation contribute to the willingness to take responsible actions

Well-Being 2030
Individual & Societal

Anticipation

Creating New Value

Taking Responsibility

Literacy Numeracy
Data Literacy
Students
Digital Literacy Health Literacy

Reconciling
Tensions & Dilemmas

Reflection

Action

Peers

V14 | **OECD** 2030 Learning Compass

Current curricula and 2030 aspirations

Preliminary findings of curriculum content mapping (lower secondary; Ontario, Canada)

Skills, Attitudes and Values

Key concepts 2030 Learning Framework

Competency Development Cycle

Compound competencies for 2030

Number of mapped content items

Critical Thinking, Communication, Problem Solving, Cooperation/Collaboration, Respect, Self-Regulation, Persistence/Resilience, Empathy, Creative Thinking, Conflict Resolution, Responsibility, Student Agency, Reflection, Action, Anticipation, Global Competency, Digital Literacy, Literacy for SD, Computational Thinking, Entrepreneurship

■ Arts ■ Humanities ■ Mathematics ■ National Language/s ■ PE/Health ■ Science ■ Technologies

Current curricula and 2030 aspirations

Preliminary findings of curriculum content mapping (lower secondary; Japan)

A continuum of support

Make learning central, encourage engagement and responsibility

Be acutely sensitive to individual differences

Provide continual assessment with formative feedback

Be demanding for every student with a high level of cognitive activation

Ensure that students feel valued and included and learning is collaborative

Delivered wisdom

User-generated wisdom

Recognising both students and adults as resources
for the co-creation of communities, for the design
of learning and for the success of students

What teachers say and what teachers do

96% of teachers: My role as a teacher is to facilitate students own inquiry

lge, skills
alities do
require?

86%: Students learn best
by findings solutions on their own

lge, skills
alities do
require?

74%: Thinking and reasoning is more important than curriculum content

lge, skills
alities do
require?

Prevalence of **memorisation**
rehearsal, routine exercises, drill and practice and/or repetition

Prevalence of **elaboration**
reasoning, deep learning, intrinsic motivation, critical thinking, creativity, non-routine problems

	United Kingdom
	Netherlands
	Spain
	Norway
	United States
	Singapore
	Canada
	Shanghai-China
	Sweden
	France
	Korea
	Japan
	Germany
	Poland
	Switzerland

-2.00 **High** -1.50 -1.00 -0.50 **Low** 0.00

0.00 **Low** 0.50 1.00 1.50 **High** 2.00

Students' use of **memorisation strategies**

Below the OECD average ■ At the same level as the OECD average ■ Above the OECD average

More

Less

Memorisation

% of students who report they learn by heart

Macao-China 15, Russian Federation 16, Serbia 11, Slovak Republic 11, Albania 12, Switzerland 13, Mexico 19, Poland 9, Malaysia 12, Liechtenstein 17, Viet Nam 5, Lithuania 14, Kazakhstan 22, Chinese Taipei 16, Hong Kong-China 10, Denmark 28, Italy 10, Latvia 22, Colombia 26, Iceland 23, Germany 17, Japan 12, Qatar 13, Korea 17, Slovenia 11, Tunisia 10, Romania 16, Peru 22, Croatia 9, France 19, Montenegro 13, Costa Rica 19, Argentina 21, Sweden 31, Czech Republic 25, Shanghai-China 25, Estonia 14, Bulgaria 11, OECD average 21, Turkey 13, Brazil 30, Canada 26, Singapore 22, Greece 20, Austria 13, Portugal 27, Finland 32, United States 29, Hungary 17, Luxembourg 13, Norway 28, Belgium 24, Jordan 14, Israel 22, Thailand 46, United Arab Emirates 13, Australia 35, Chile 22, New Zealand 35, Indonesia 23, Spain 19, Netherlands 22, United Kingdom 37, Ireland 28, Uruguay 23

Source: Figure 4.1

49

Memorisation is **less useful** as problems become **more difficult** *(OECD average)*

Source: Figure 4.3

There are large international differences in the use of **control strategies**

Below the OECD average | At the same level as the OECD average | Above the OECD average

More

Control

Less

% of students who try to work out what the most important parts to learn are

Country	Value
Tunisia	46
Jordan	43
Thailand	19
Spain	42
Uruguay	55
Qatar	53
United Arab Emirates	55
Peru	49
Indonesia	39
Montenegro	48
Czech Republic	35
Chile	54
Chinese Taipei	42
Croatia	43
Turkey	59
Hungary	46
Romania	48
Netherlands	54
Slovenia	32
Shanghai-China	40
Ireland	49
Greece	46
Italy	44
Brazil	45
Lithuania	56
Estonia	48
Korea	40
Argentina	44
Norway	48
United States	40
Latvia	46
Slovak Republic	49
Portugal	44
Finland	45
Malaysia	50
Colombia	40
Serbia	40
United Kingdom	43
Luxembourg	55
Sweden	44
Bulgaria	62
OECD average	49
New Zealand	46
Viet Nam	54
Belgium	53
Russian Federation	44
Poland	65
Australia	45
Israel	61
Singapore	47
Costa Rica	48
Austria	55
Liechtenstein	42
Kazakhstan	49
Mexico	54
Canada	48
Denmark	48
Albania	54
Germany	50
Hong Kong-China	60
Switzerland	55
France	62
Japan	59
Macao-China	53
Iceland	59

Source: Figure 5.1

51

Control strategies are **always helpful** but **less so** as problems become **more difficult** *(OECD average)*

Easy problem

Using control strategies is associated with a lower chance of success as problems become more difficult

Difficult problem

$R^2 = 0.31$

Difficulty of mathematics item on the PISA scale

Greater success — *Less success*

Odds ratio

1.20

0.95

300 400 500 600 700 800

Students' use of **elaboration strategies**

Elaboration — *More* ↑ / *Less*

Legend: ■ Below the OECD average ■ At the same level as the OECD average ■ Above the OECD average

% of students who understand new concepts by relating them to things they already know

Country	Value
United Kingdom	20
Iceland	18
Australia	20
Ireland	23
France	19
New Zealand	19
Israel	26
Canada	26
Austria	32
Japan	29
Belgium	22
Singapore	31
Uruguay	22
Germany	33
Netherlands	24
HK-China	30
Luxembourg	33
Costa Rica	33
Norway	23
Finland	23
United States	30
Portugal	29
OECD average	30
Denmark	23
Indonesia	38
Switzerland	32
Bulgaria	27
Macao-China	32
Chile	24
Albania	33
Sweden	24
Kazakhstan	29
Greece	35
UAE	32
Hungary	37
Brazil	25
Argentina	35
Liechtenstein	41
Estonia	38
Mexico	27
Spain	39
Turkey	28
Shanghai-China	35
Poland	27
Colombia	33
Korea	43
Latvia	32
Czech Republic	40
Viet Nam	41
Croatia	48
Slovenia	56
Romania	36
Russian Fed.	41
Montenegro	39
Malaysia	38
Peru	30
Italy	46
Serbia	50
Slovak Republic	40
Lithuania	30
Thailand	34
Qatar	34
Chinese Taipei	42
Jordan	44
Tunisia	44

Source: Figure 6.1

53

Elaboration strategies are **more useful** as problems become **more difficult** *(OECD average)*

Greater success

Odds ratio

1.50

R² = 0.82

Using elaboration strategies is associated with a greater chance of success as problems become more difficult

Difficult problem

Easy problem

Less success

0.80

300   400   500   600   700   800

Difficulty of mathematics item on the PISA scale

Source: Figure 6.2

Approaches to teaching

Better
Engagement and career expectations

Better
Learning outcomes

Student-oriented   Teacher-directed

Some lessons

- Rigor, focus and coherence
- Remain true to the disciplines
  - but aim at interdisciplinary learning and the capacity of students to see problems through multiple lenses
  - Balance knowledge of disciplines and knowledge about disciplines
- Focus on areas with the highest transfer value
  - Requiring a theory of action for how this transfer value occurs
- Authenticity
  - Thematic, problem-based, project-based, co-creation in conversation
- Some things are caught not taught
  - Immersive learning propositions

Prescription

Ownership of professional practice

Powerful learning environments are constantly creating synergies and finding new ways to enhance professional, social and cultural capital with others. They do that with families and communities, with higher education, with other schools and learning environments, and with businesses.

Making teaching not just financially, but intellectually more attractive
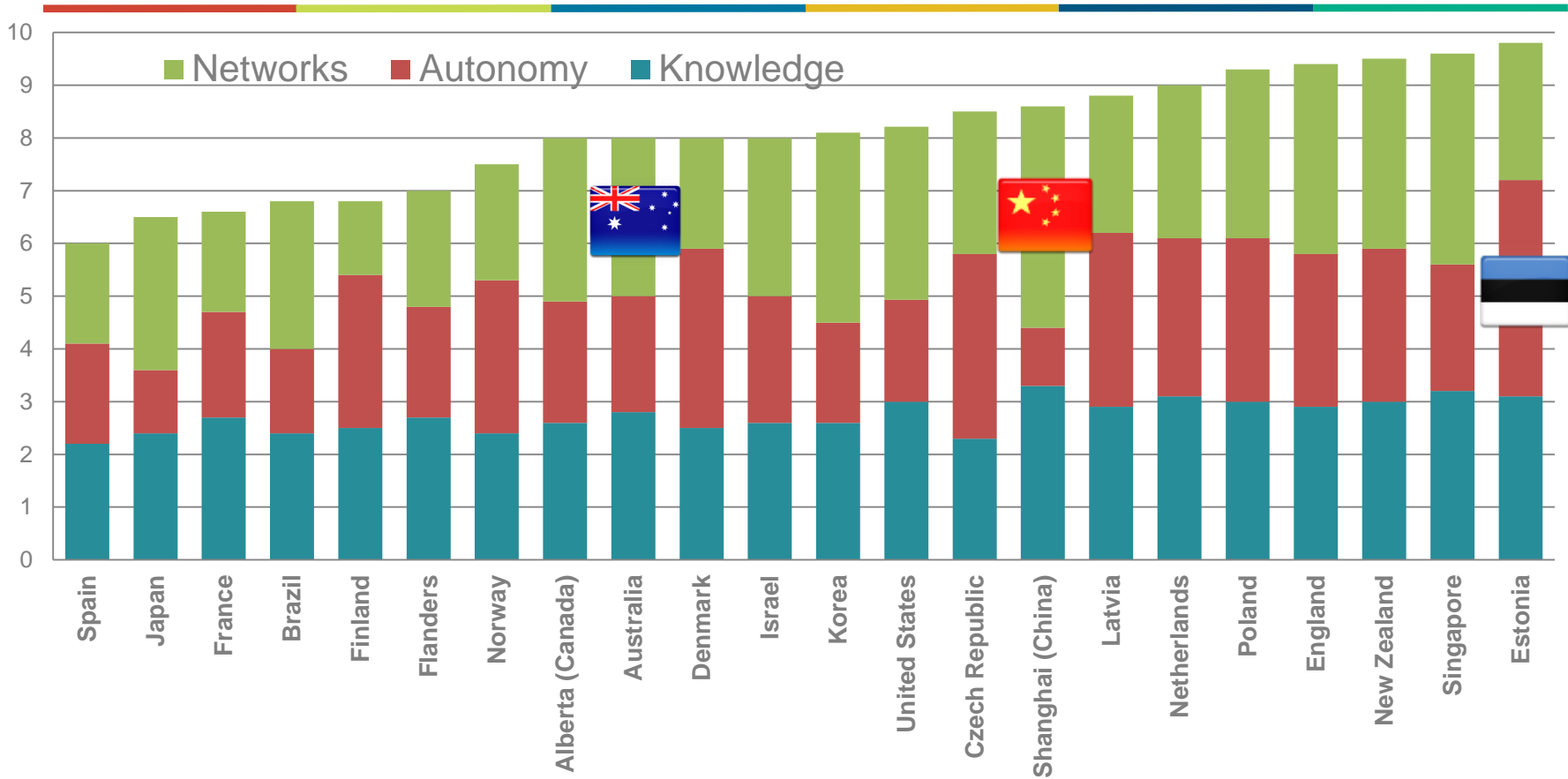
- Public confidence in profession and professionals
- Professional preparation and learning
- Collective ownership of professional practice
- Decisions made in accordance with the body of knowledge o the profession
- Professional responsibility in the name of the profession and accountability towards the profession

Policy levers to teacher professionalism

Autonomy: Teachers' decision-making power over their work (teaching content, course offerings, discipline practices)

Teacher professionalism

Peer networks: Opportunities for exchange and support needed to maintain high standards of teaching (participation in induction, mentoring, networks, feedback from direct observations)
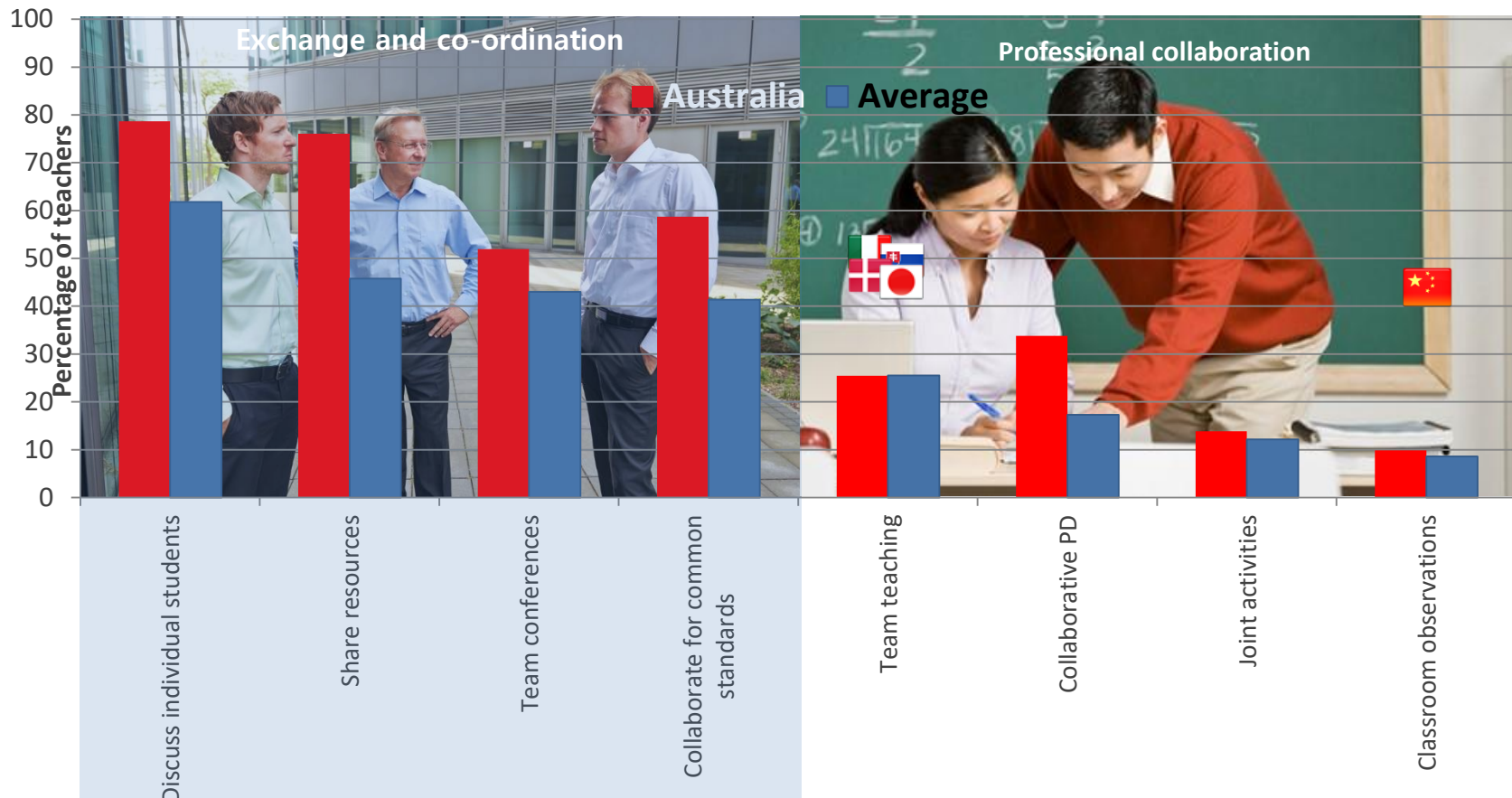
Knowledge base for teaching (initial education and incentives for professional development)
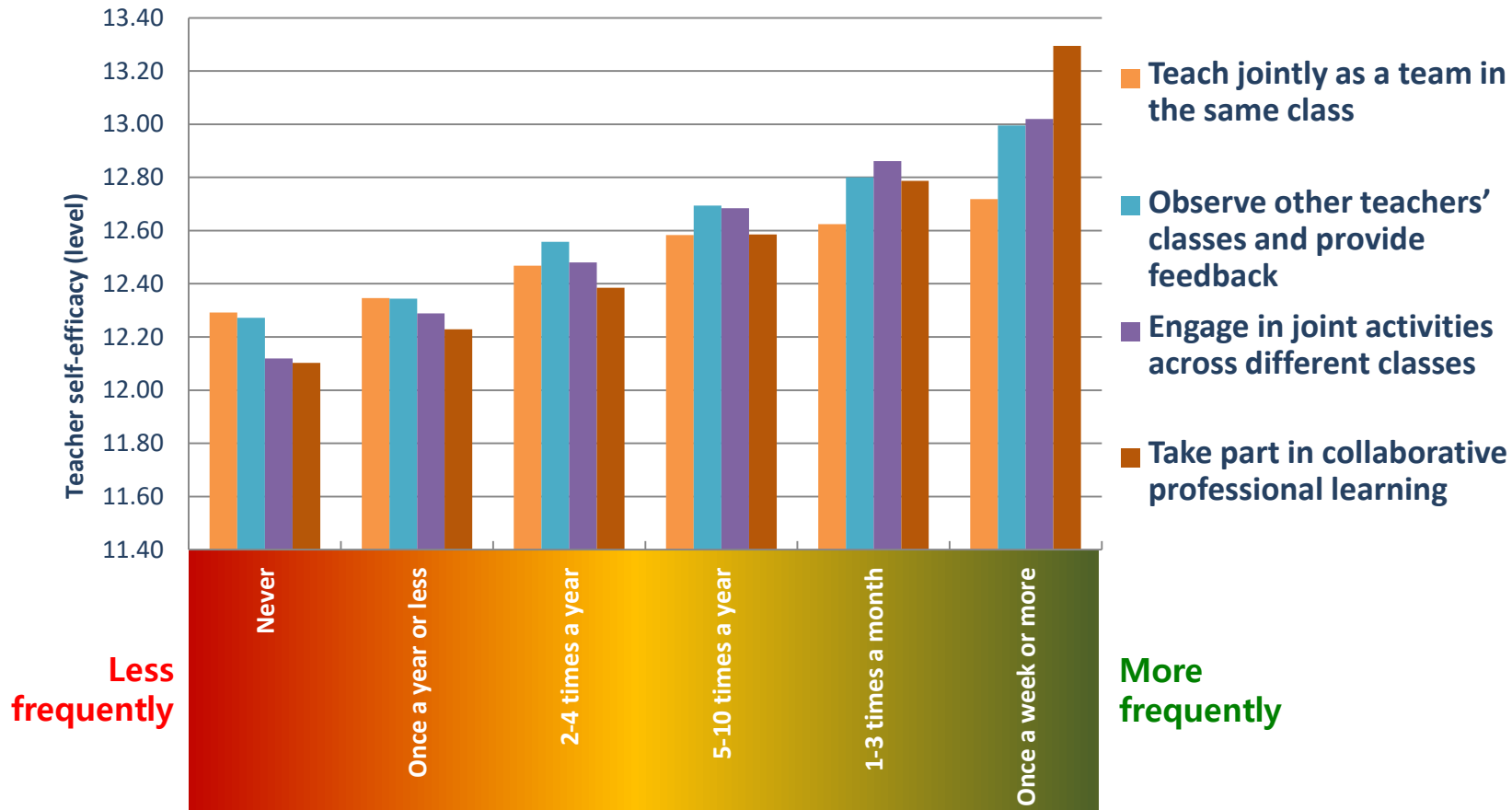
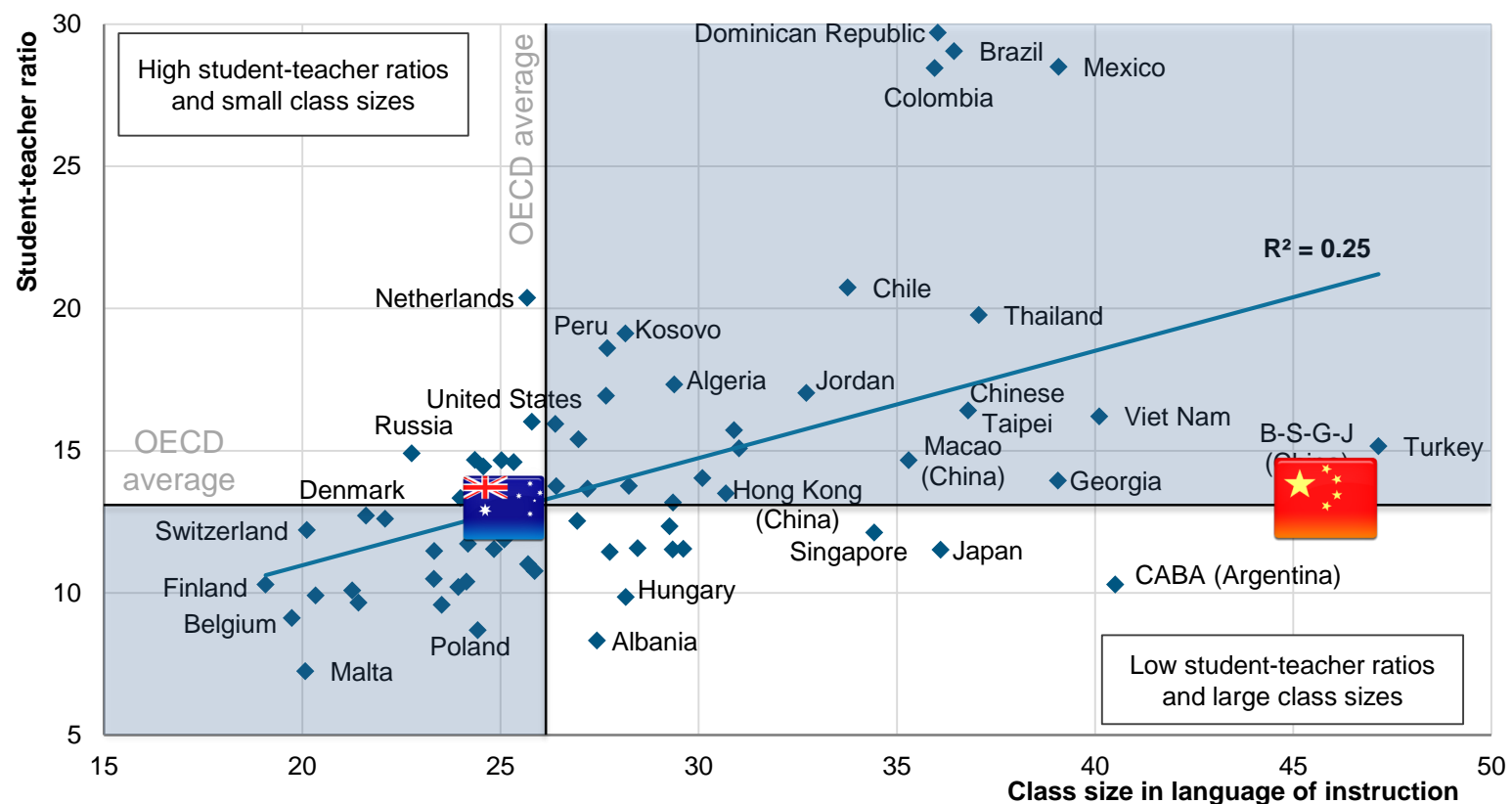# Teacher professionalism

Teacher professional collaboration

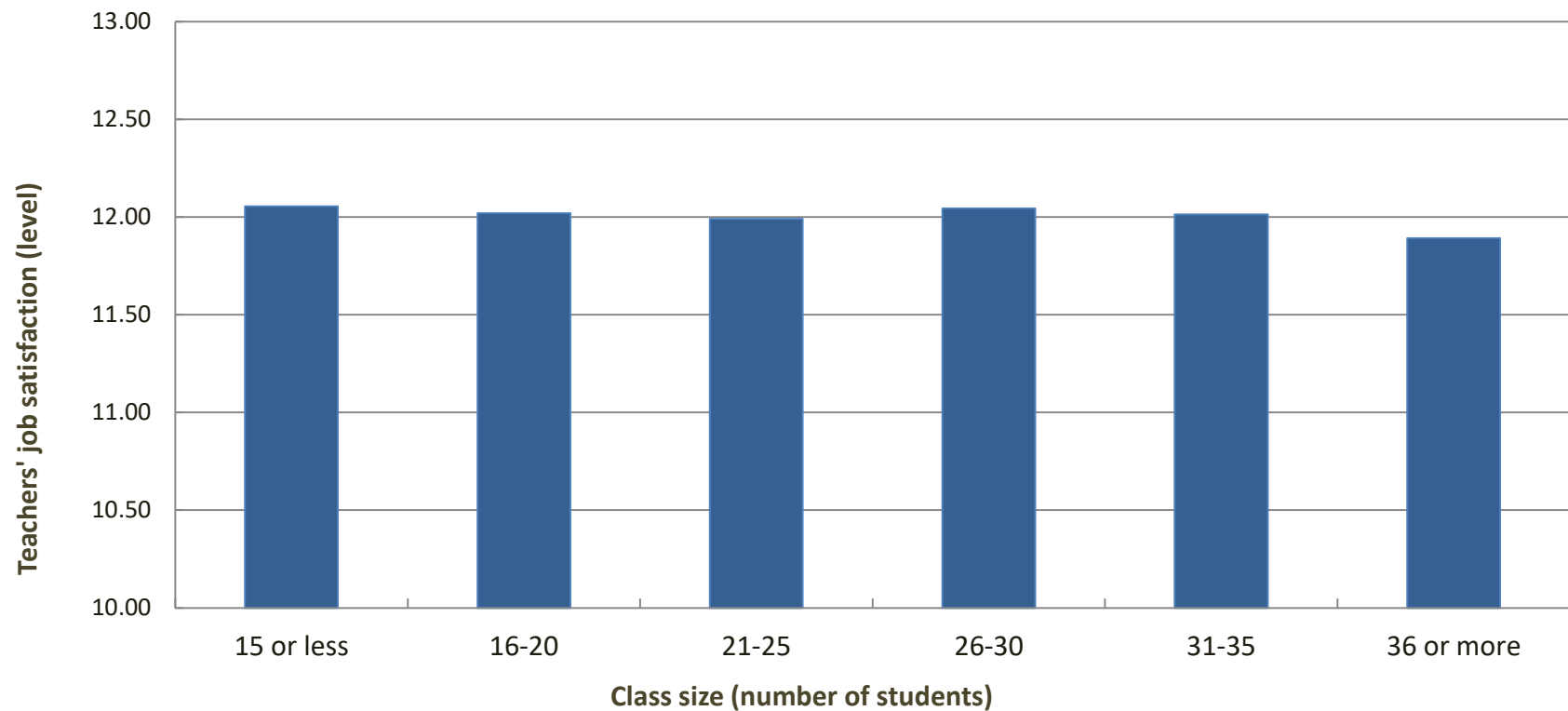**Percentage of lower secondary teachers who report doing the following activities at least once per month**

(OECD countries)

Exchange and co-ordination

Professional collaboration

■ Australia   ■ Average

Percentage of teachers

Discuss individual students

Share resources

Team conferences

Collaborate for common standards

Team teaching

Collaborative PD

Joint activities

Classroom observations

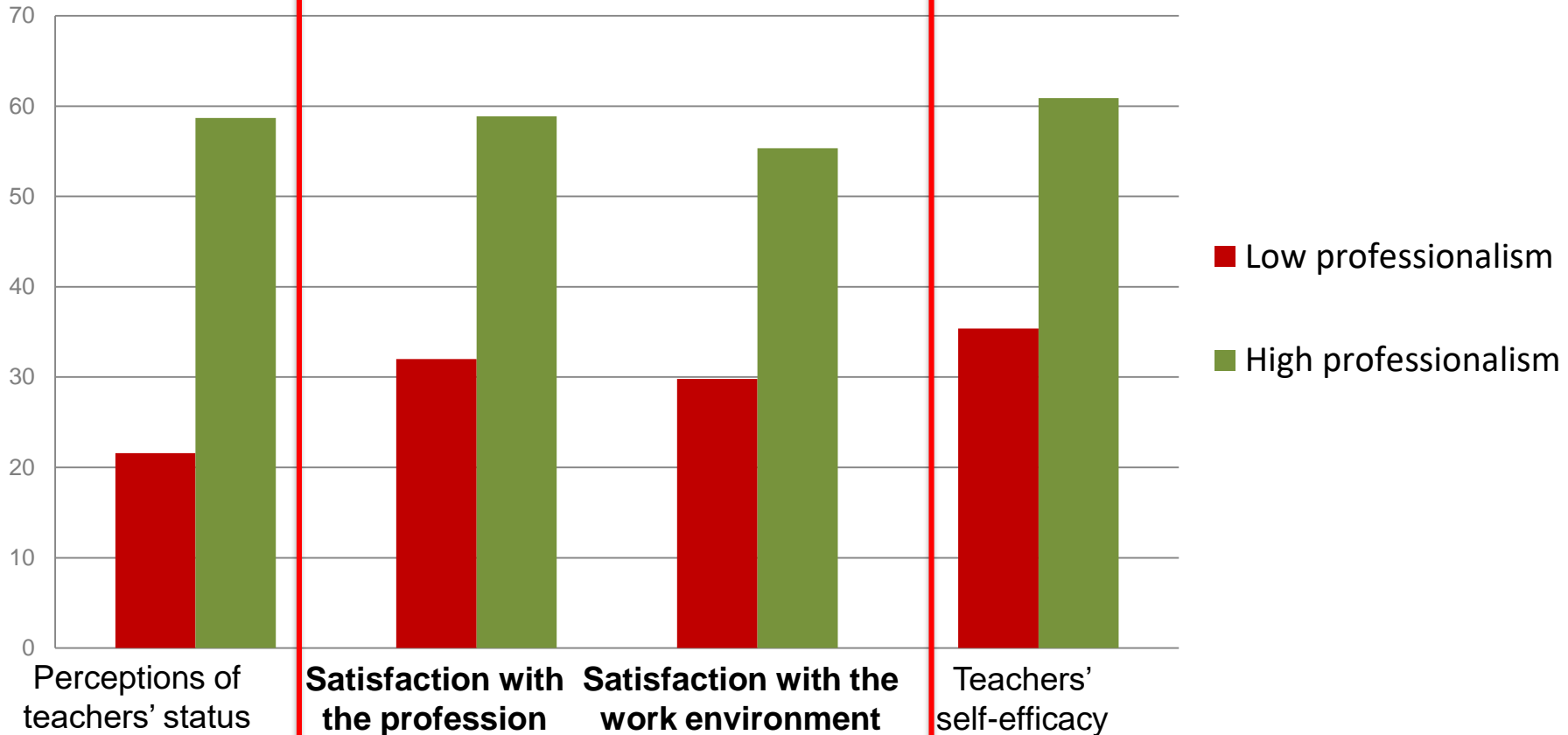# Teachers' self-efficacy and professional collaboration

Figure II.6.14

Student-teacher ratios and class size

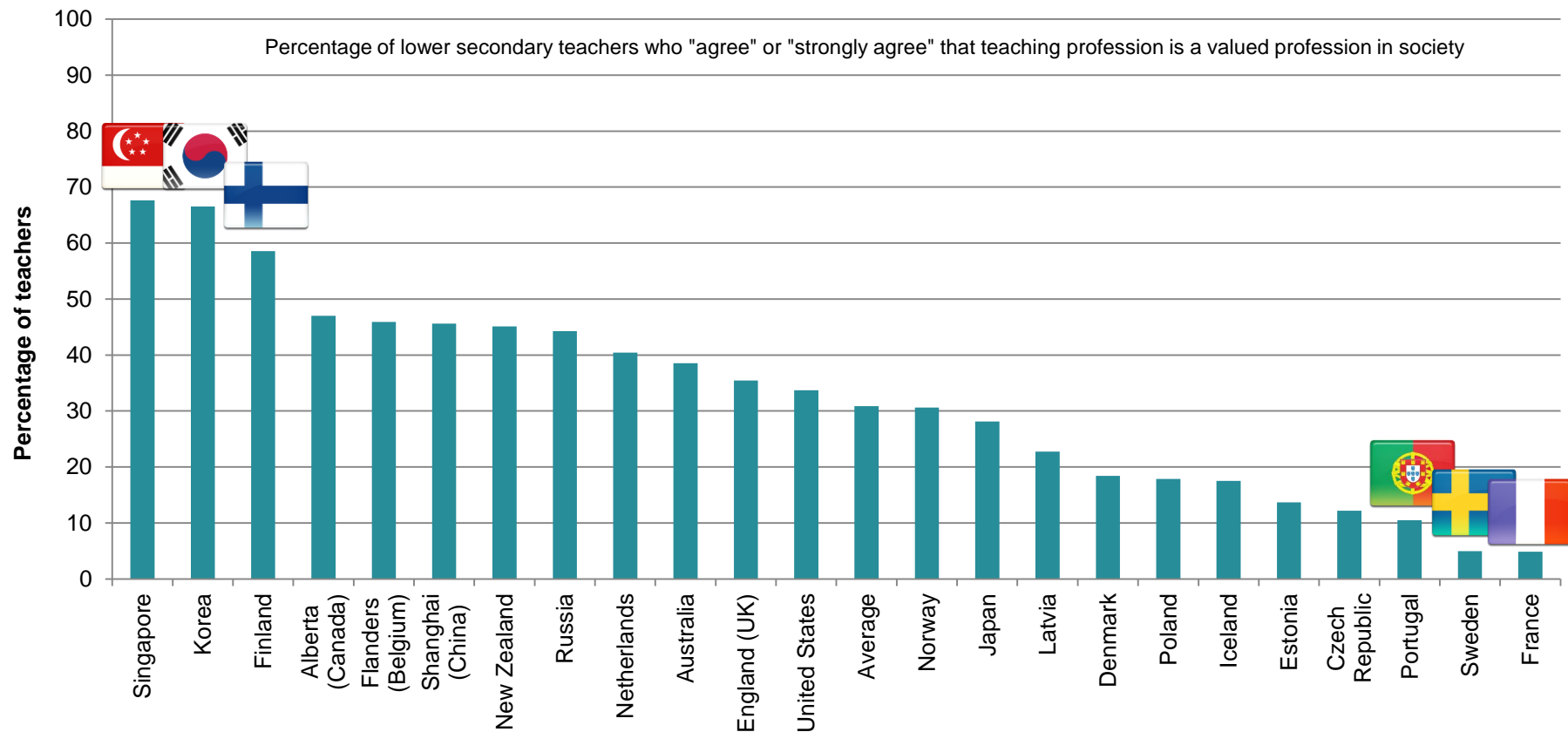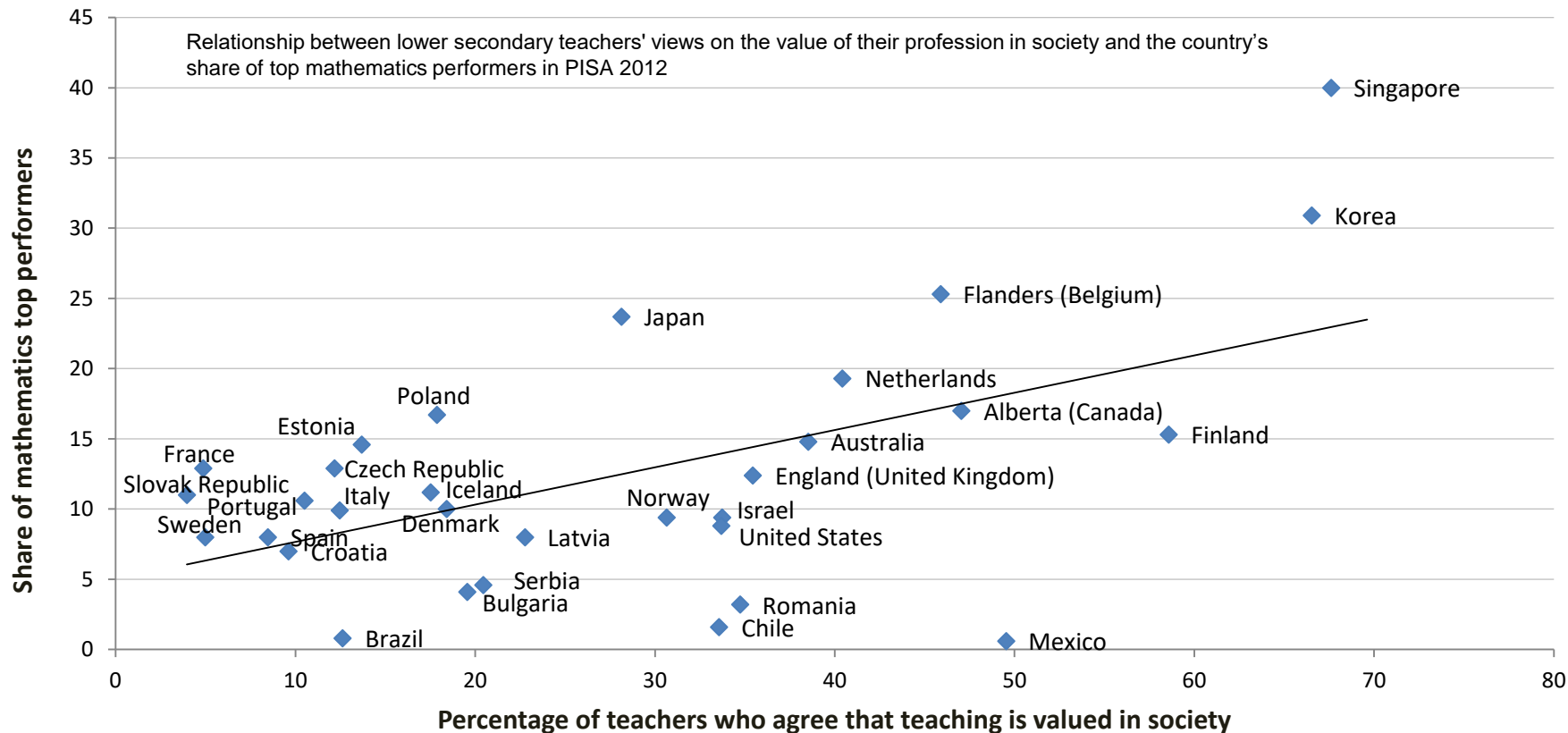Teachers' job satisfaction and class size

Teacher job satisfaction and professionalism

Teachers perception of the value of teaching

Percentage of lower secondary teachers who "agree" or "strongly agree" that teaching profession is a valued profession in society

Countries where teachers believe their profession is valued show higher levels of excellence in learning outcomes (PISA)

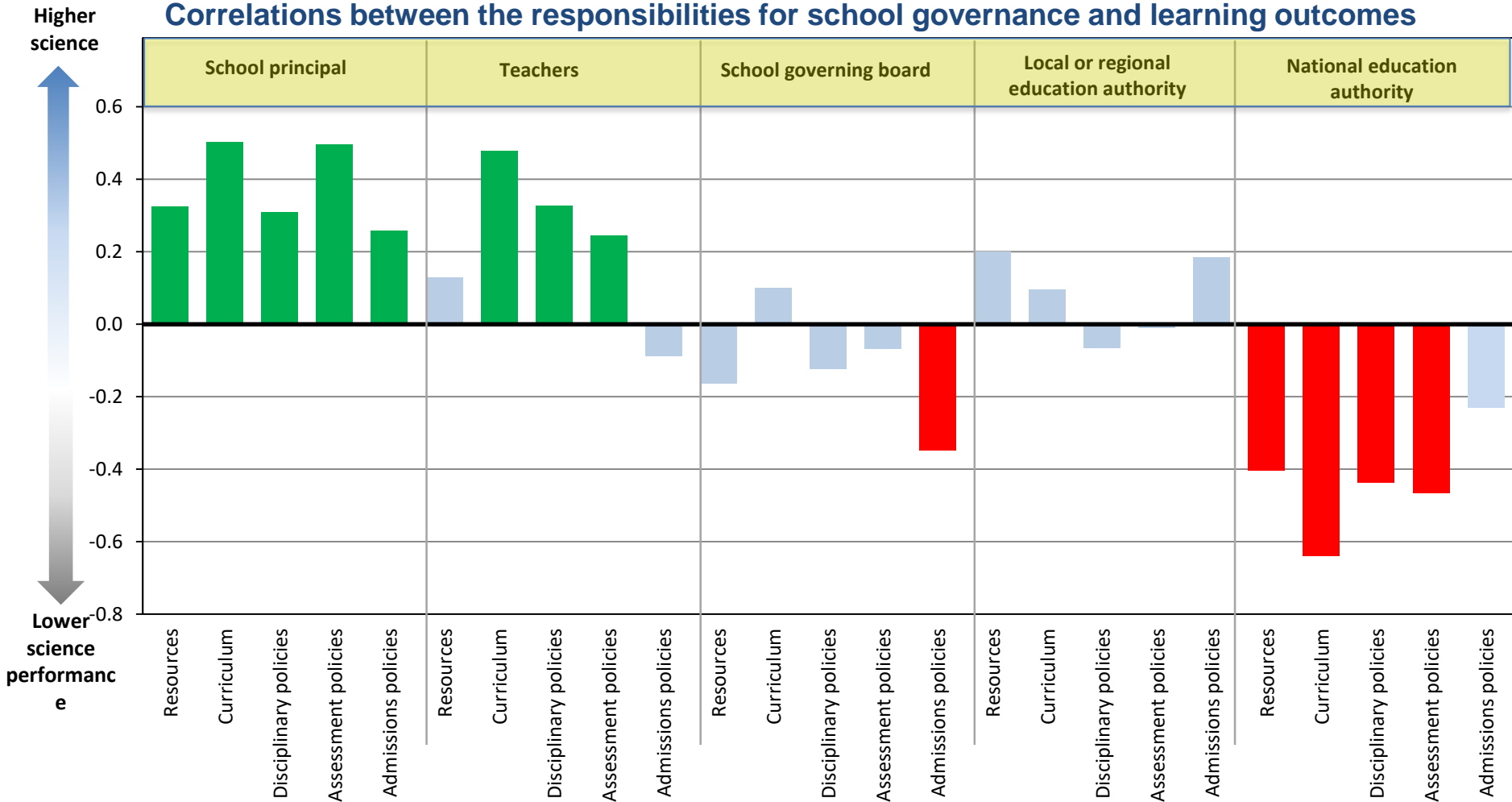Relationship between lower secondary teachers' views on the value of their profession in society and the country's share of top mathematics performers in PISA 2012

Y-axis: Share of mathematics top performers (0–45)

X-axis: Percentage of teachers who agree that teaching is valued in society (0–80)

Data points (approximate):
- Singapore (~67, 40)
- Korea (~67, 31)
- Flanders (Belgium) (~46, 25)
- Japan (~28, 24)
- Netherlands (~40, 19)
- Poland (~18, 17)
- Alberta (Canada) (~47, 17)
- Finland (~58, 15)
- Australia (~38, 15)
- Estonia (~14, 15)
- France (~5, 13)
- Czech Republic (~12, 13)
- England (United Kingdom) (~35, 12)
- Czech Republic / Italy (~14, 10)
- Slovak Republic (~4, 11)
- Iceland (~18, 10)
- Portugal (~9, 10)
- Norway (~31, 9)
- Israel (~34, 9)
- United States (~34, 9)
- Sweden (~5, 8)
- Latvia (~23, 8)
- Spain (~10, 7)
- Croatia (~10, 7)
- Serbia (~20, 5)
- Bulgaria (~19, 4)
- Romania (~35, 3)
- Chile (~33, 2)
- Brazil (~12, 1)
- Mexico (~49, 1)

Bureaucratic Look-up

Devolved Look-outward

Correlations between the responsibilities for school governance and learning outcomes
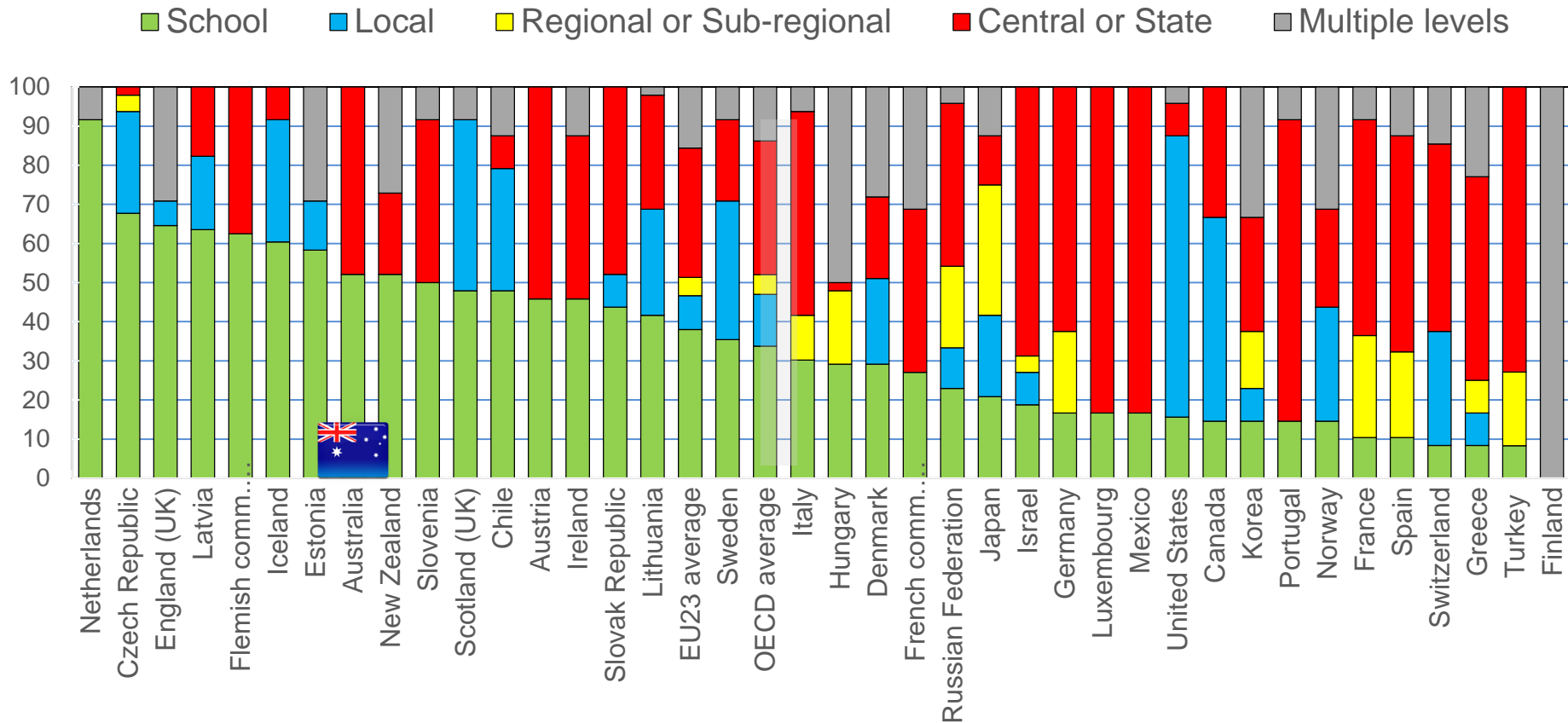

Source: OECD, PISA 2015 Database.

PISA Figure II.4.8

Who decides?

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

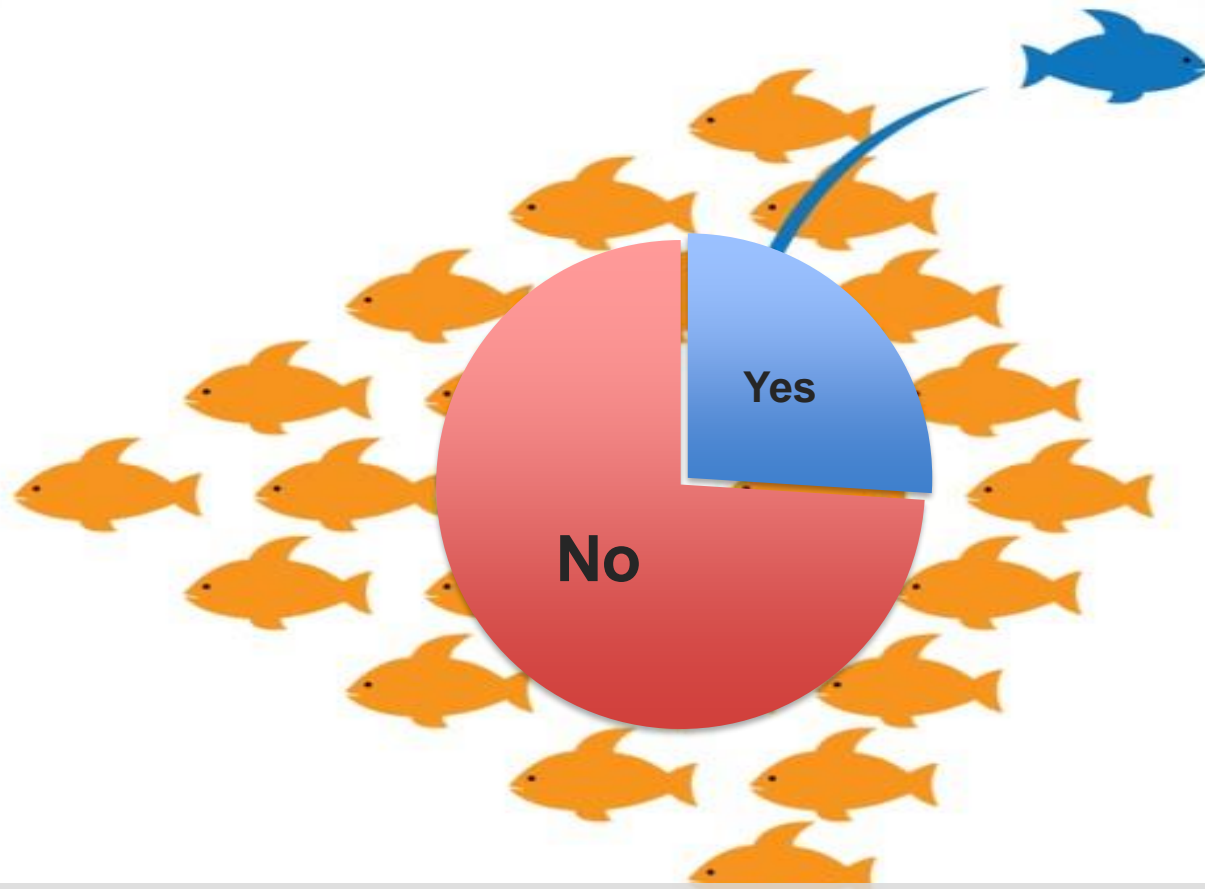Legend: ■ School ■ Local □ Regional or Sub-regional ■ Central or State ■ Multiple levels

Standardisation and Conformity

Standardisation and compliance lead students to be educated in batches of age, following the same standard curriculum, all assessed at the same time.

Ingenious

Building instruction from student passions and capacities, helping students personalise their learning and assessment in ways that foster engagement and talents.

If I am more innovative in my teaching I will be rewarded (country average)

Making reform happen

Knowledge is only as valuable as our capacity to act on it, and the road of educational reform is littered with good ideas that were poorly implemented

Making reform happen

Setting the direction

People are more likely to accept changes that are not solely in their own interests if they understand the reasons for these changes and can see the role they should play within the broad strategy.

Engaging the profession

Building capacity

Looking outward

Making reform happen

Setting the direction

People are more likely to accept changes that are not solely in their own interests if they understand the reasons for these changes and can see the role they should play within the broad strategy.

Engaging the profession

Educational leaders are rarely successful with reform unless they build a shared understanding and collective ownership for change, and unless they build capacity and create the right policy climate, with accountability measures designed to encourage innovation rather than compliance

Building capacity

Looking outward

Making reform happen

Setting the direction

People are more likely to accept changes that are not solely in their own interests if they understand the reasons for these changes and can see the role they should play within the broad strategy.
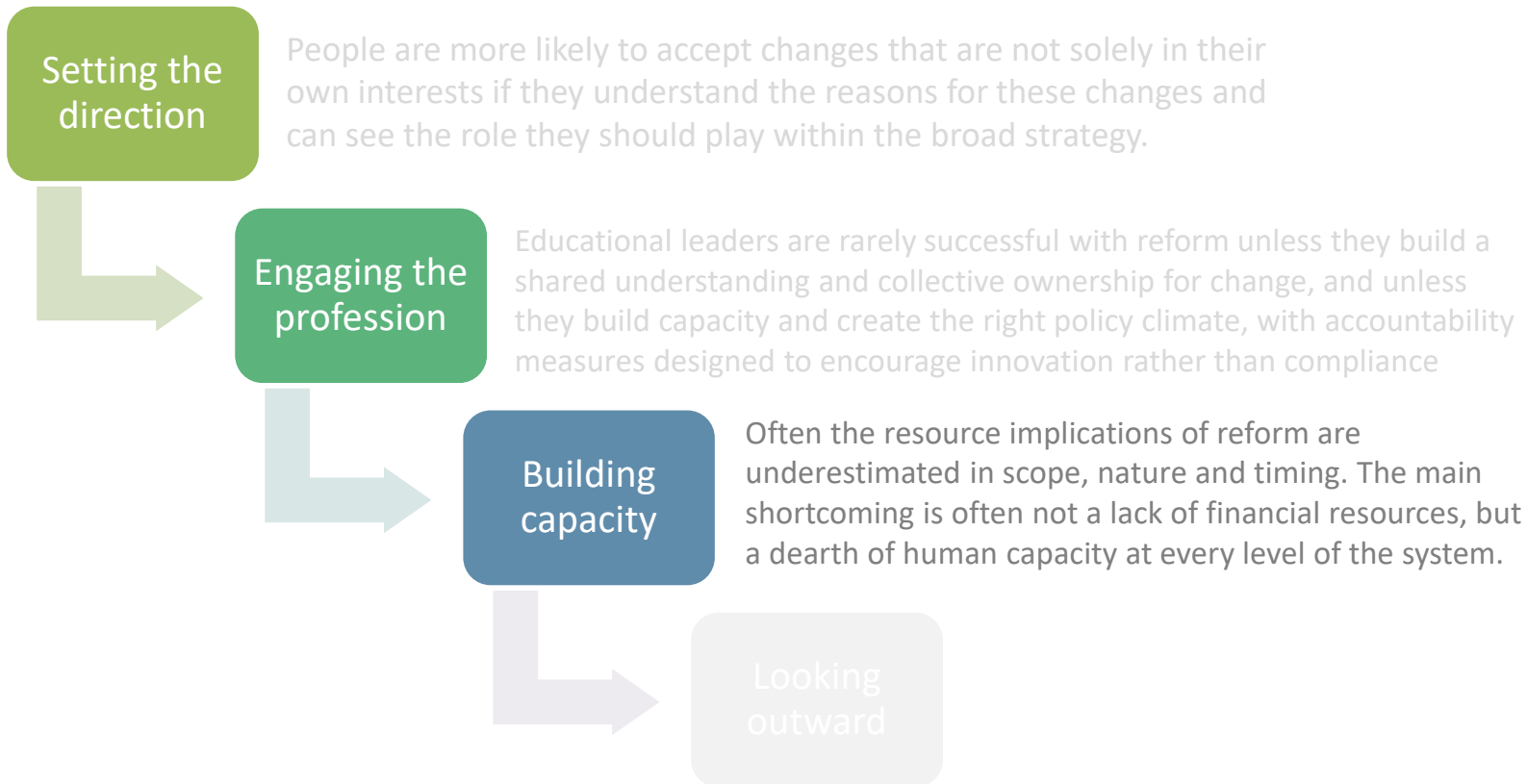
Engaging the profession

Educational leaders are rarely successful with reform unless they build a shared understanding and collective ownership for change, and unless they build capacity and create the right policy climate, with accountability measures designed to encourage innovation rather than compliance

Building capacity

Often the resource implications of reform are underestimated in scope, nature and timing. The main shortcoming is often not a lack of financial resources, but a dearth of human capacity at every level of the system.

Looking outward

Making reform happen

Setting the direction

People are more likely to accept changes that are not solely in their own interests if they understand the reasons for these changes and can see the role they should play within the broad strategy.

Engaging the profession

Educational leaders are rarely successful with reform unless they build a shared understanding and collective ownership for change, and unless they build capacity and create the right policy climate, with accountability measures designed to encourage innovation rather than compliance

Building capacity

Often the resource implications of reform are underestimated in scope, nature and timing. The main shortcoming is often not a lack of financial resources, but a dearth of human capacity at every level of the system.

Looking outward

School systems that feel threatened by alternative ways of thinking get trapped in old practice. The ones that progress are those that are open to the world and ready to learn from and with the world's education leaders.

The real obstacle to education reform is not conservative followers but conservative leaders

- be transparent with teachers and school leaders about where reform is heading and what it means for them
- be aware of how organisational policies and practices can either facilitate or inhibit transformation
- tackle institutional structures that are built around the interests and habits of educators and administrators rather than learners
- recognise emerging trends and patterns and see how these might benefit or obstruct the goals of change
- use knowledge about what motivates people to convince others to support change
- use understanding of power and influence to build the alliances and coalitions needed to get things done
- help rules become practice, and good practice to become culture

In conclusion

oe.cd/WorldClass

Andreas.Schleicher@OECD.org

Universal high quality education is an attainable goal, and our task is not to make the impossible possible, but to make the possible attainable. It is entirely within our means to deliver a future for millions of learners who currently don't have one

Thank you

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

– **All publications**

– **The complete micro-level database**

Email: **Andreas.Schleicher@OECD.org**

Twitter: **SchleicherOECD**

Wechat: **AndreasSchleicher**