

Let's Hack Education with Data

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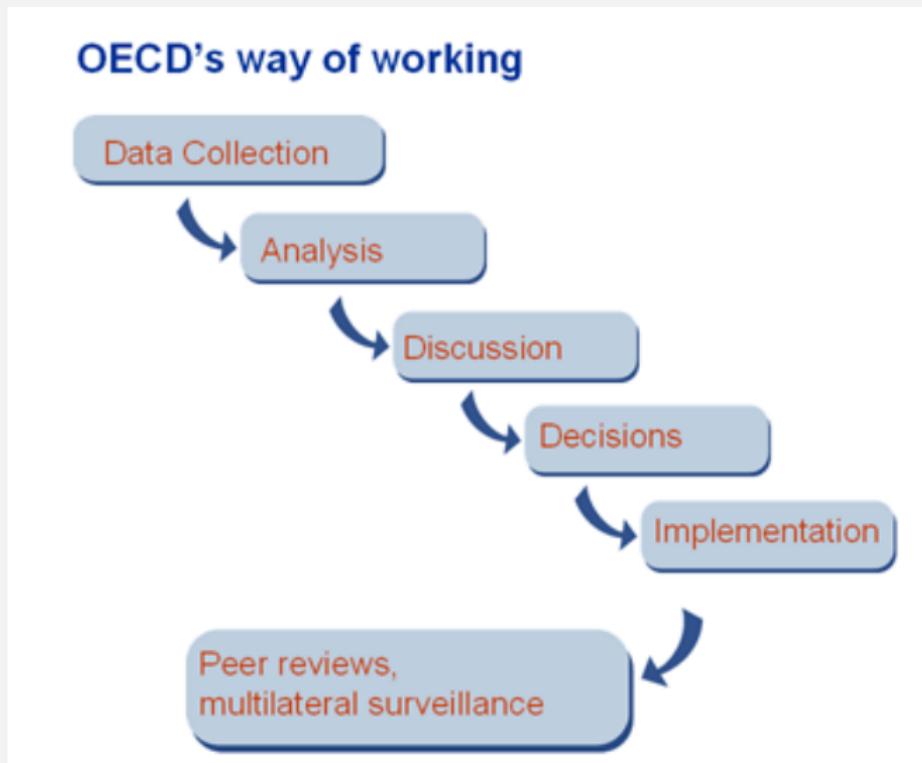
Organisation for Economic Co-operation and Development

The plan:

- intro Short introduction to PISA
- story How to show the „parental effect”
- story Strong and weak sides of different countries
- story Students cognitive endurance vs. performance



American schools were unquestionably the best in the world — that is, until data showed otherwise in recent years.
[from: <http://asiasociety.org/>]



The Programme for International Student Assessment (PISA) is an international assessment of the reading, science and mathematical literacy of 15-year-old students. In most OECD countries students at this age are approaching the end of compulsory schooling.

It takes place in 3-year cycles (starting in 2000, and 2012 saw the fifth implementation of the study), allowing to monitor changes in student achievement and other features of the education system over time.

PISA assesses students' performance on 'real-life' tasks that are considered relevant for effective participation in adult society and for life-long learning.

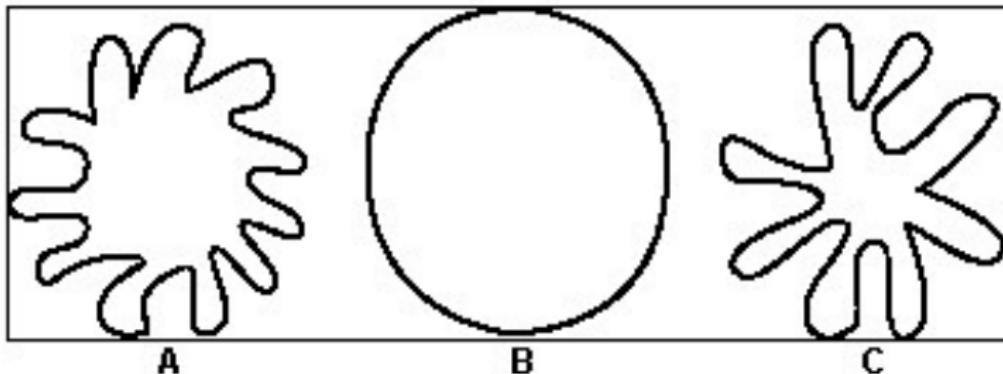
The number of countries participating in PISA has increased from 32 in 2000 to 64 in 2012, making it the largest study of its kind.

[from: Educational Research Center <http://www.erc.ie/>]

Cycle	Major Domain	Minor Domains
PISA 2000	Reading	Mathematics, Science
PISA 2003	Mathematics	Reading, Science, Cross-curricular problem solving
PISA 2006	Science	Reading, Mathematics
PISA 2009	Reading	Mathematics, Science
PISA 2012	Mathematics	Reading, Science, Cross-curricular problem solving
PISA 2015	Science	Mathematics, Reading, Collaborative problem solving

Respondent	Instrument
Students	PISA assessment (2 hours) and Student questionnaire (40 minutes)
School Principals	School questionnaire (30 minutes)
Teachers of 'major domain'	Teacher questionnaire (30 minutes)
Parents	Parent questionnaire (30 minutes)

SHAPES TEXT



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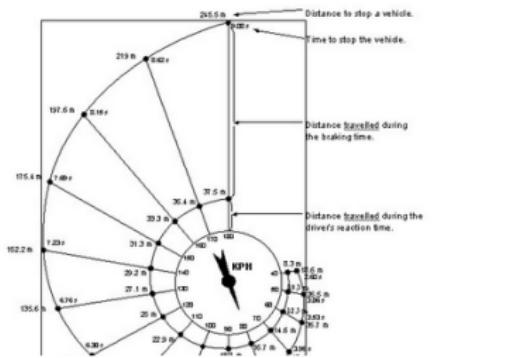
Describe a method for estimating the area of figure C.

BRAKING

The approximate distance to stop a moving vehicle is the sum of:

- the distance covered during the time the driver takes to begin to apply the brakes (reaction-time distance)
- the distance travelled while the brakes are applied (braking distance)

The 'snail' diagram below gives the theoretical stopping distance for a vehicle in good braking conditions (a particularly alert driver, brakes and tyres in perfect condition, a dry road with a good surface) and how much the stopping distance depends on speed.



[Popup Stimulus >>](#)

A second driver, travelling in good conditions, stops her vehicle in a total distance of 70.7 metres. At what speed was the vehicle travelling before the brakes were applied?

ISCO major groups

ISCO sub-major groups

● Information and communications technology

590-

● Teaching professionals

● Science and engineering professionals Business and administration professionals Legal, social and cultural professionals

570-

● Professionals

- Administrative and commercial managers
Information and communications technician
- Production and specialised services managers
- Chief executives, senior officials and legislators
- Health professionals

550-

● Managers

- Business and administration associate professionals
- Managers
- Science and engineering associate professionals

530-

● Technicians and associate professionals

● Clerical support workers

- General and keyboard clerks
- Customer service clerks
- Health, social, cultural and related associate professionals
- Other clerical support workers
- Numerical and material recording clerks
- Personnel data workers

510-

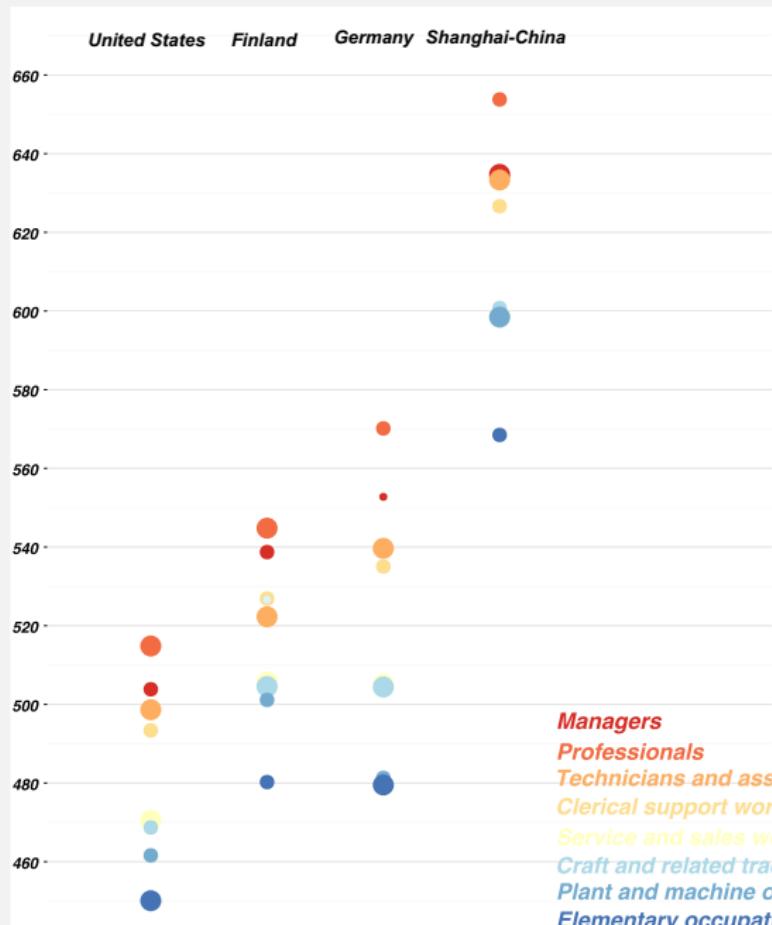
● Country average: Germany

● Craft and related trades workers Skilled agricultural, forestry and fishery workers

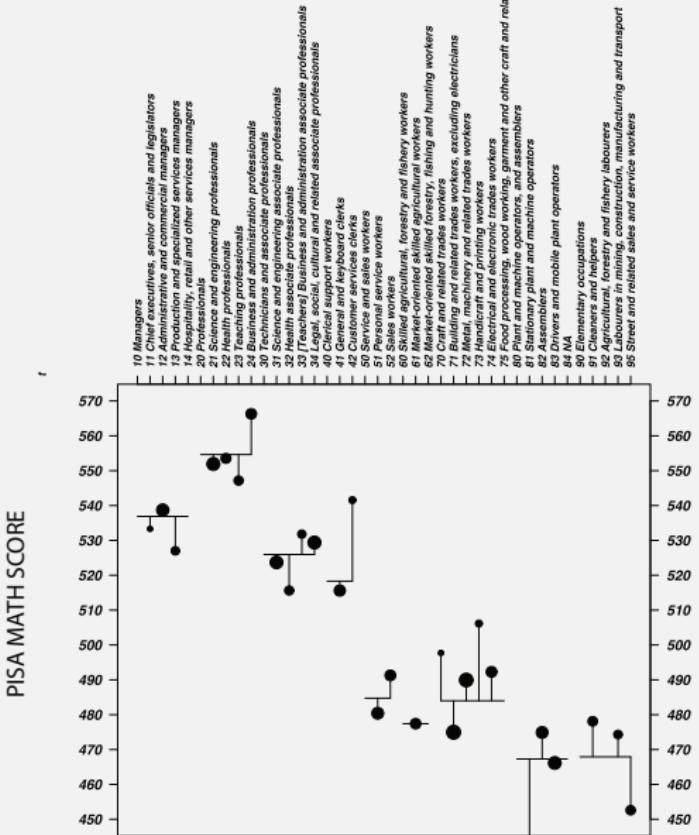
- Protective service workers
- Hospitality, retail and other services managers
Electrical and electronic trades workers

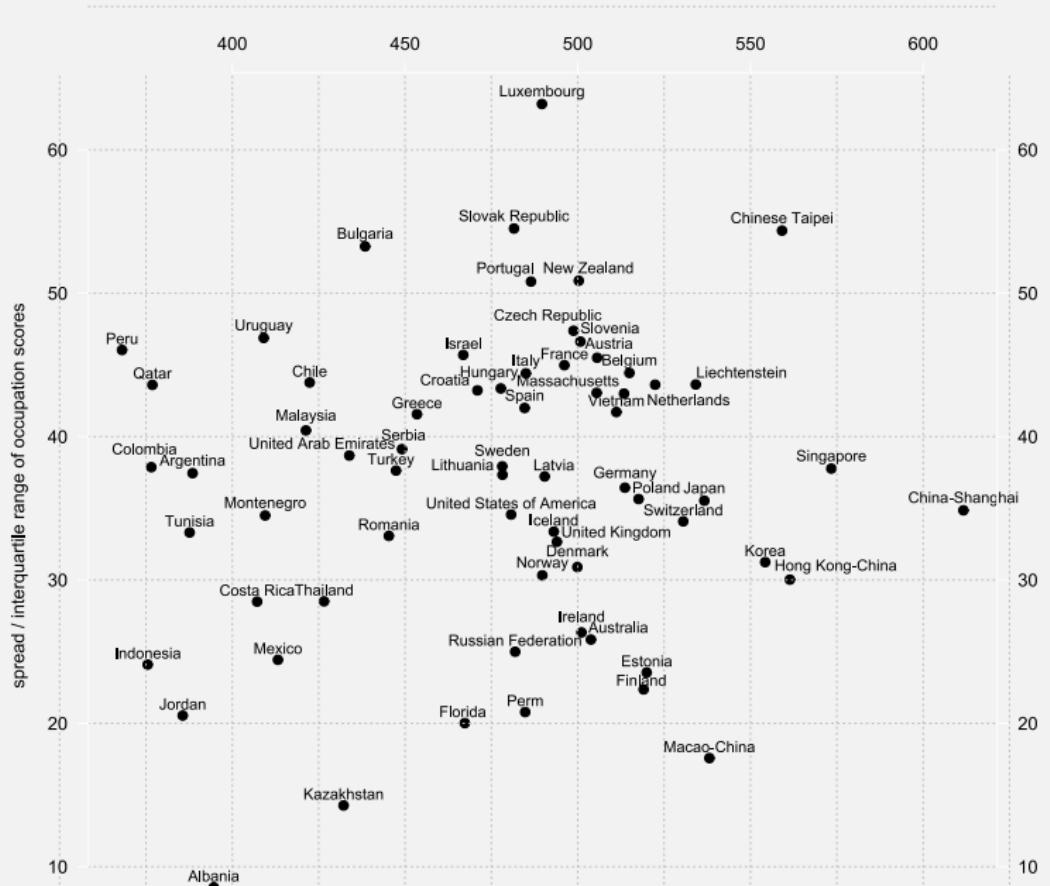
● Handicraft and printing workers

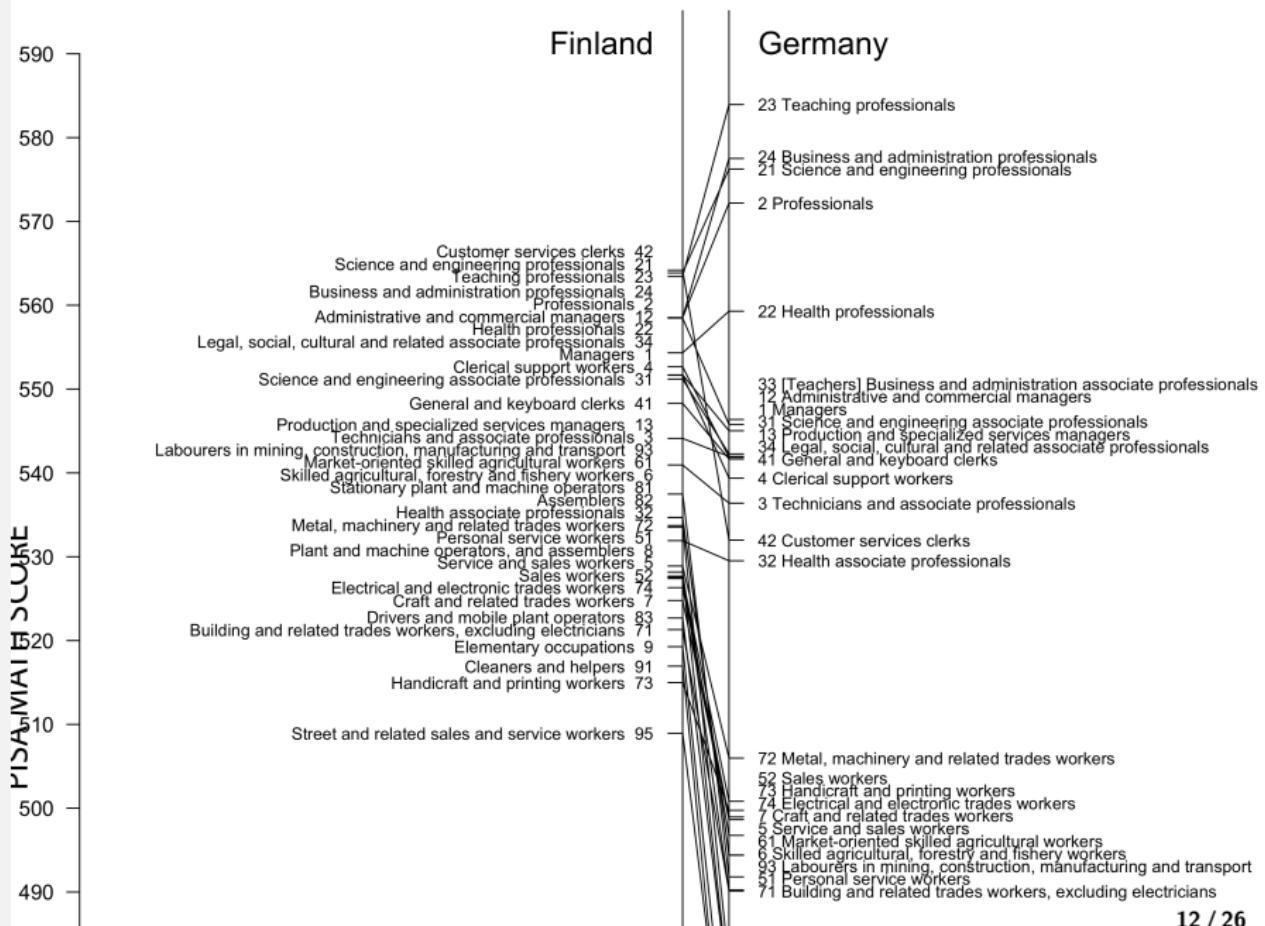
- Food processing, wood working, garment and textile workers
- Metal, machinery and related trades workers
- Refuse workers and other elementary workers
- Market-oriented skilled agricultural workers



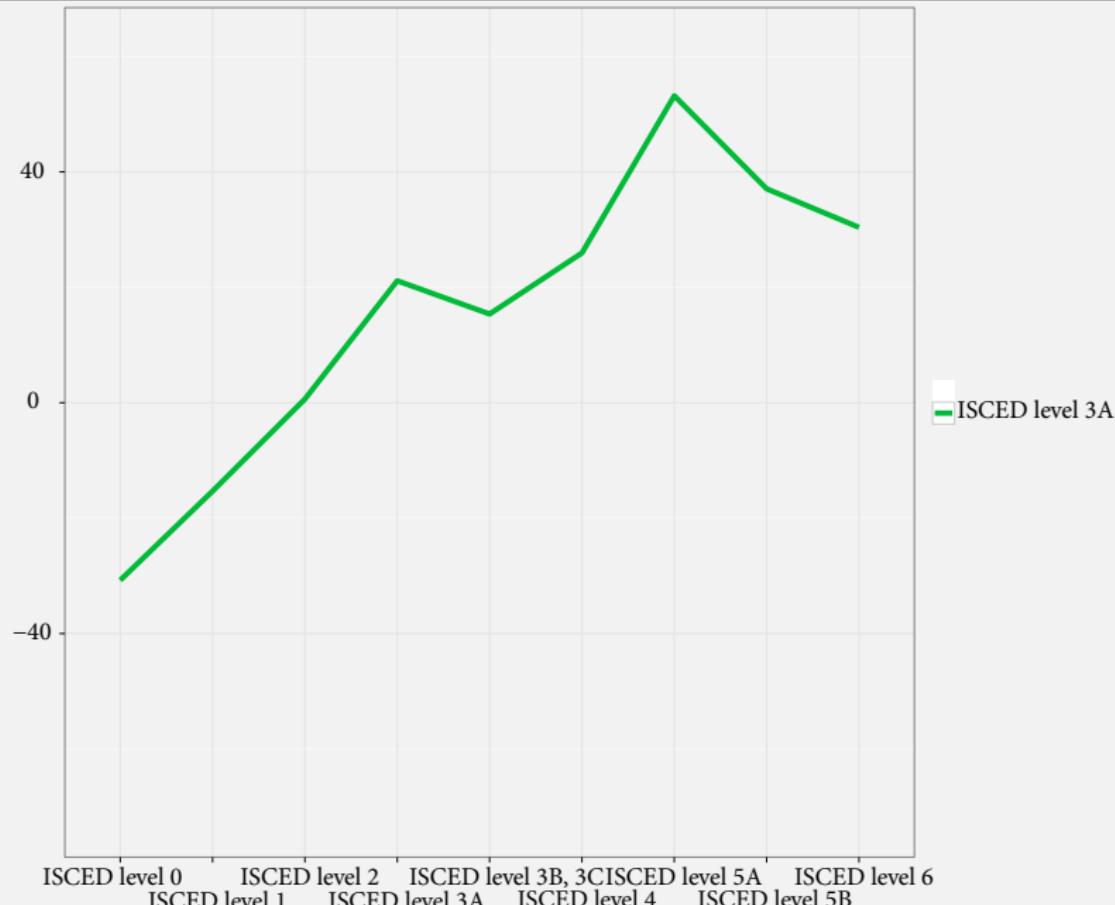
Managers
Professionals
Technicians and associate professionals
Clerical support workers
Service and sales workers
Craft and related trades workers
Plant and machine operators, and assemblers
Elementary occupations



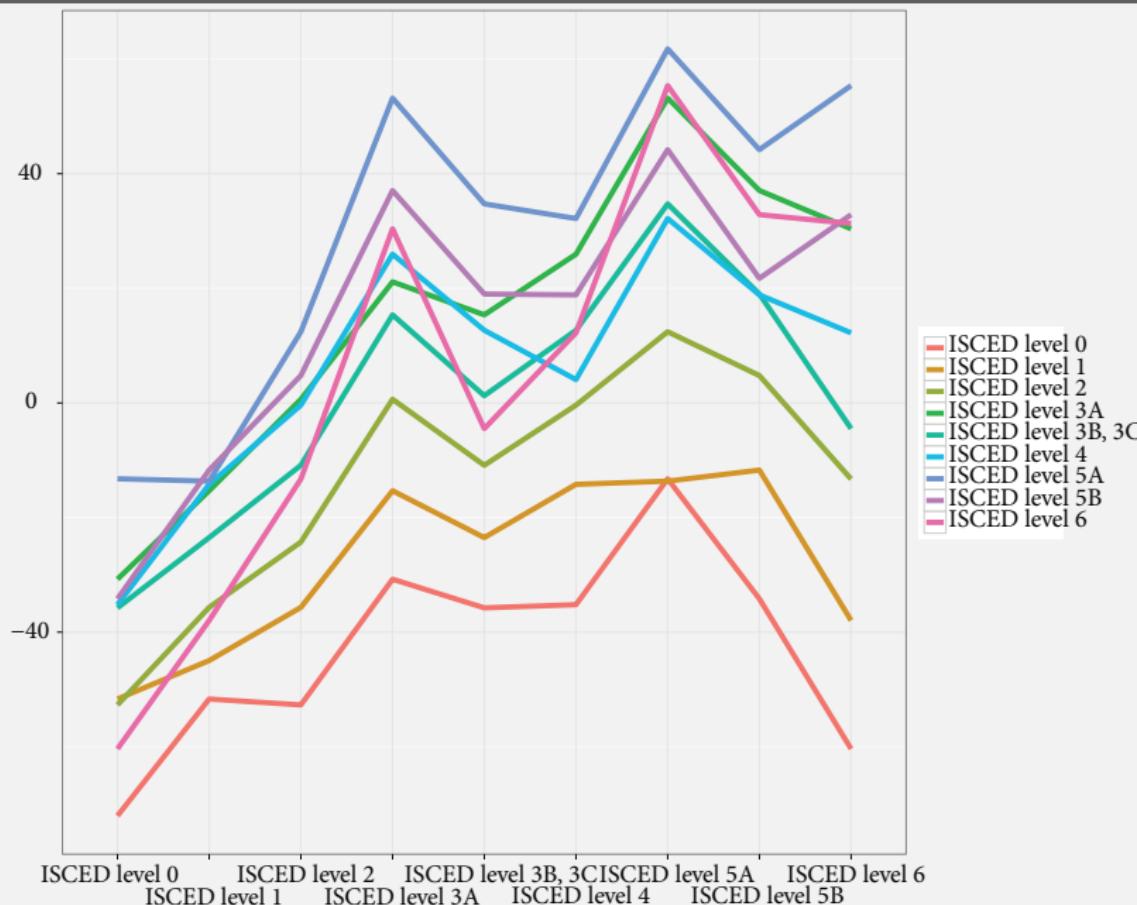


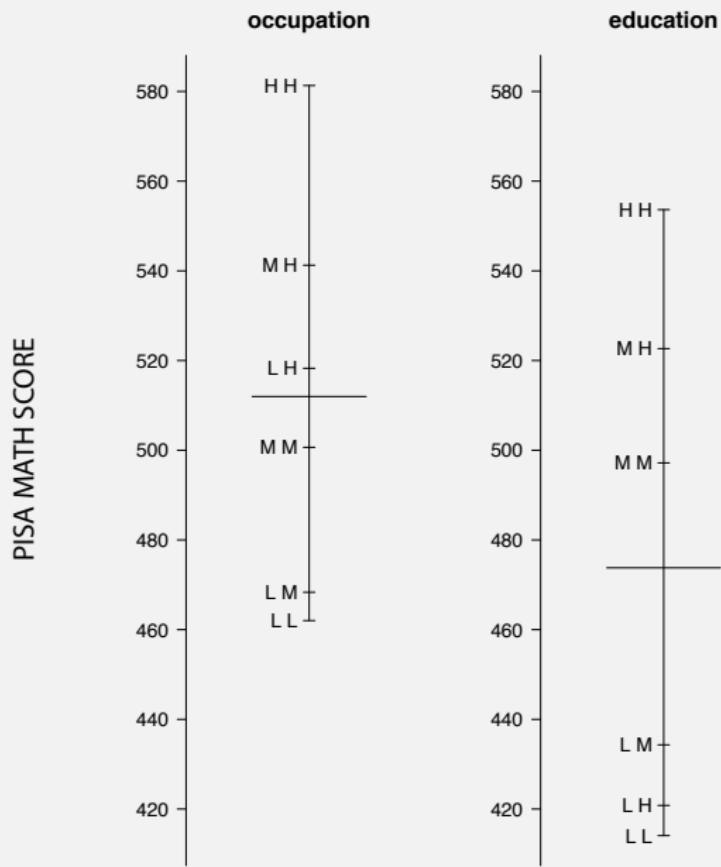


PISA RELATIVE MATH SCORE



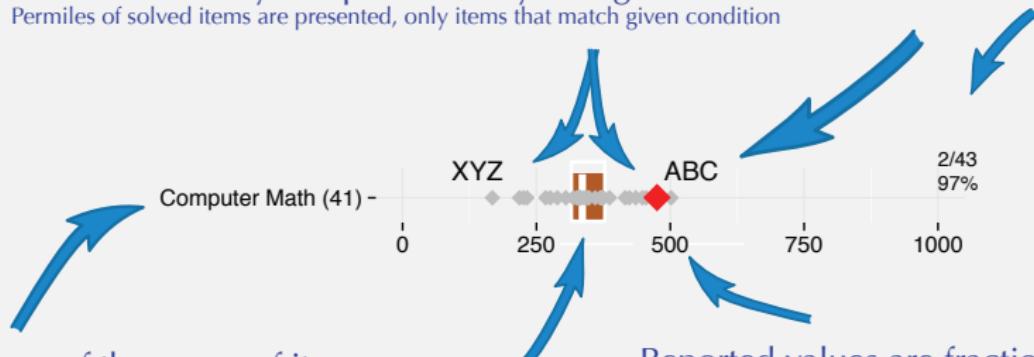
PISA RELATIVE MATH SCORE



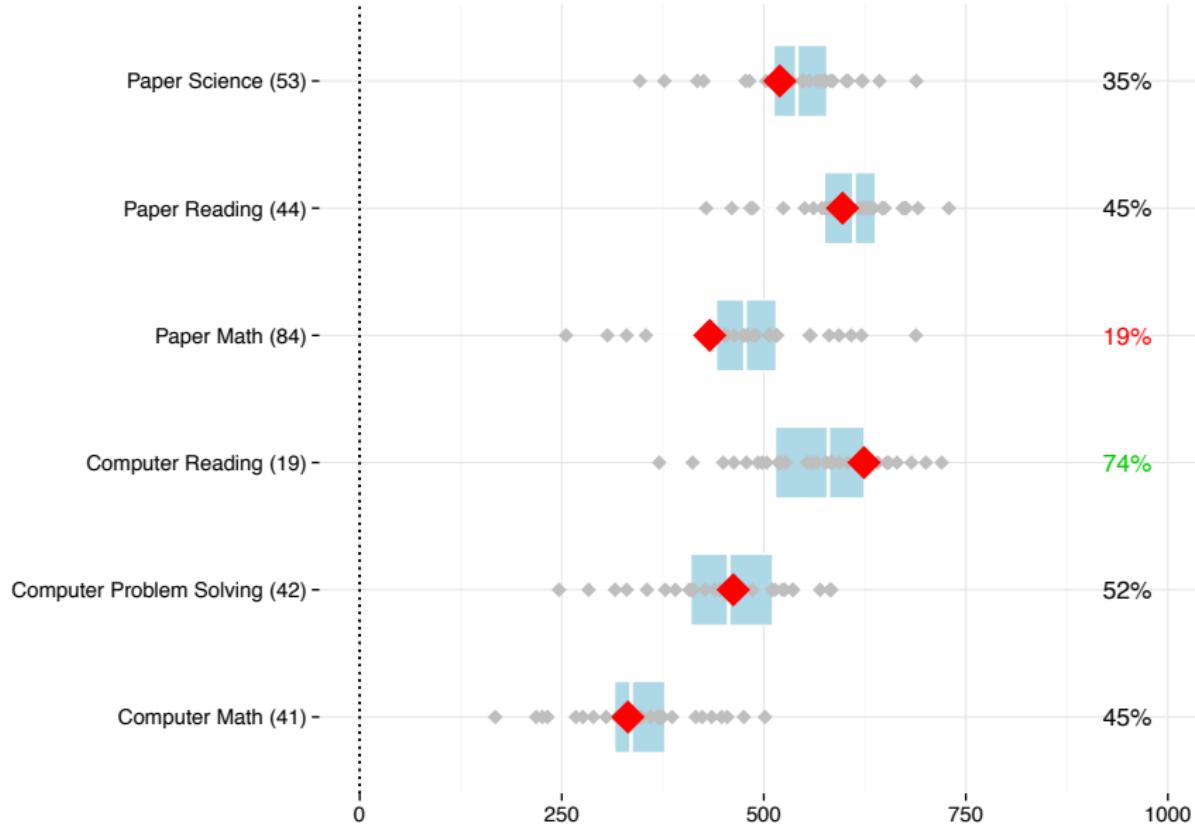


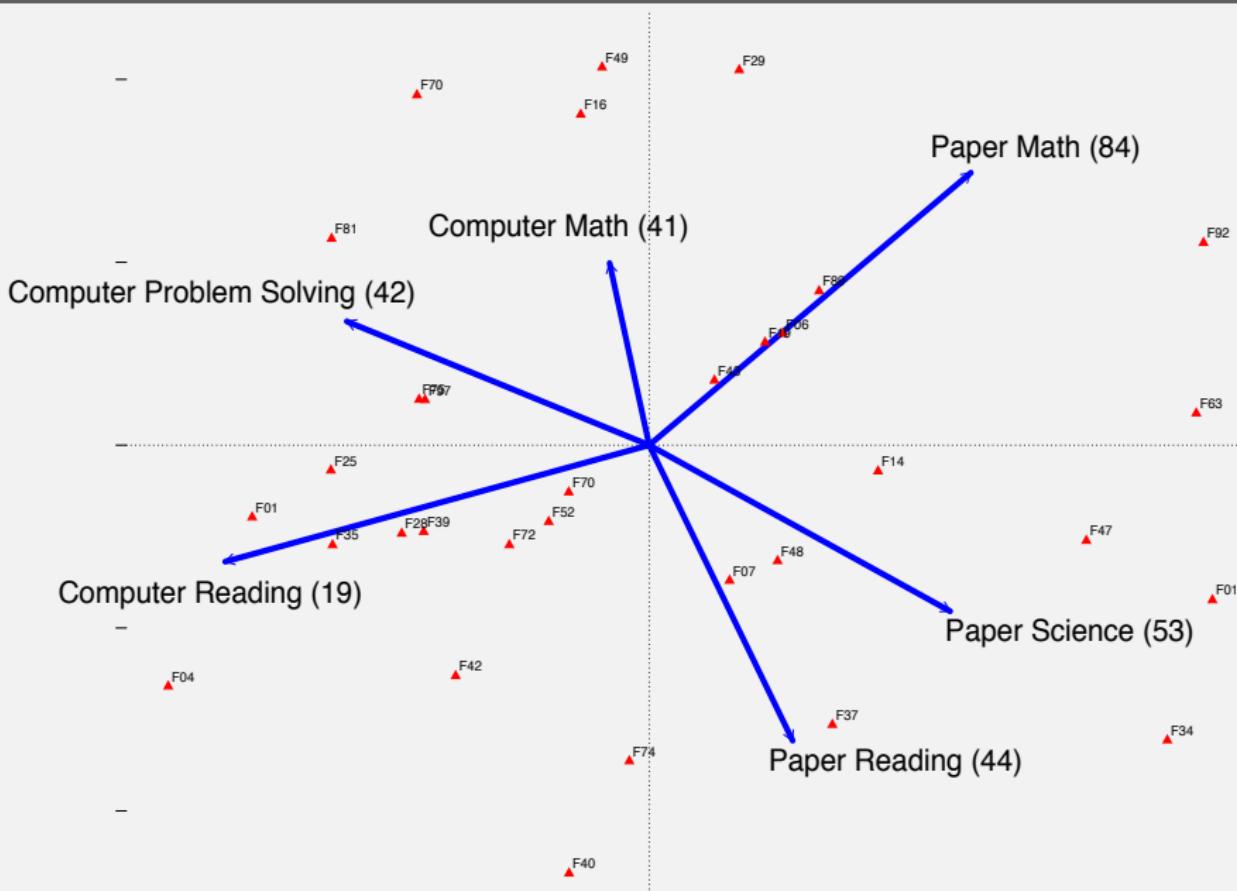
Red dot stands for selected country
the number on the right is
the country centile and position in the ranking

Each country is represented by a single dot
Permiles of solved items are presented, only items that match given condition



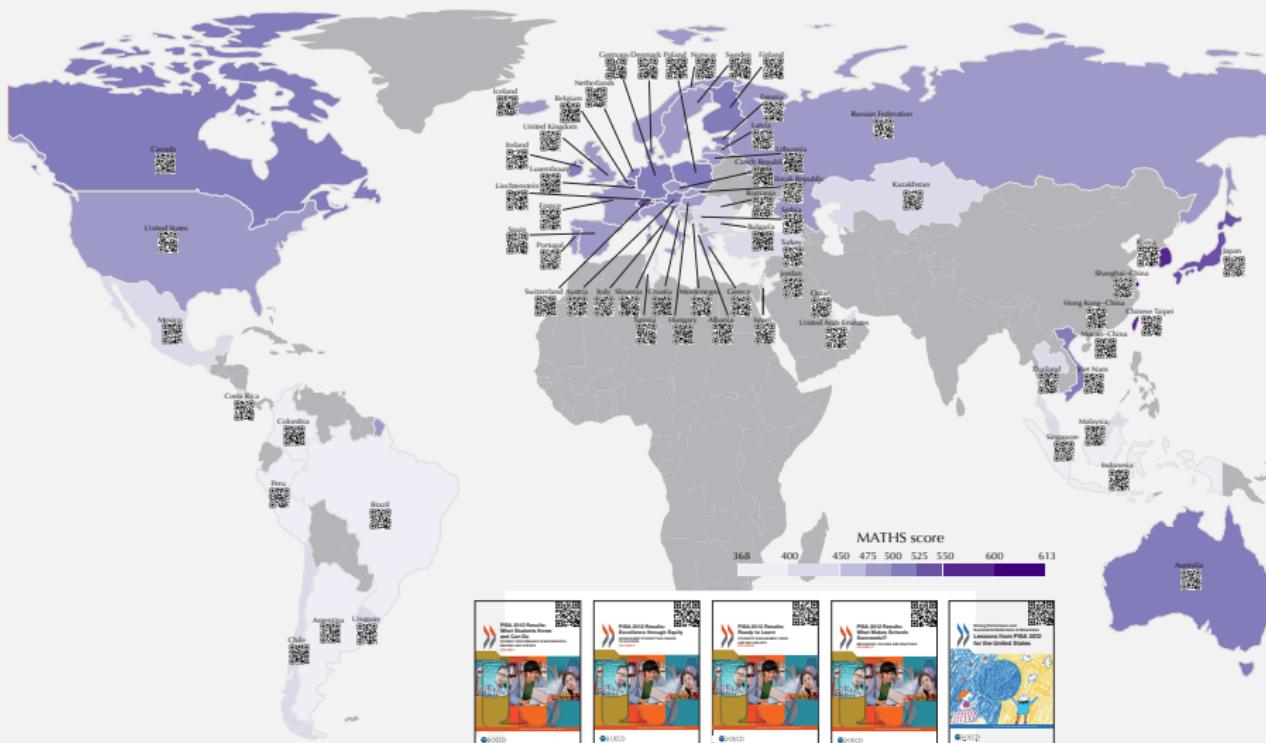
The box shows 25th and 75 centiles
white line in the middle stands for median



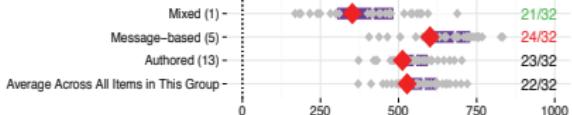




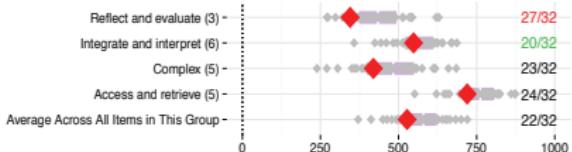
PISA 2012 Key Results



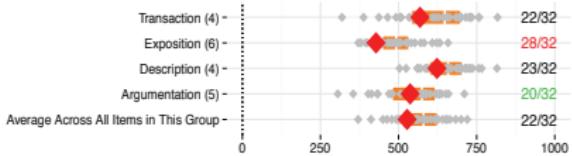
Computer Reading Environment



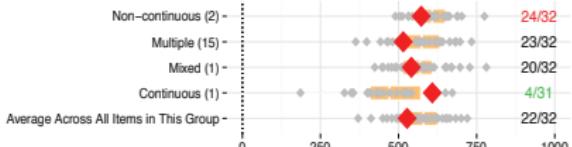
Computer Reading Aspect



Computer Reading Text Type



Computer Reading Text Format



Space and shape (12)



Social (30)



Simple Multiple Choice (18)



Simple Multiple Choice (13)



Public (5)



Natural resources (11)



Living systems (9)



Exposition (16)



Continuous (1)



Constructed Response Manual (6)



Constructed Response Manual (2)



Complex Multiple Choice (16)



Access and retrieve (10)



Selected Response Variations (2)



Scientific (8)



Reflect and evaluate (3)



Public (10)



Non-continuous (2)



Message-based (5)



Exposition (6)



Constructed Response Expert (5)



Constructed Response Expert (4)



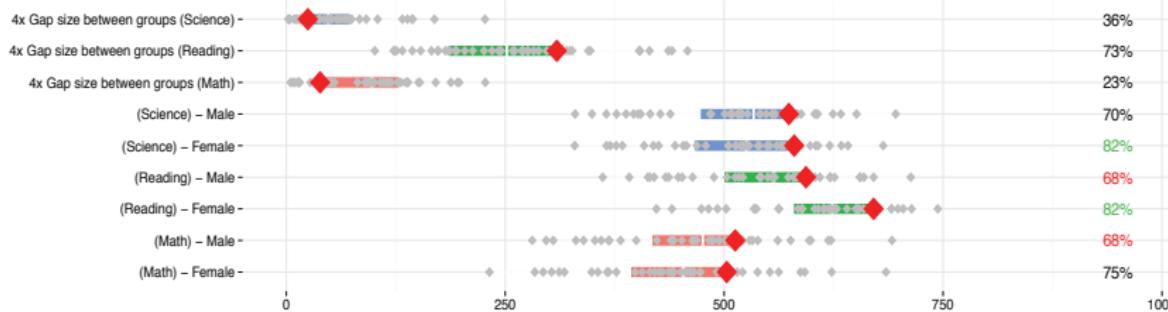
Change and relationships (11)



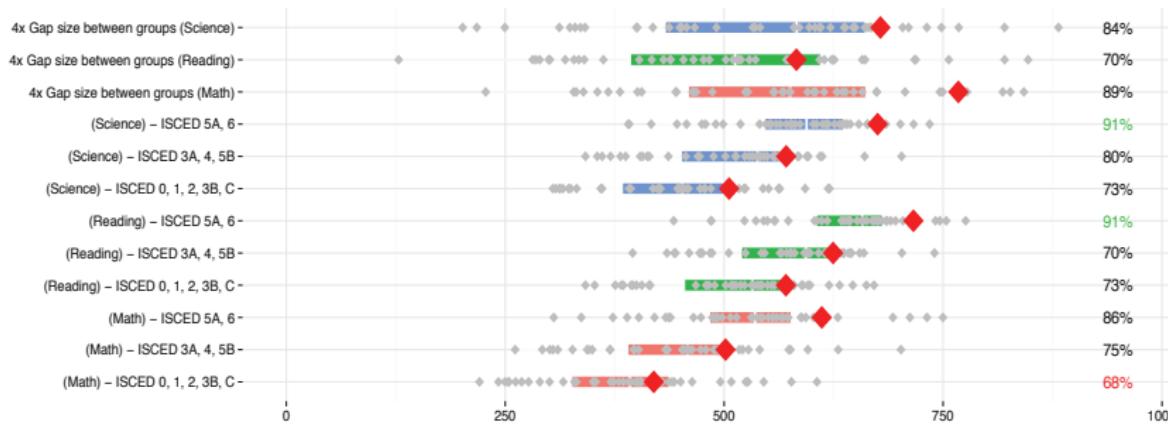
Access and retrieve (5)



Gender

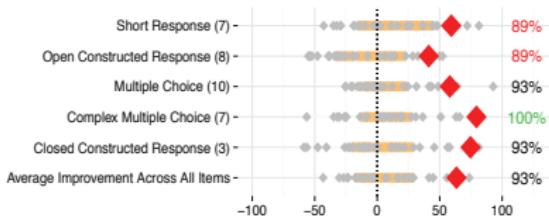
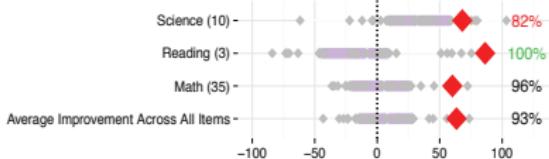


Highest education

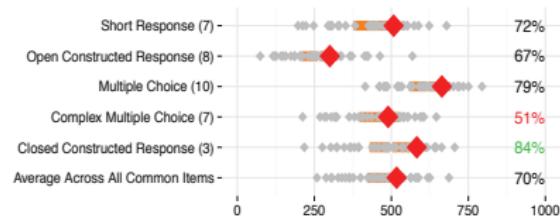
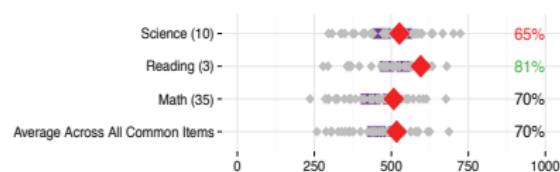
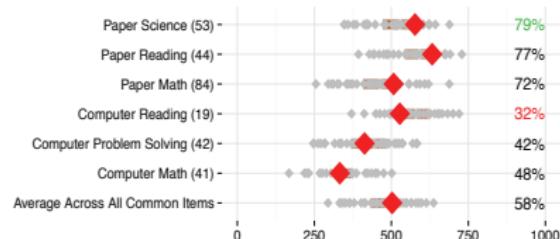




Improvement 2012 – 2003



Performance in 2012



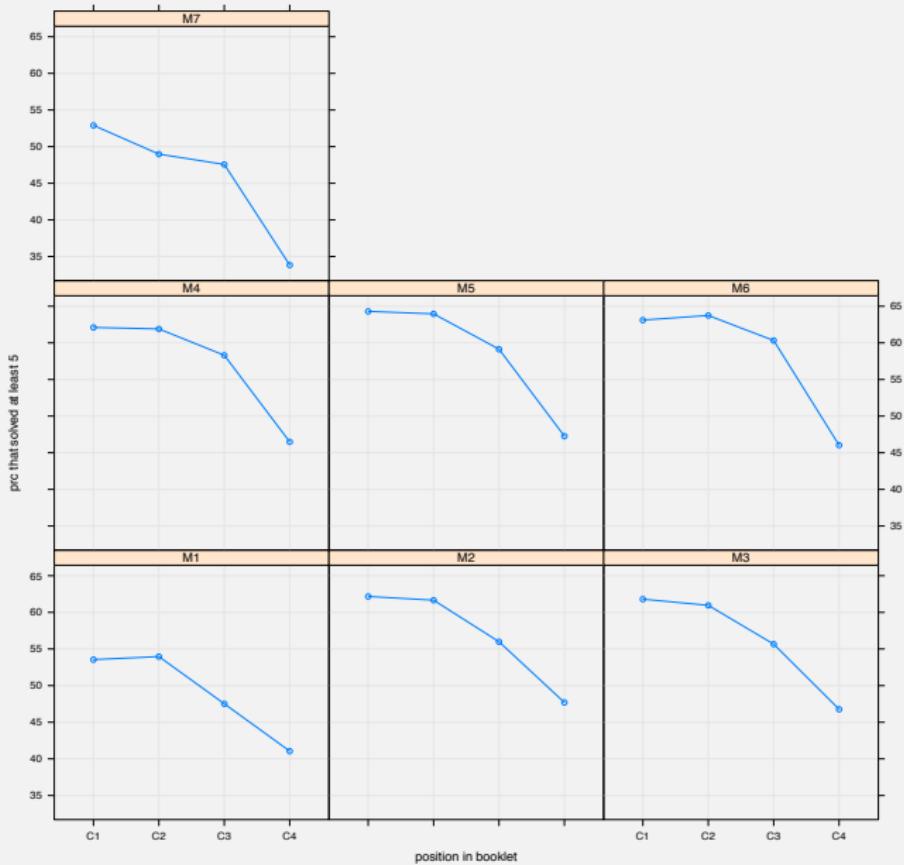
Booklets design in different PISA studies

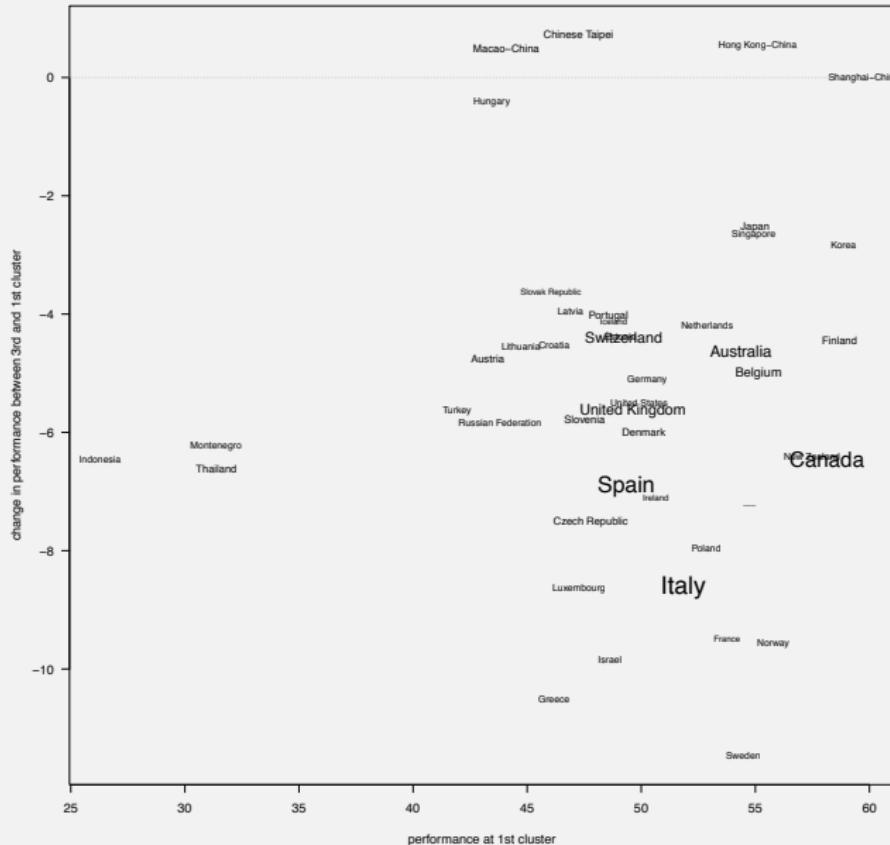
2000				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1	R1	R2	R4	
2	R2	R3	R5	
3	R3	R4	R6	
4	R4	R5	R7	
5	R5	R6	R1	
6	R6	R7	R2	
7	R7	R1	R3	R8
8			R8	R9
9			R9	R8

2003				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1	M1	M2	M4	
2	M2	M3	M5	
3	M3	M4	M6	
4	M4	M5	M7	
5	M5	M6		M1
6	M6	M7		M2
7	M7			M3
8				M4
9				M5
10				M6
11			M1	M7
12			M2	
13	M1	M3		

2009				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1		R1	R3A	
2	R1		R4A	R7
3		R3A		
4	R3A	R4A		R2
5	R4A		R5	
6	R5	R6	R7	R3A
7	R6			R4A
8	R2			R6
9			R6	R1
10		R5		
11		R7	R2	
12	R7			
13		R2	R1	R5

2012				
	Cluster 1	Cluster 2	Cluster 3	Cluster 4
1	PM5		PM6A	
2			PM7A	
3		PM6A		PM3
4	PM6A	PM7A		PM4
5	PM7A		PM1	PM5
6	PM1	PM2		PM6A
7	PM2		PM3	PM7A
8			PM4	
9		PM3	PM5	
10	PM3	PM4		PM1
11	PM4	PM5		PM2
12			PM2	
13		PM1		





Variables that correlate with student's endurance

2003	2009	2000
Talking about books – Q35c		
Sex – Q3	Sex	Sex Q3
Favourite hobby – Q35b	Read Attitude – Favourite hobbies	Interested in Students Q26b
Feel happy – Q35e	Read Attitude – Happy as present	Late for school Q28
Enjoy library – Q35g	Read Attitude – Enjoy library	Well with Students Q26a
Waste of time – Q35f	Read Attitude – Talk about books	Lesson can't work well Q38i
Doing nothing – Q26q	Read Attitude – Waste of time	Listen to me Q26c
For information – Q35h	Read Attitude – Exchange	Give extra help Q26d
Only if I have to – Q35a	Read Attitude – Only if I have to	Lesson late start Q38k
Reading fun – CC2/34	Reading Enjoyment Time	Learn_important parts Q34a
How many books at home – Q37	Read Attitude – Need information	ISCED Orientation
Homework <maths> – Q33b	Read Attitude – Cannot sit still	Possessions literature Q17h
Read each day – Q34	Summary – Copy accurately	Country of birth Father Q15a_c
Quickly in most – CC2/31	Text – Summarise	School useful Q24d
I complete on time – Q32a	Summary – Write own words	Learn_exactly Q34l
Good most – CC2/35	Read Attitude – Hard to finish	Attitude further study Q30g
Homework <test lang> – Q33a	Read Attitude – Express opinions	Attitude career Q30e
Hard to finish – Q35d	Study – Important Points	School done little Q24a
Sport – Q18f	How many books at home	Treat me fairly Q26e
Best to acquire – CC1/20	Like Read – Fiction	School waste of time Q24b
	Summary – Check important facts	Attitude job Q30h