HKPISA

What does HKPISA 2003 tell us about the Mathematical , Scientific and Reading Literacy of our students?

Results from HKPISA 2003

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OECD/PISA 2003

Western Europe	*Asia/Pacific Rim*	*Eastern Europe*	*America & Others*
Austria	Australia	Czech Republic	Brazil
Belgium	Hong Kong, China	Greece	Canada
Denmark	Indonesia	Hungary	Mexico
Finland	Japan	Latvia	Tunisia
France	Korea	Poland	United States
Germany	Macao, China	Russian Federation	Uruguay
Iceland	New Zealand	Serbia & Montenegro	
Ireland	Thailand	Slovak Republic	
Italy		Turkey	
Liechtenstein			
Luxembourg			
The Netherlands			
Norway			
Portugal			
Spain			
Sweden			
Switzerland			
United Kingdom			

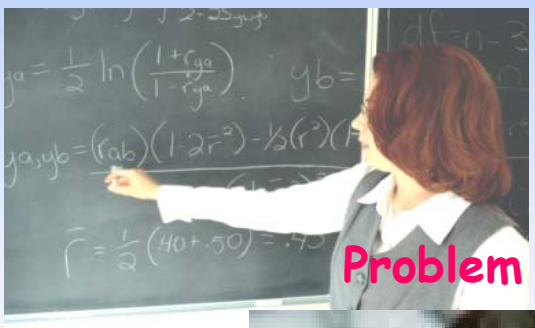
Basic Design

- Age-based target population *(15 year-olds)*
- National samples of 150 schools with 5,000 students
- Two hours of testing time for each student
- Context questionnaires for the students, parents and schools
- Sample
  - 275,000 students
  - 41 participating countries

Testing Scope

- To test students' competencies for real-life situations which are not constrained by the common denominator of national curricula.
- Four Domains:

Mathematics



Reading

Science

Problem Solving

The Collaborating Parties

- International Parties
  - OECD
  - PISA CONSORTIUM
- Hong Kong Parties
  - HKPISA Centre, HKIER, CUHK
  - EMB, HKSAR
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Total Number of Schools Participated in HKPISA 2003

Explicit Strata	Implicit Strata	Total Number of Schools in HK	Number of Schools Participated (OECD)
Government	High Ability	17	8
	Medium Ability	9	3
	Low Ability	10	4
	Sub-total	**36**	**15**
Aided	High Ability	127	50
	Medium Ability	124	41
	Low Ability	107	33
	Sub-total	**358**	**124**
Independent	Local (DSS)	29	5
	International	20	1
	Sub-total	**49**	**6**
	Total	**443**	**145**

Distribution of Grade Levels

Form 1	211	4.7%
Form 2	439	9.8%
Form 3	1132	25.3%
Form 4	2692	60.1%
Form 5	4	0.1%
Total	**4478**	**100%**

Overview

1. Overall Quality from HKPISA+ to HKPISA2003
2. Overall Equality between
   - between schools
   - boys and girls
   - high and low achievers
   - high and low SES students
3. Factors Related to High Achieving students in HK
4. Factors Related to High Achieving schools in HK
5. Implications for Policy, Practices, and Research

Mean Performance of 15-year-Olds in the Top Ten Countries

(shaded area indicates scores significantly different from Hong Kong)

Mathematical Literacy			Reading Literacy			Scientific Literacy			Problem Solving Skills		
Country	*Mean*	*S.E.*	*Country*	*Mean*	*S.E.*	*Country*	*Mean*	*S.E.*	*Country*	*Mean*	*S.E.*
Hong Kong	**550**	**(4.5)**	Finland	543	(1.6)	Finland	548	(1.9)	Korea	550	(3.1)
Finland	544	(1.9)	Korea	534	(3.1)	Japan	548	(4.1)	**Hong Kong**	**548**	**(4.2)**
Korea	542	(3.2)	Canada	528	(1.7)	**Hong Kong**	**539**	**(4.3)**	Finland	548	(1.9)
Netherlands	538	(3.1)	Australia	525	(2.1)	Korea	538	(3.5)	Japan	547	(4.1)
Liechtenstein	536	(4.1)	Liechtenstein	525	(3.6)	Liechtenstein	525	(4.3)	New Zealand	533	(2.2)
Japan	534	(4.0)	New Zealand	522	(2.5)	Australia	525	(2.1)	Macao	532	(2.5)
Canada	532	(1.8)	Ireland	515	(2.6)	Macao	525	(3.0)	Australia	530	(2.0)
Belgium	529	(2.3)	Sweden	514	(2.4)	Netherlands	524	(3.1)	Liechtenstein	529	(3.9)
Macao	527	(2.9)	Netherlands	513	(2.9)	Czech Republic	523	(3.4)	Canada	529	(1.7)
Switzerland	527	(3.4)	**Hong Kong**	**510**	**(3.7)**	New Zealand	521	(2.4)	Belgium	525	(2.2)

Trend from HKPISA+ to HKPISA 2003

Mean Scores and Percentiles Comparisons in Mathematics, Science, and Reading between HKPISA+ and HKPISA 2003

Subject Domain	Mean Scores		Significance Level of Changes						
	HKPISA+	HKPISA 2003	5th	10th	25th	Mean	75th	90th	95th
Mathematical Literacy	560	550	NA	NA	NA	NA	NA	NA	NA
Space and Shape	543	558	O	O	O	+	+++	+	O
Change and Relationships	546	540	O	-	O	O	O	O	O
Scientific Literacy	541	539	O	O	O	O	O	O	O
Reading Literacy	525	510	O	O	--	---	---	---	---

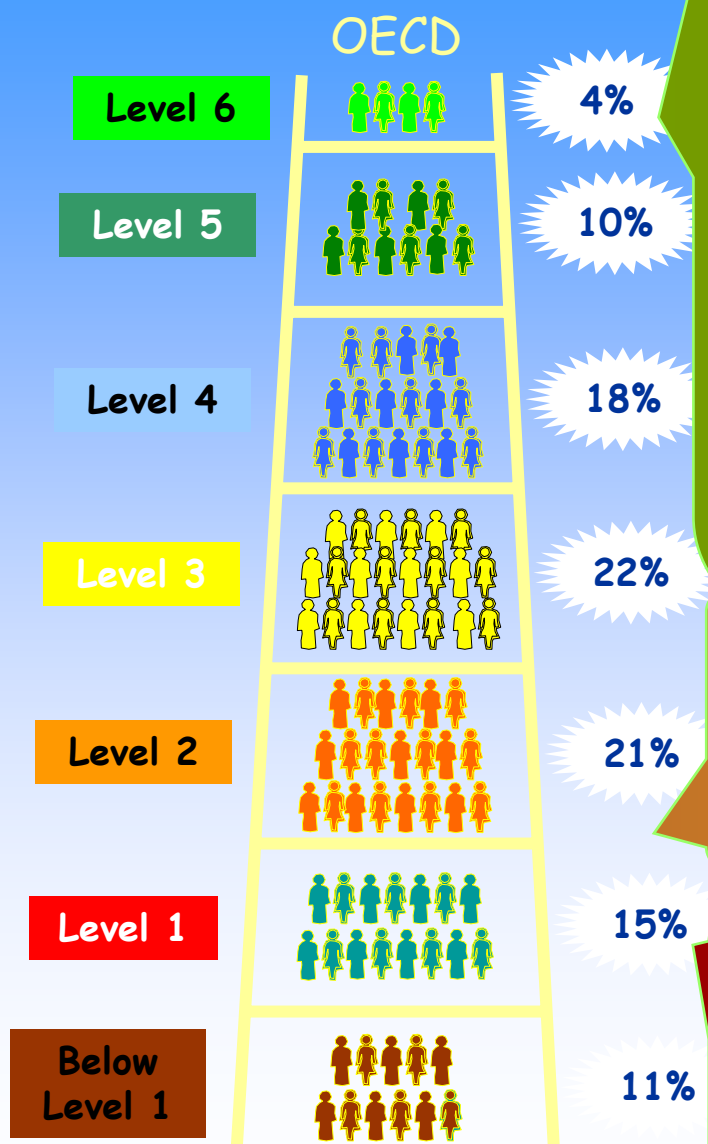
Note: The symbols indicate where in the distribution of student performance changes occurred.

+, ++, and +++ represents "HKPISA 2003 higher than HKPISA+ at 90%, 95%, and 99% confidence level respectively"

-, - -, and - - - represents "HKPISA 2003 lower than HKPISA+ at 90%, 95%, and 99% confidence level respectively"

O represents "no difference"

What students



Mathematics Level 6:

- Conceptualise and use information based on investigations and modelling of complex problems
- Link different information sources and representations and flexibly translate among them
- Show mathematical thinking and reasoning
- Communicate their actions and reflections regarding their findings, interpretations, arguments

Mathematics Level 2:

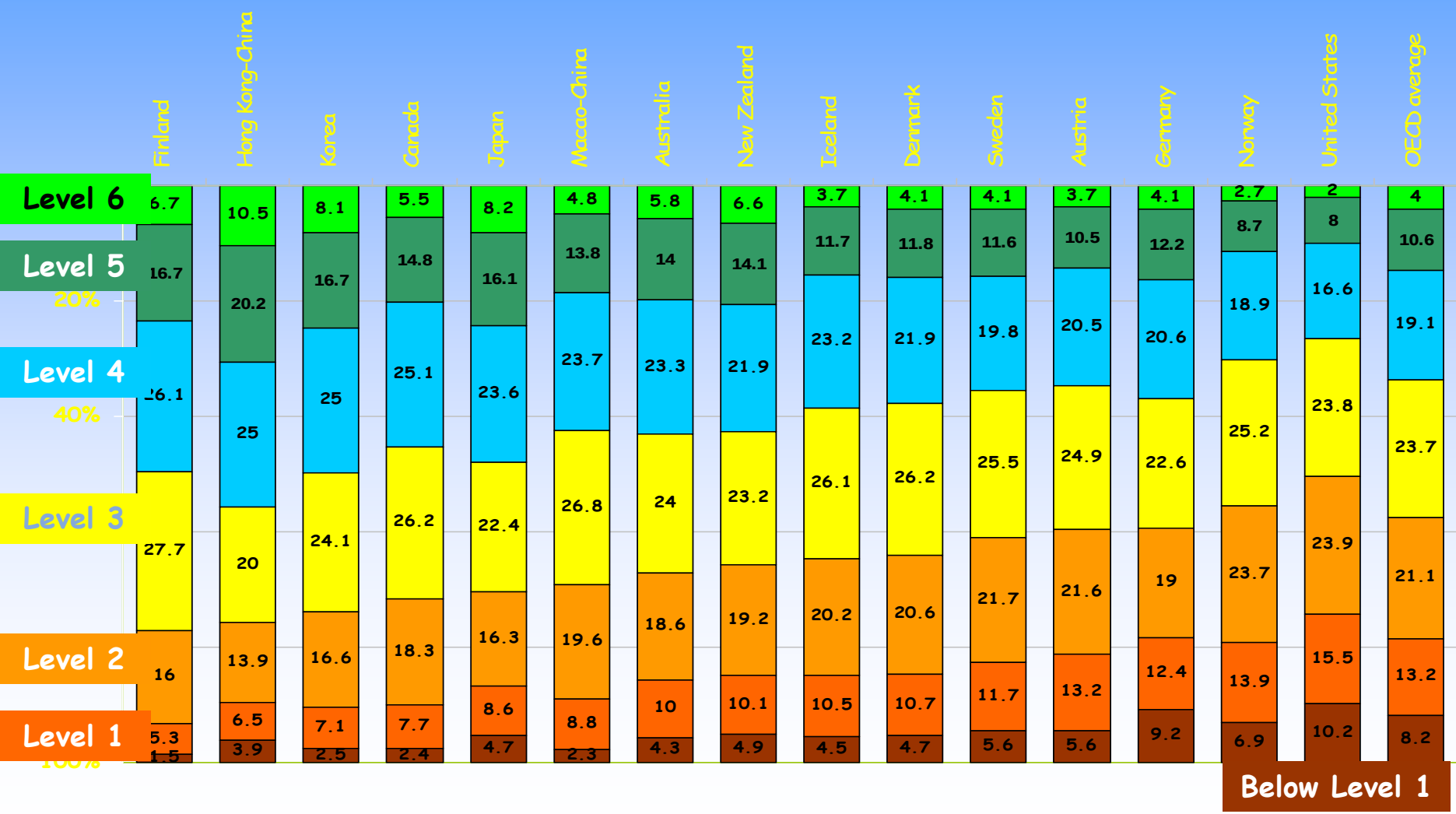
- Interpret and recognise situations in contexts that require no more than direct inference

Mathematics Level 1:

- Answer questions in familiar contexts where all relevant information is present
- Carry out routine procedures according to direct instructions in explicit situations.

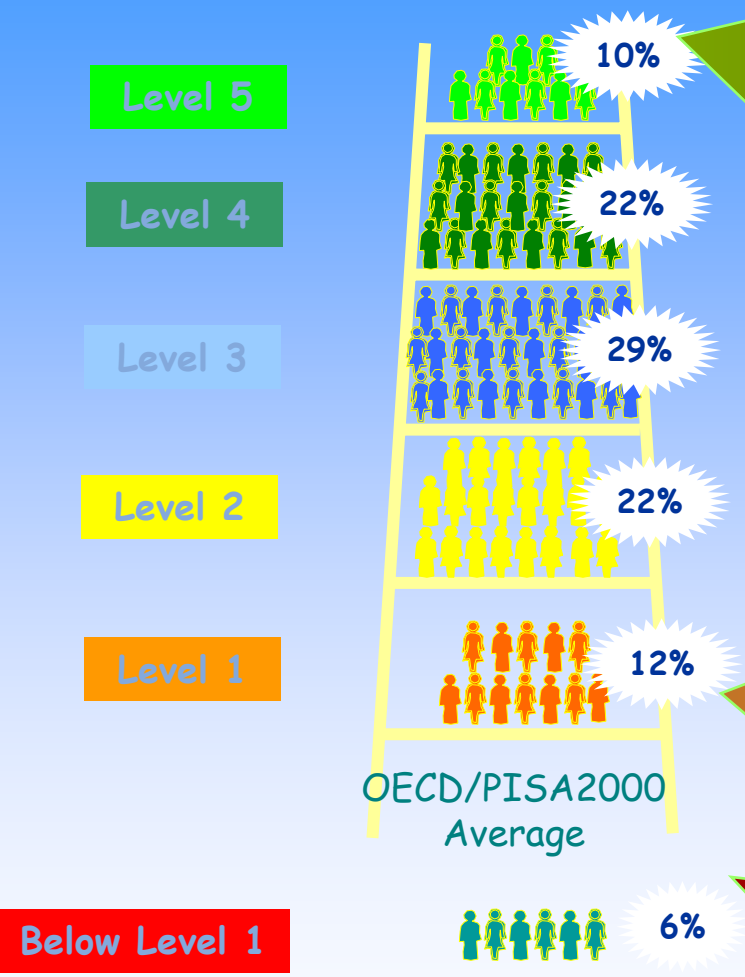
OECD (2004), *Learning for tomorrow's world: First*

Percentage of students at each of the proficiency levels on the mathematics scale



OECD (2004), *Learning for tomorrow's world: First results from PISA 2003*, Table 2.5a, p.354.

What students can do in reading



Reading Literacy Level 5:

- Locate and sequence/combine multiple pieces of deeply embedded information, some of which may be outside text
- Critically evaluate or hypothesise, drawing on specialised knowledge
- Draw on deep understanding of long and

Reading Literacy Level 1:

- Locate one or more independent pieces of explicitly stated information
- Make a simple connection between information in the text and common knowledge

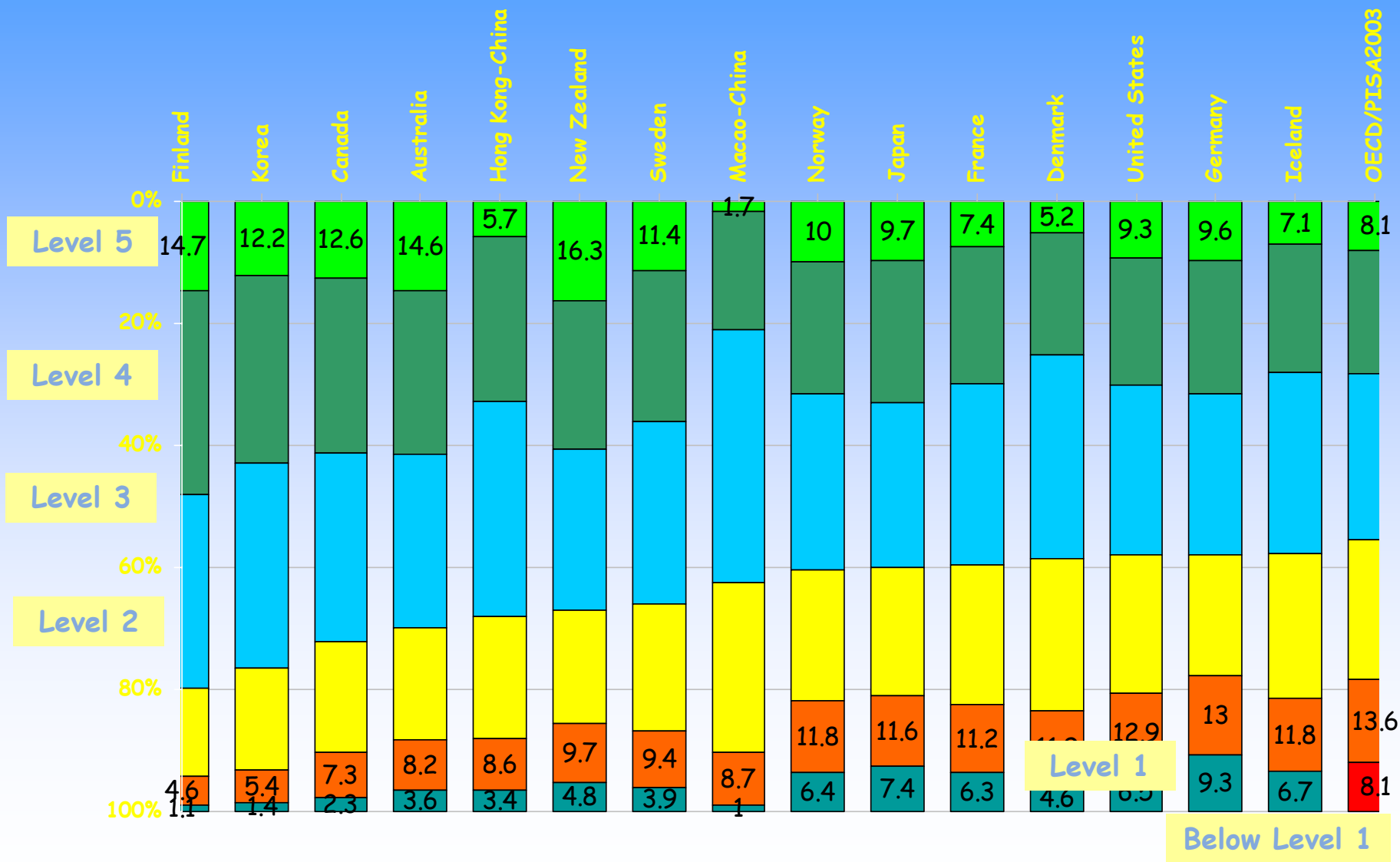
Below Level 1:

- Many of these students have technically learned to read…

… but they can not use reading for learning

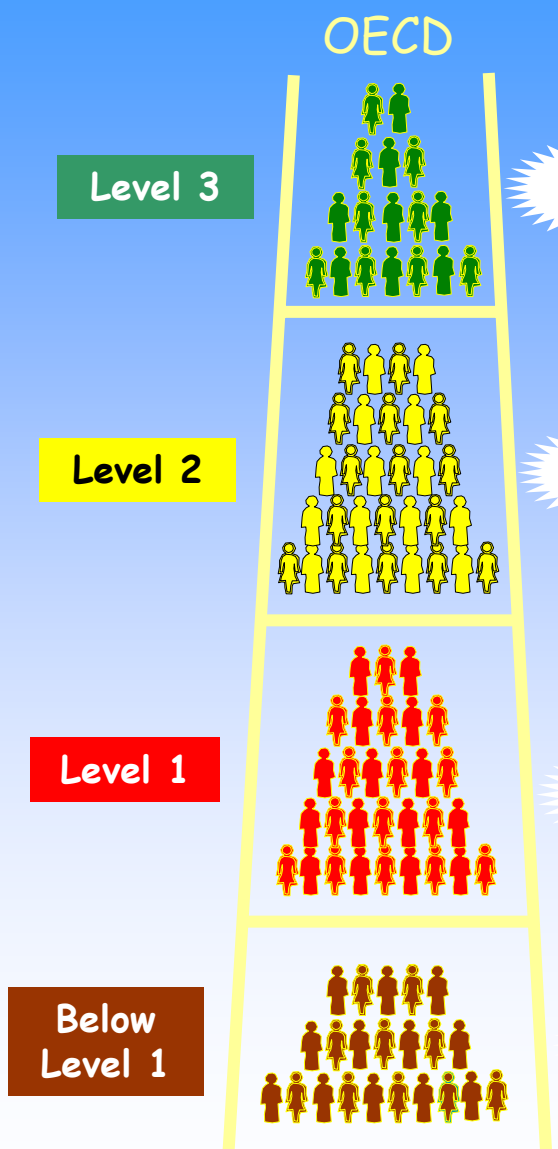
OECD (2004). *Learning for tomorrow's world: First results from PISA 2003*, Table 6.1, p.443.

Percentage of students at each of the proficiency levels in reading



OECD (2004), *Learning for tomorrow's world: First results from PISA 2003*, Table 6.1, p.443.

PISA Proficiency Levels in Problem Solving



Problem solving Level 3
Reflective, communicative problem solvers.

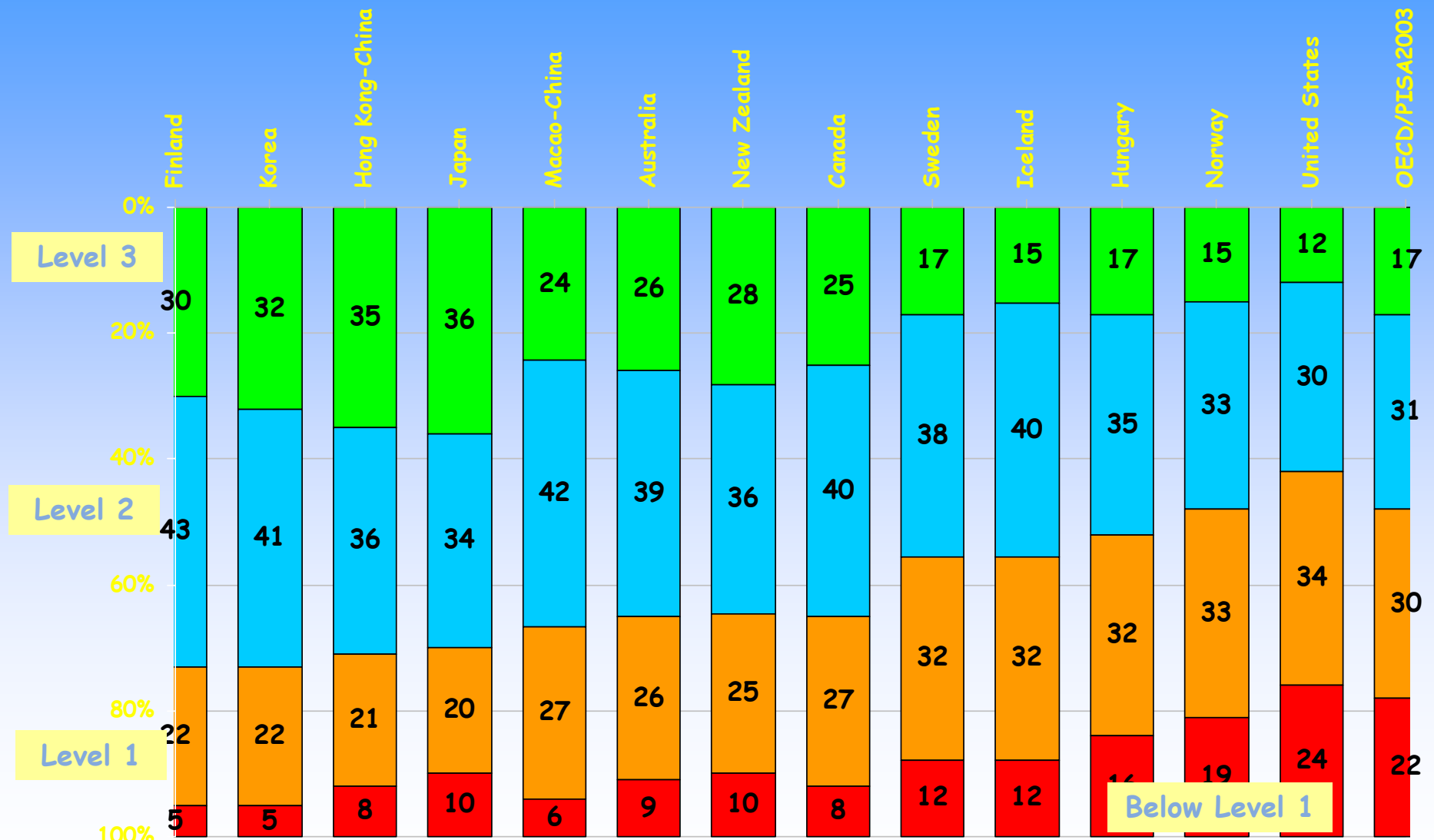
Problem solving Level 2
Reasoning, decision-making problem solvers.

Problem solving Level 1
Basic problem solvers.

Below Level 1
Weak or emergent problem solvers.

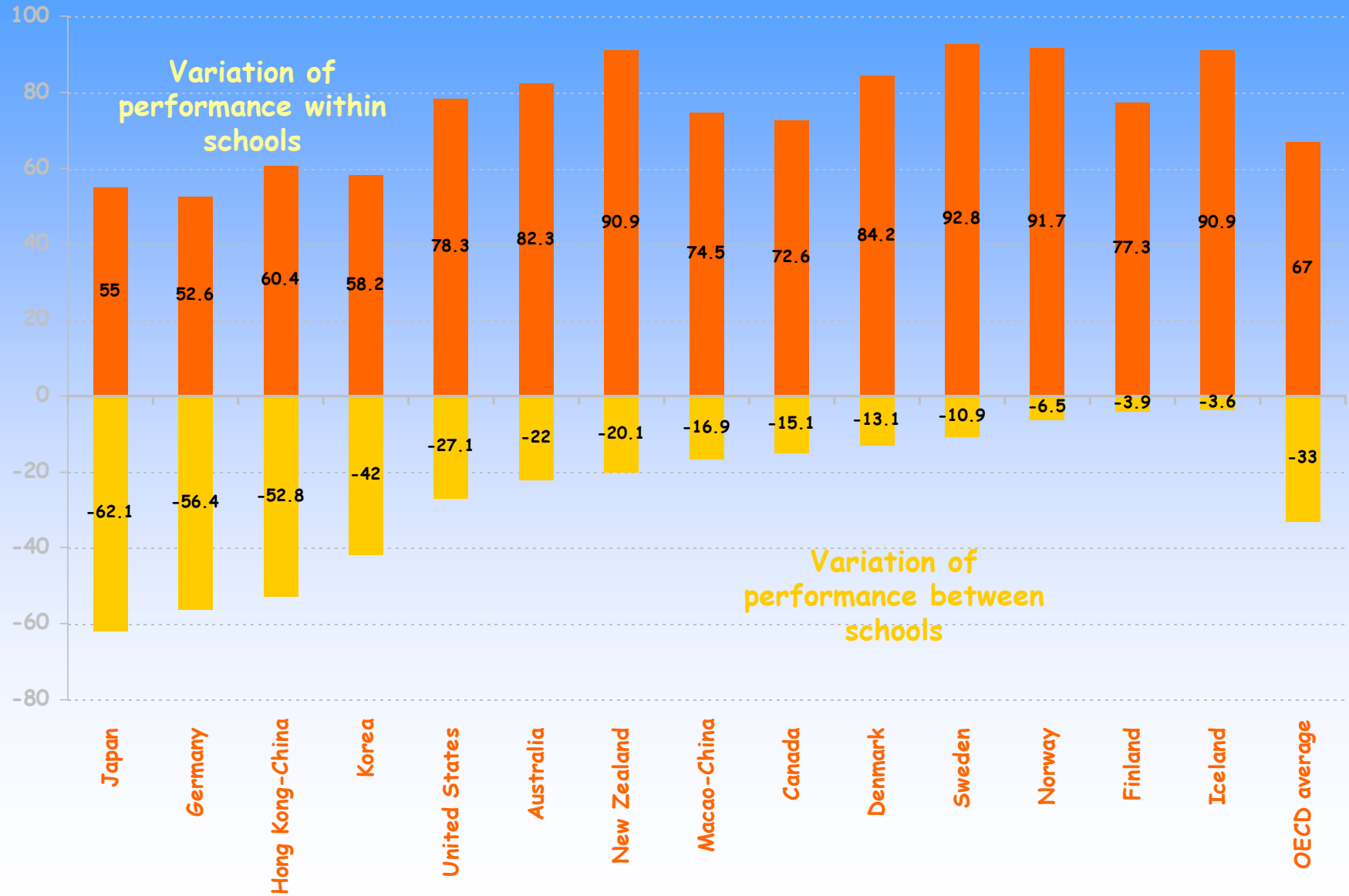
OECD (2004), *Problem solving for tomorrow's world: First results from PISA 2003.*

Percentage of students at each of the proficiency levels in problem solving



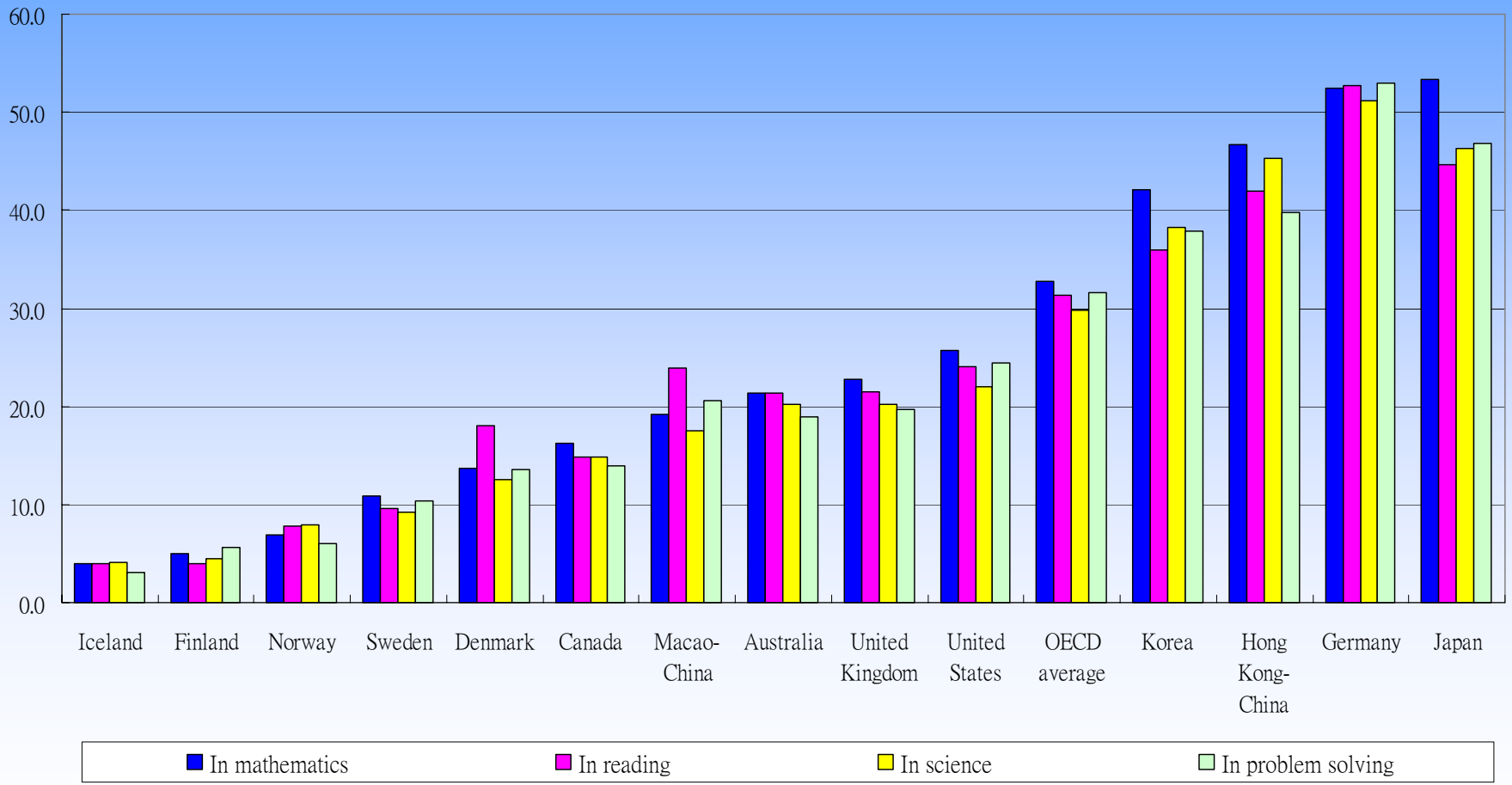
OECD (2004), *Problem solving for tomorrow's world: First results from PISA 2003.*

Variation in student performance in mathematics

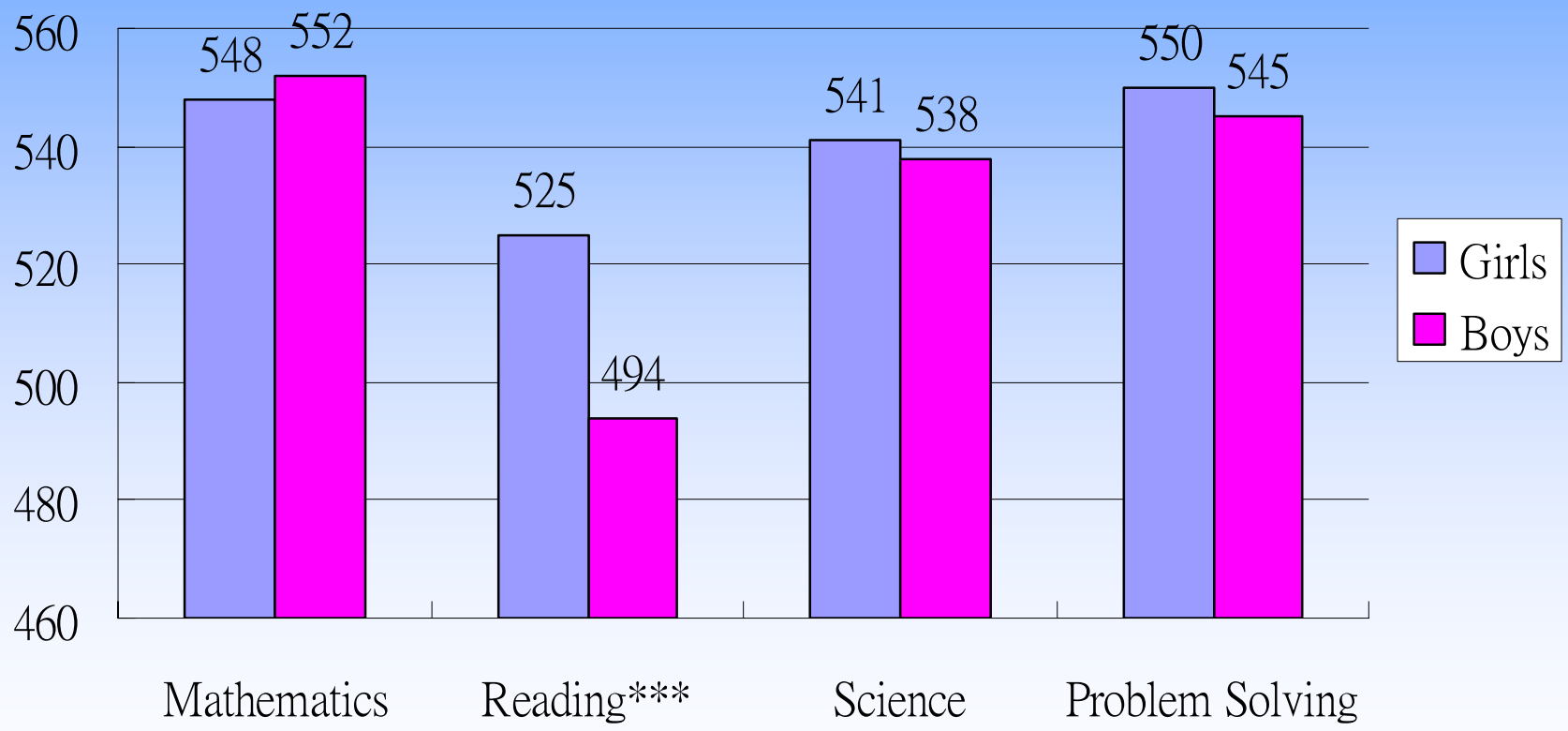


OECD (2004), *Learning for tomorrow's world: First results from PISA 2003*, Table 4.1a, p.383.

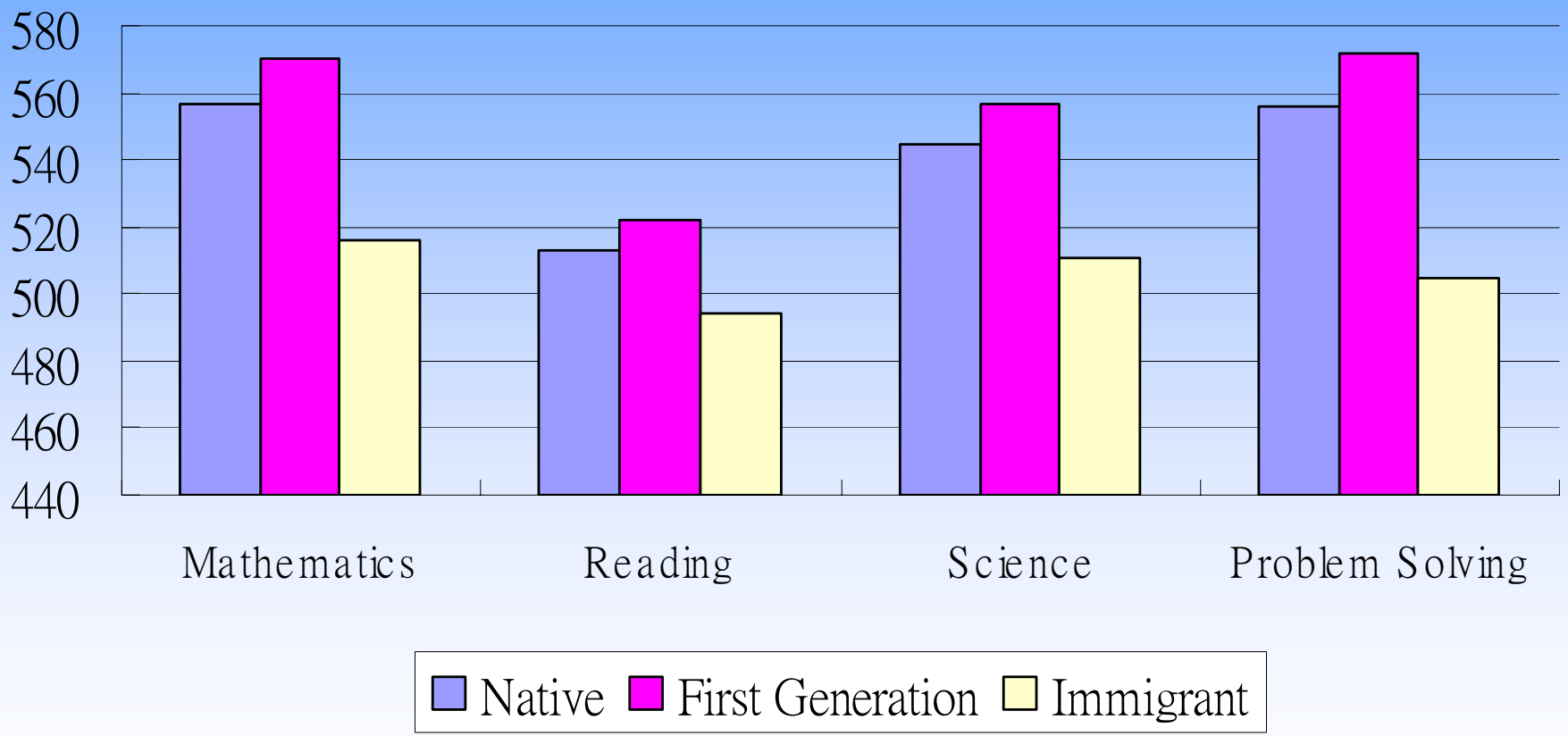
Percentage of between school variation within selected countries in four domains



Gender Difference in Literacy Performance in Hong Kong

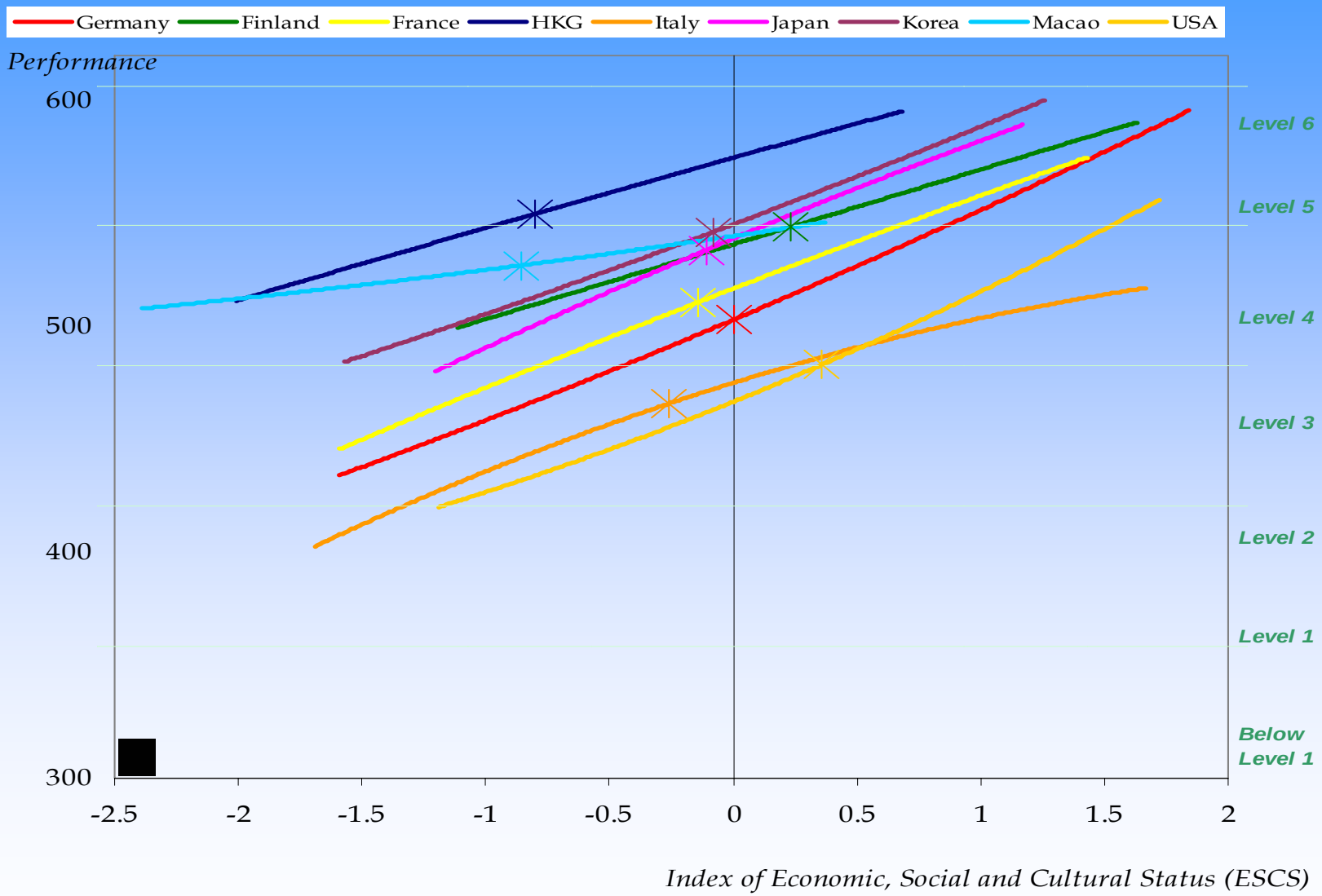


Difference in Literacy Performance for immigrant and local students in Hong Kong



Social Background and Student Performance

Socio-Economic and Cultural Background and Student Performance in Mathematics



Note: The ESCS index for PISA 2003 is derived from three variables related to family background: highest parental education, highest parental occupation and number of home possessions related to classical culture.

Summary

Strength of HK educational systems

- High Quality in Maths, Science and Problem Solving
- Low gender difference in Maths, Science and Problem Solving
- Low impact of SES

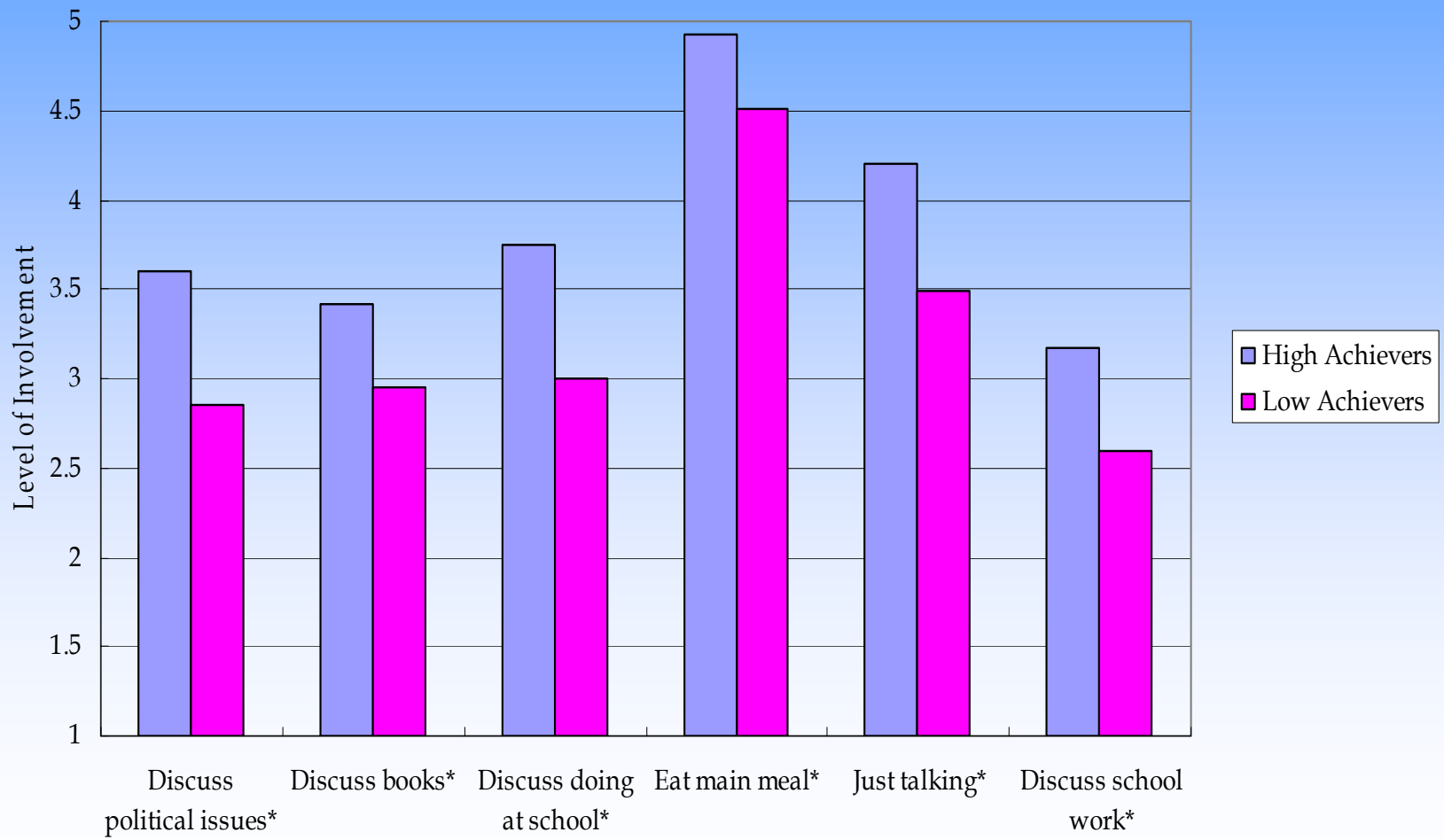
Weaknesses of HK educational systems

- High Academic Inequality among schools
- High gender gap in Reading
- High achievement gap between immigrant and first generation/local students

Characteristics of Effective Learners in HK

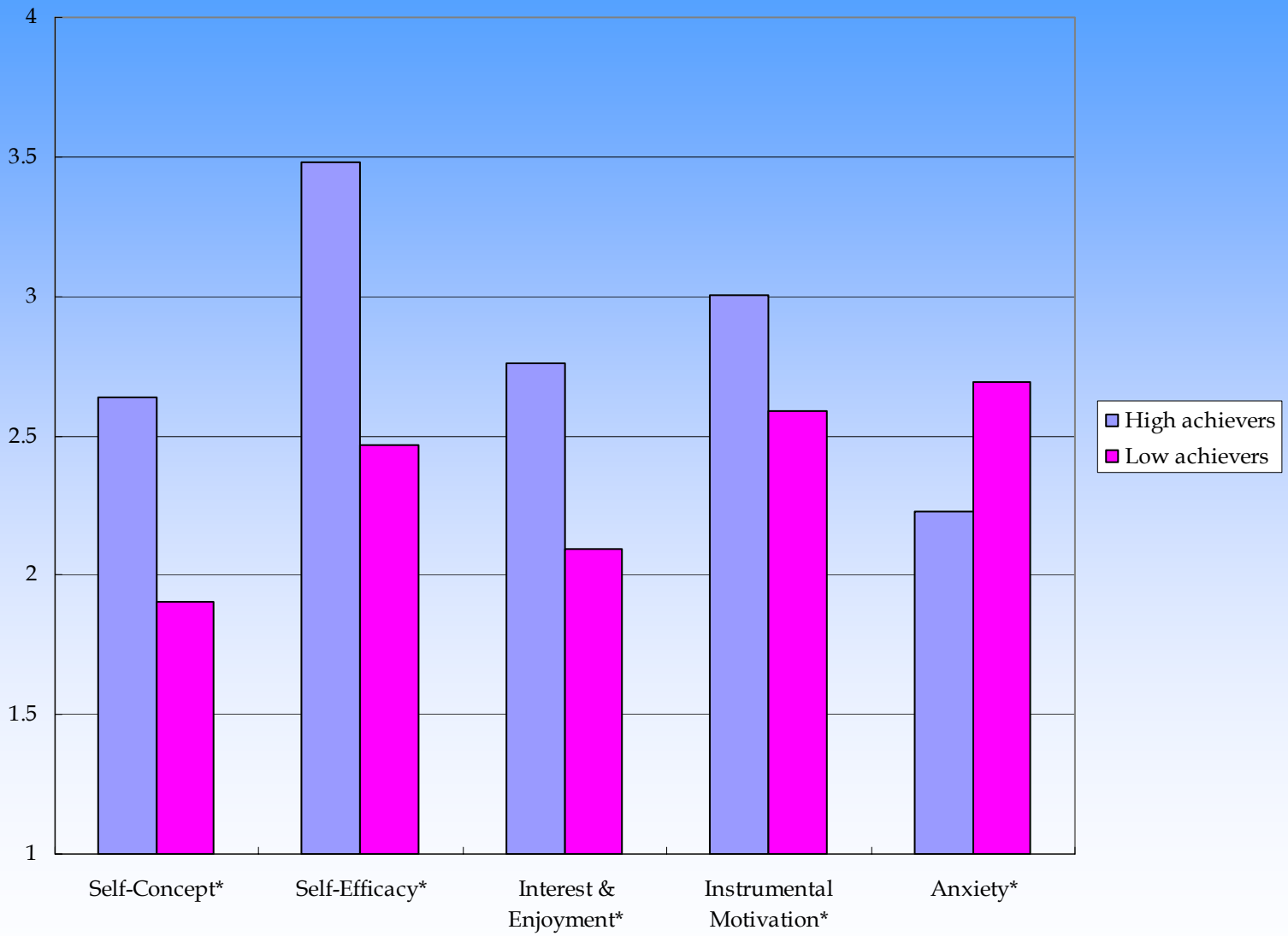
- Active home based parental involvement
- Positive self-concept and self-efficacy, higher interest & enjoyment and instrumental motivation, and lower anxiety
- The use of multiple learning strategies like control strategy, cooperative learning, competitive learning, and elaboration

Home Based Parental Involvement in HKPISA 2003



* represents the difference between high and low achievers is statistically significant.

Self-Related Cognitions in Learning Mathematics in HKPISA 2003



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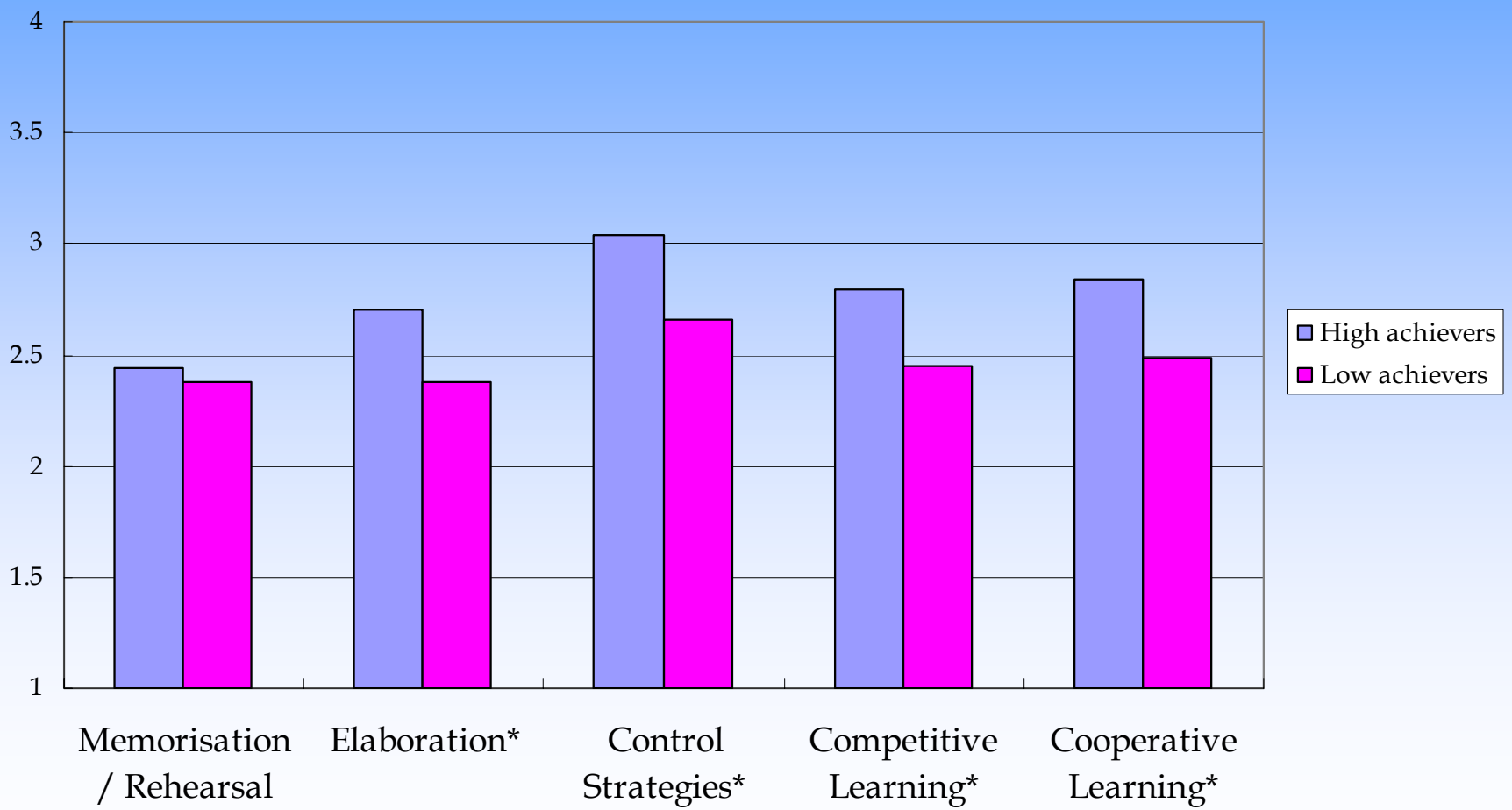
Learning Strategies in Mathematics in HKPISA 2003



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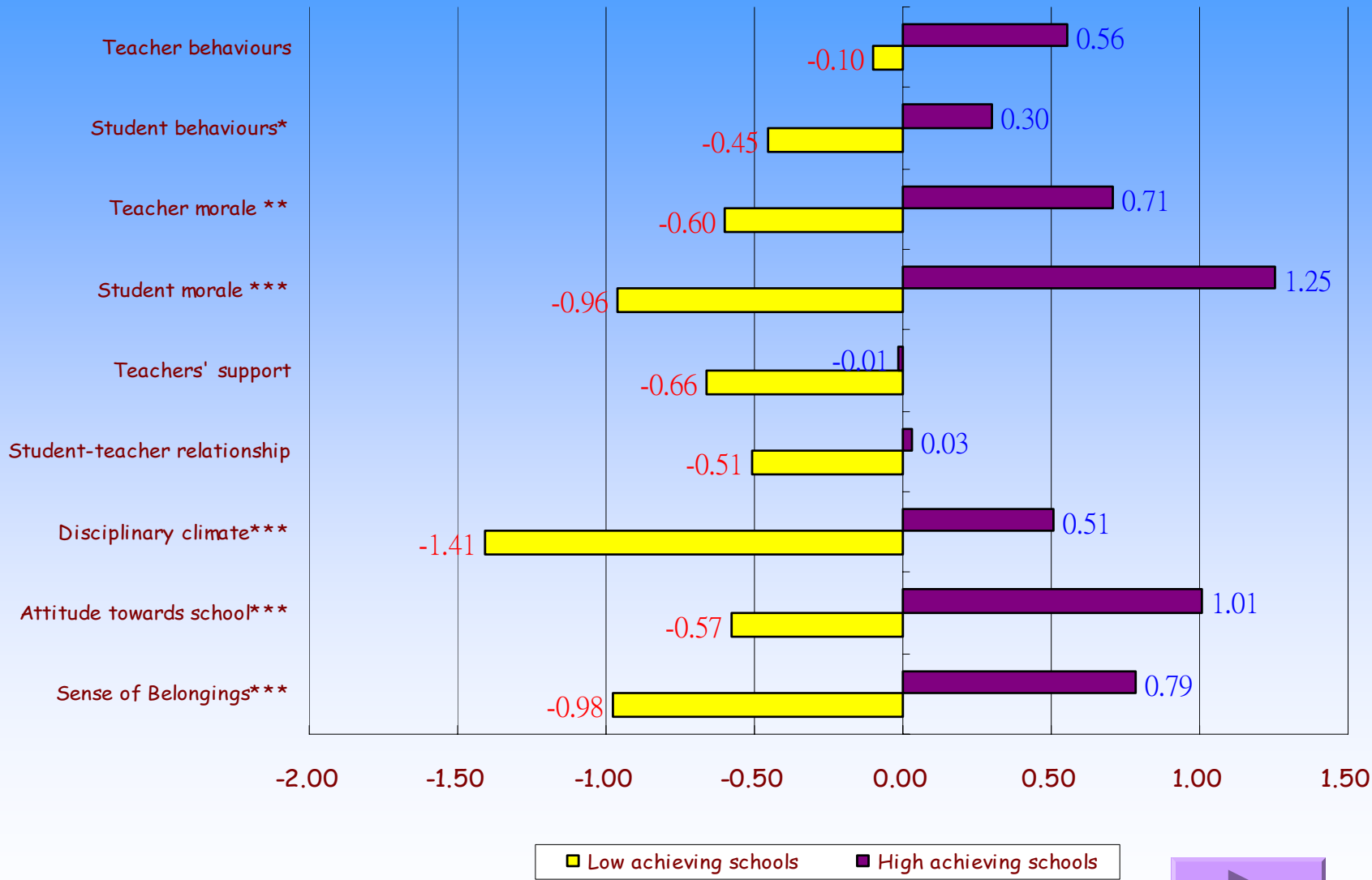
Characteristics of Effective Schools in HK

- High teacher morale
- High student morale
- Good student behavior
- Good disciplinary climate
- Positive attitude towards schools
- Strong sense of belongings

Characteristics of Effective Schools in HK



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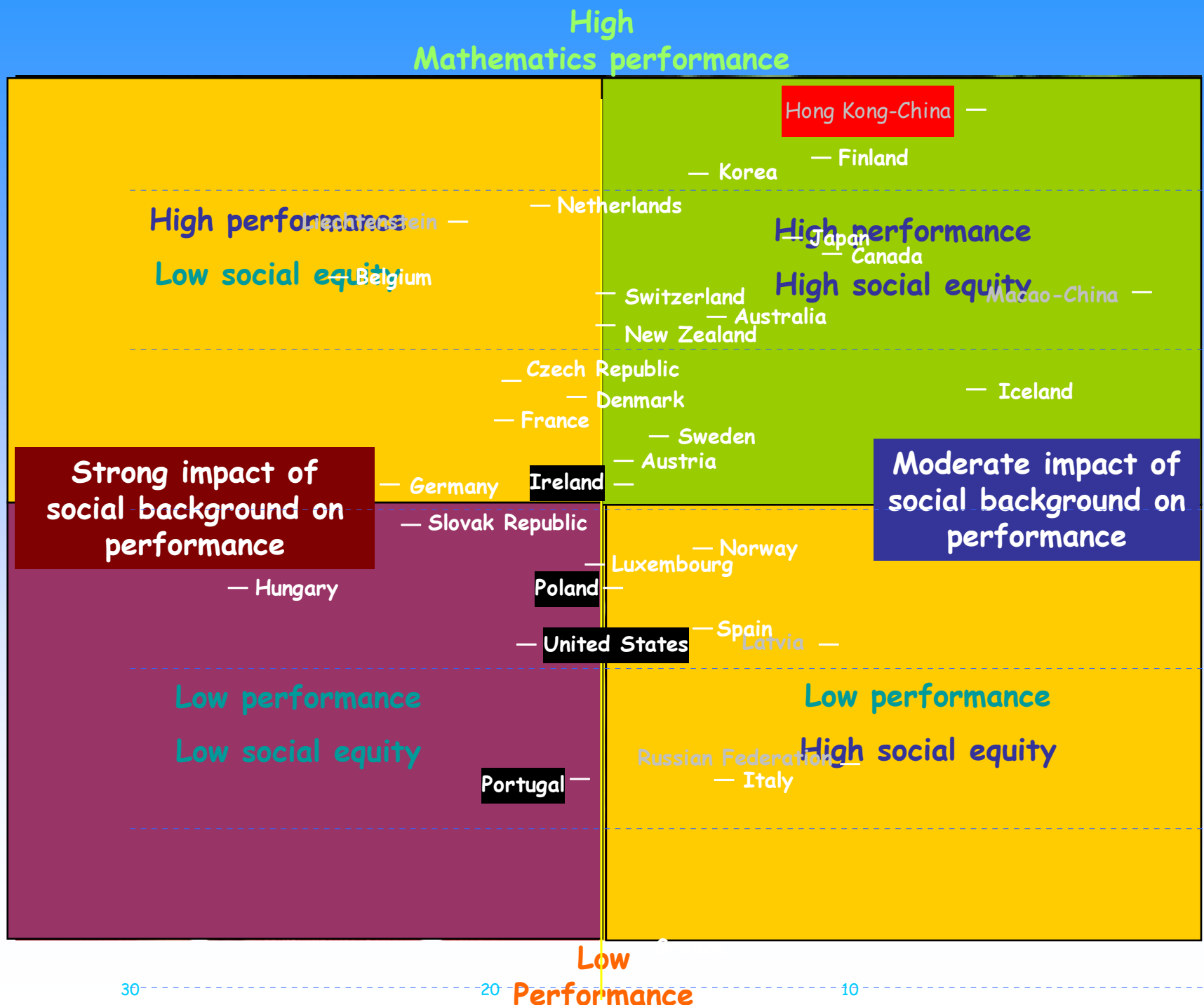
High
Mathematics performance
Hong Kong-China
Finland
Korea
Netherlands
High performance
Low social equity
Belgium
Japan
Canada
High social equity
Switzerland
Macao-China
Australia
New Zealand
Czech Republic
Iceland
Denmark
France
Sweden
Austria
Strong impact of social background on performance
Germany
Ireland
Moderate impact of social background on performance
Slovak Republic
Norway
Luxembourg
Hungary
Poland
Spain
United States
Latvia
Low performance
Low social equity
Low performance
High social equity
Russian Federation
Portugal
Italy
Low
Performance
540
520
500
480
460
440
30
20
10
0

Recommendation (1) Policy and Practices

Student Learning

- Positive self-related cognition
- Effective learning strategies

Family & School Level

- Active Parental involvement
- Positive School Climate

System Level

- More support for the disadvantaged
- Reading climate at home, in school and the community

Looking Forward

- Future Development
  - Research: Evidence based school profile
  - Professional Development of school teachers

- Future PISA assessments will show whether progress is made in the right direction
  - 2006 Science and ICT
  - 2009 Reading and communication

Thank you !

Further information

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