

Workshop of ICT Indicators in Education

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ICT Indicators: a work in progress

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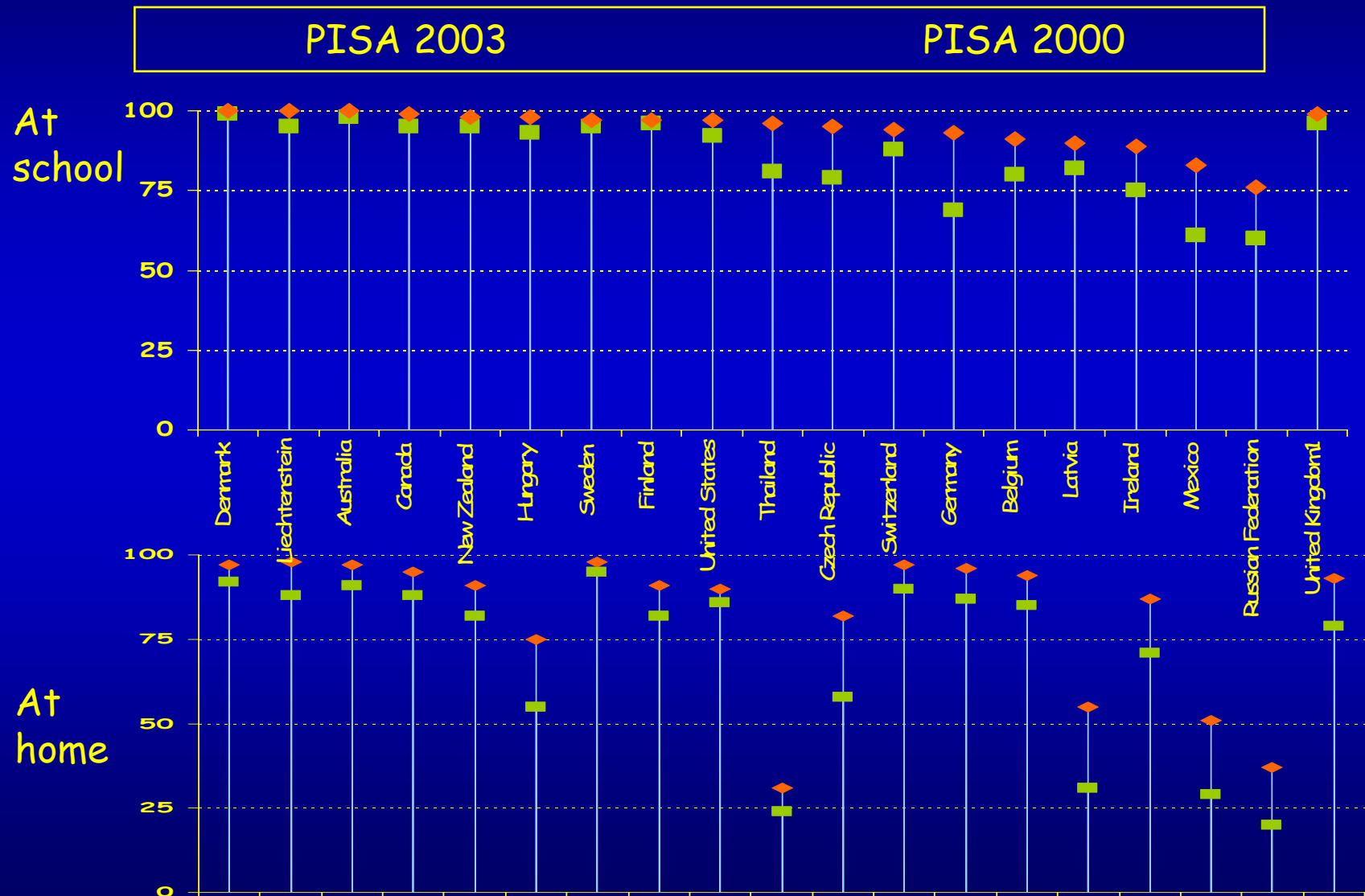
Outline

- What do we know?
- What do we need to know?
- How to proceed?

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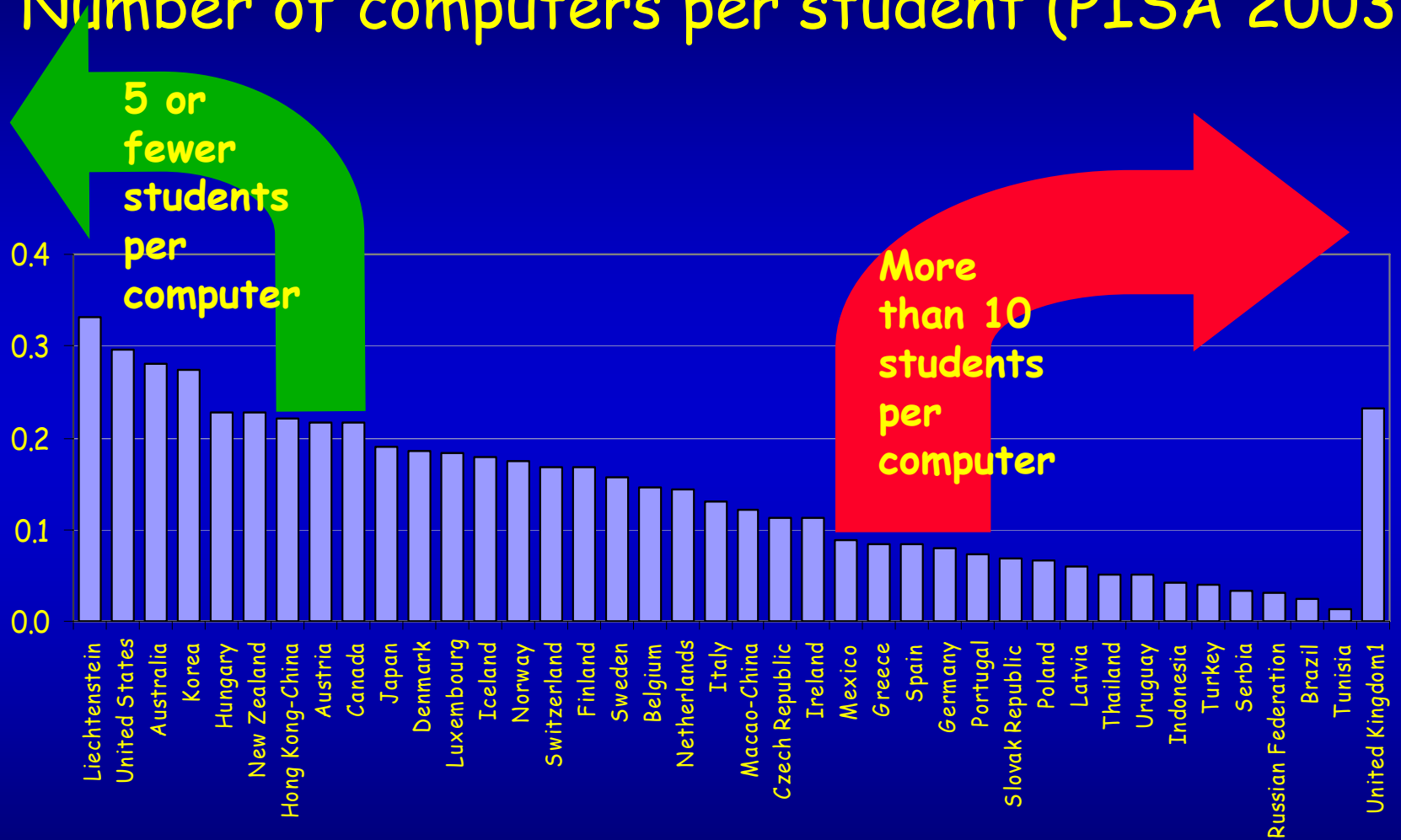
Access to computers at school has increased rapidly between PISA 2000 and PISA 2003...



1. Response rate too low to ensure comparability.

Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Figure 2.5, p.22.

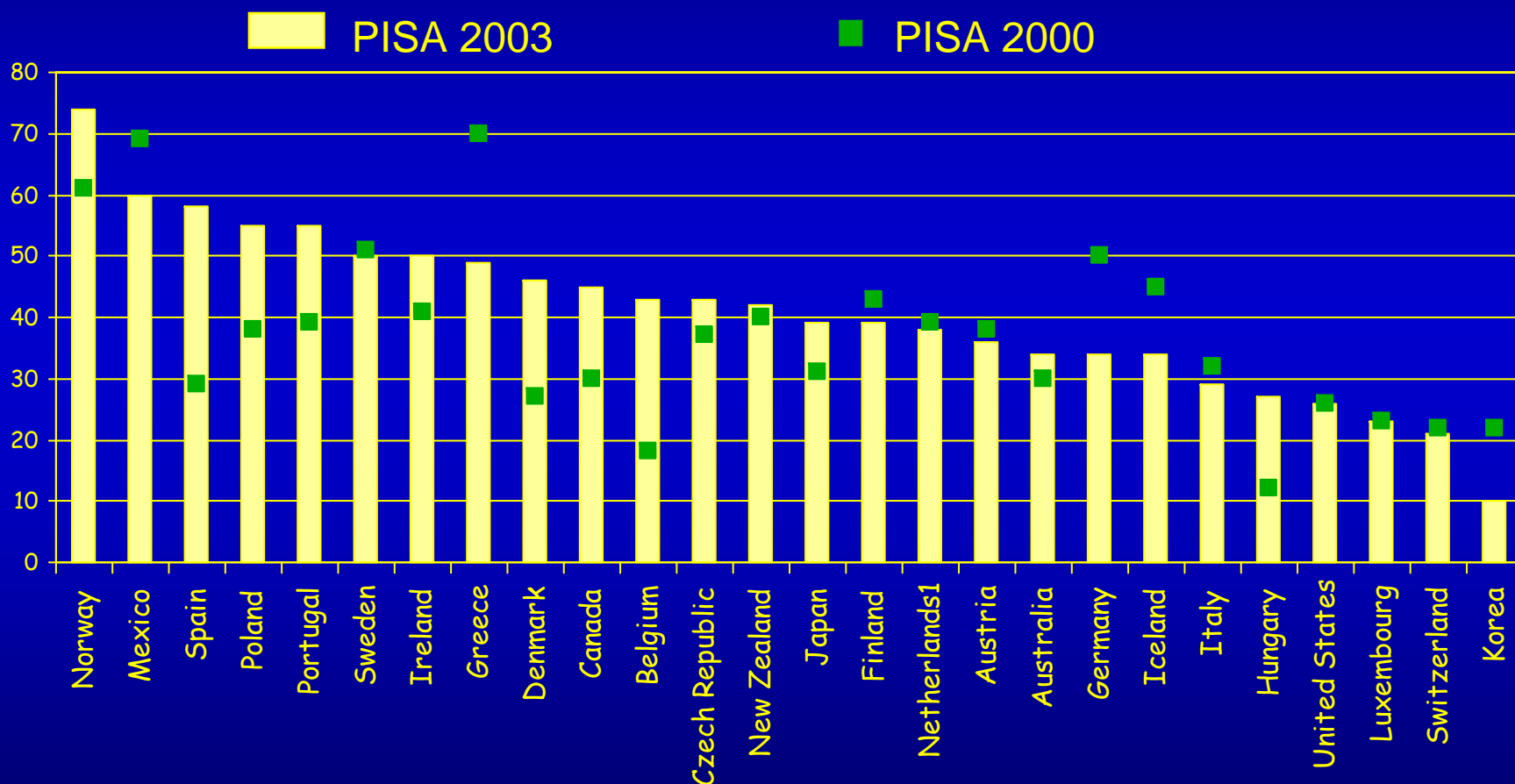
But in some countries students still have only limited opportunity to use computers at school.
Number of computers per student (PISA 2003)



1. Response rate too low to ensure comparability.

School principals' reports on shortage of computers for instruction

Percentage of students in schools whose principals report that instruction is hindered by a shortage of computers for instruction



1. Response rate too low to ensure comparability for PISA 2000.

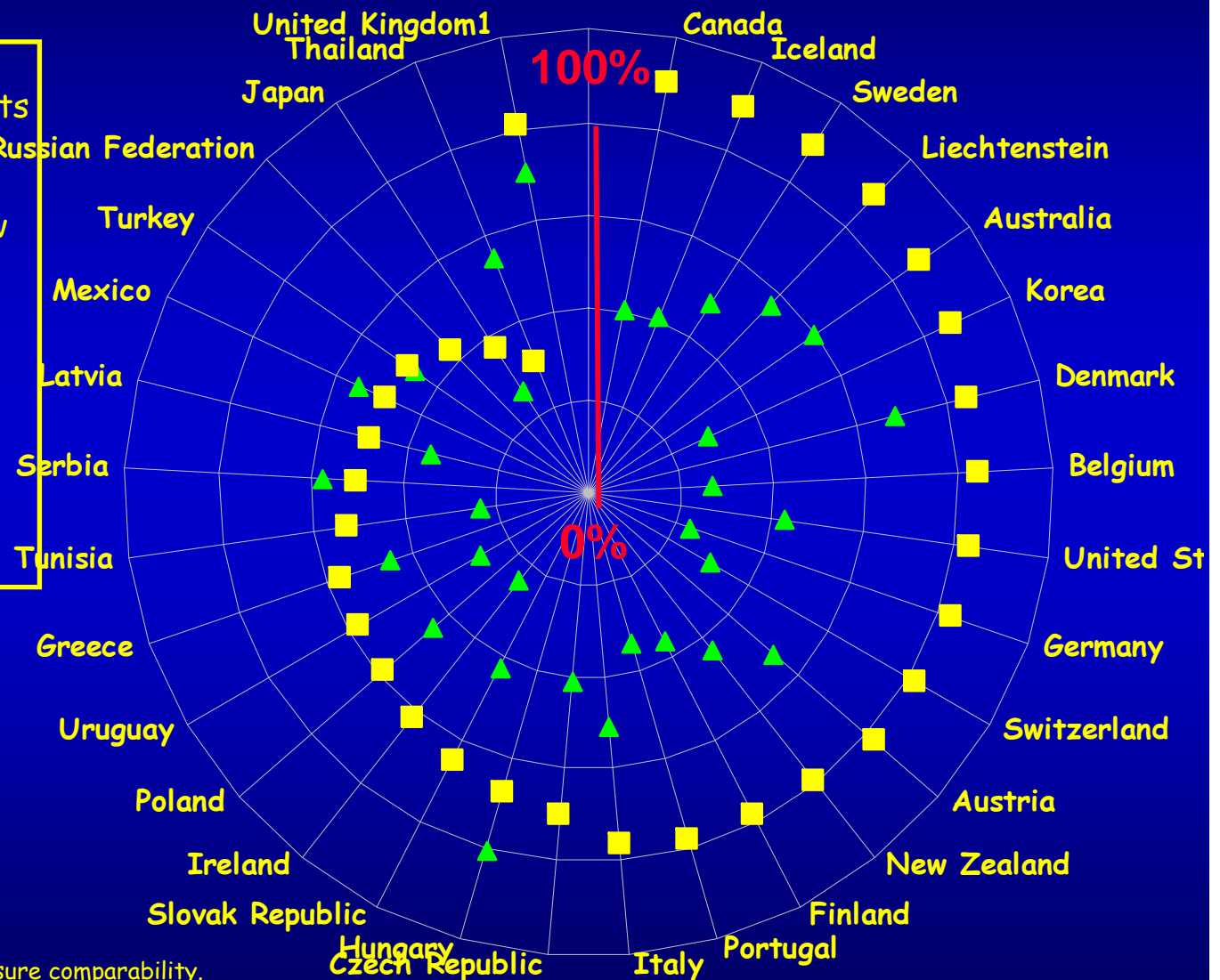
2. Response rate too low to ensure comparability for PISA 2003.

Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Figure 2.9, p.29.

Percentage of students using a computer at least a few times each week

Percentage of students reporting they use computers "Almost every day" or "A few times each week":

- At home
- ▲ At school



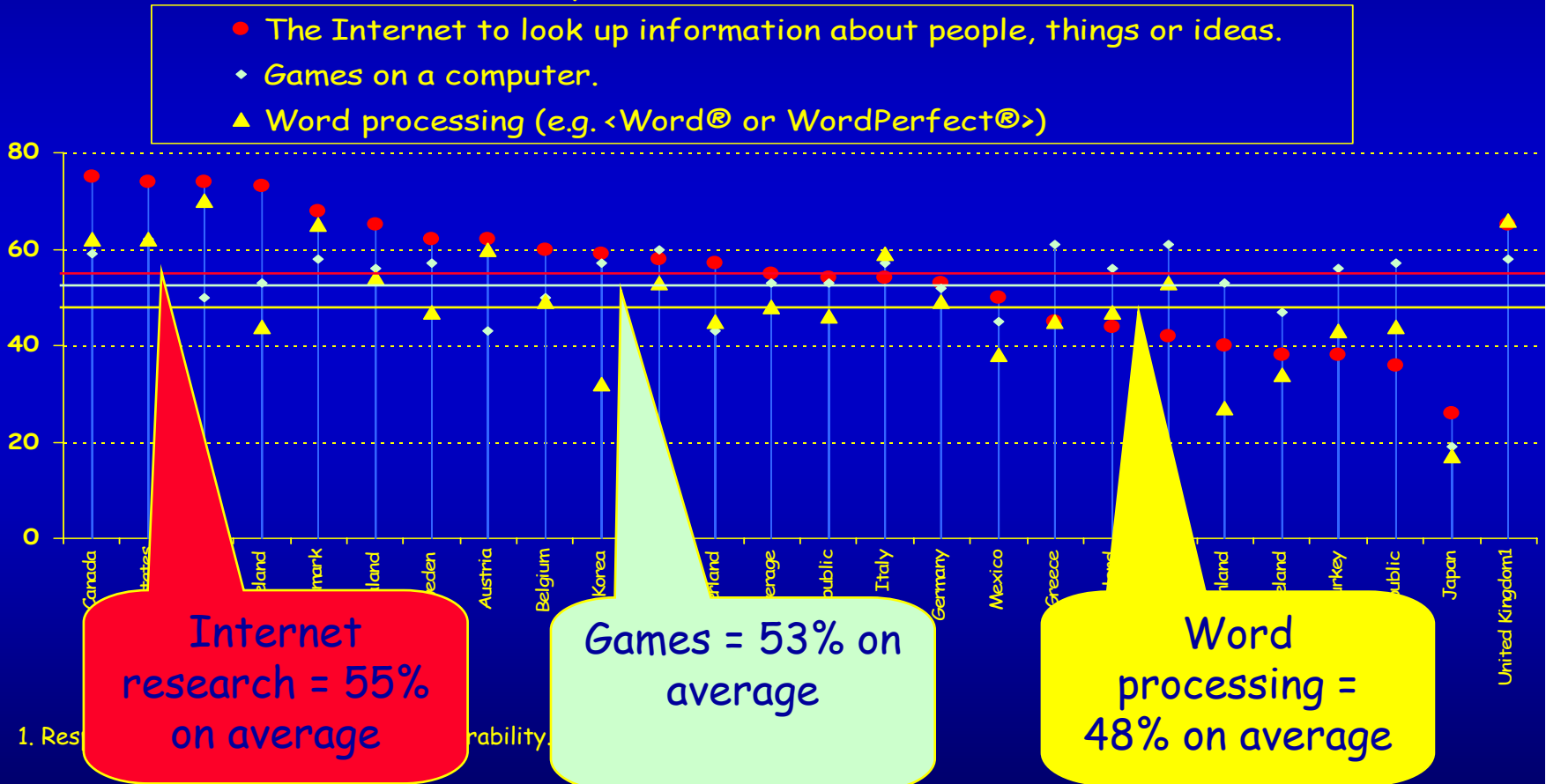
1. Response rate too low to ensure comparability.

What do students use computers to do?

- PISA asked students how often they used:
 - The Internet to look up information about people things or ideas
 - Games on a computer
 - Word processing (*e.g.* <Microsoft Word® or WordPerfect®>)
 - The Internet to collaborate with a group or team
 - Spreadsheets (*e.g.* <Lotus 1 2 3® or Microsoft Excel®>)
 - The Internet to download software (including games)
 - Drawing, painting or graphics programs on a computer
 - Educational software such as mathematics programs
 - The computer to help learn school material
 - The Internet to download music
 - The computer for programming
 - A computer for electronic communication (*e.g.* e-mail or "chat rooms")
- Students could choose from the following answers:
 - Almost every day, A few times each week, Between once a week and once a month, Less than once a month, Never

Access to computers at school is more universal than access to computers at home, but students report using computers much more frequently at home

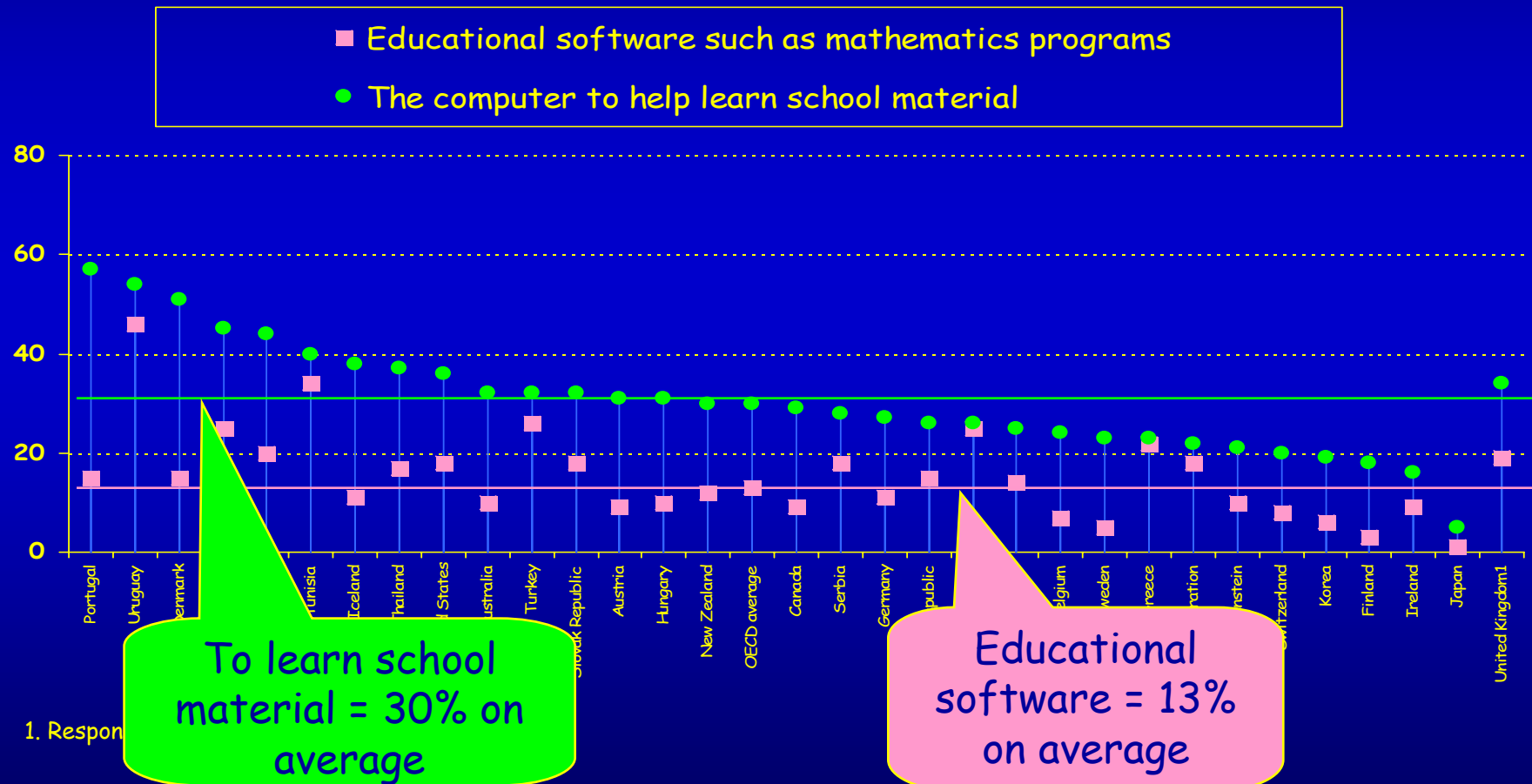
Percentage of students reporting they use the following "Almost every day" or "A few times each week":



Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Figures 3.3 and 3.4, pp.39 and 41.

A minority of students frequently use educational software on computers

Percentage of students reporting they use the following "Almost every day" or "A few times each week":



Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Figure 3.4, p.41.

In general, students are confident in performing routine and Internet tasks on computers.

Routine tasks on a computer - percentage of students who are confident (OECD average)

	I can do this...	
	By myself	With help
Open a file	90	7
Play computer games	90	7
Start a computer game	86	10
Save a computer document or file	88	8
Delete a computer document or file	88	8
Draw pictures using a mouse	85	10
Print a computer document or file	86	9
Scroll a document up and down a screen	87	8
Create/edit a document	80	13
Move files from one place to another on a computer	76	17
Copy a file from a floppy disk	75	16

Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Table 3.9, p.110.

Internet tasks on a computer - percentage of students who are confident (OECD average)

I can do this...

	<u>By myself</u>	<u>With help</u>
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Get onto the Internet	88	7
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Write and send e-mails	79	12
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Copy or download files from the Internet	70	19
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Download music from the Internet	66	21
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Attach a file to an e-mail message	58	24
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At least 90% of students report confidence in these tasks in Australia, Canada, Iceland, Korea, New Zealand, Sweden and the United States.

In general, 15-year-old boys report higher confidence than girls do in performing computing tasks and these differences are particularly apparent for the more demanding computing tasks...

High-level tasks on a computer -
percentage of students who are confident to perform these tasks by themselves or with help (OECD average)

	Boys	Girls
Use software to find and get rid of computer viruses	79	54
Create a multi-media presentation (with sound, pictures, video)	77	62
Create a computer program (e.g. in Logo, Pascal, Basic)	63	48
Construct a Web page	71	61
Create a presentation (e.g. using <Microsoft® PowerPoint® >	79	70
Use a spreadsheet to plot a graph	79	70
Use a database to produce a list of addresses	85	79

Source: OECD (2005) *Are students ready for a technology-rich world? What PISA studies tell us*, Table 3.14, p.115.

On average across OECD countries

The 37% of students having more than 5 years of computer experience scored at 532 points

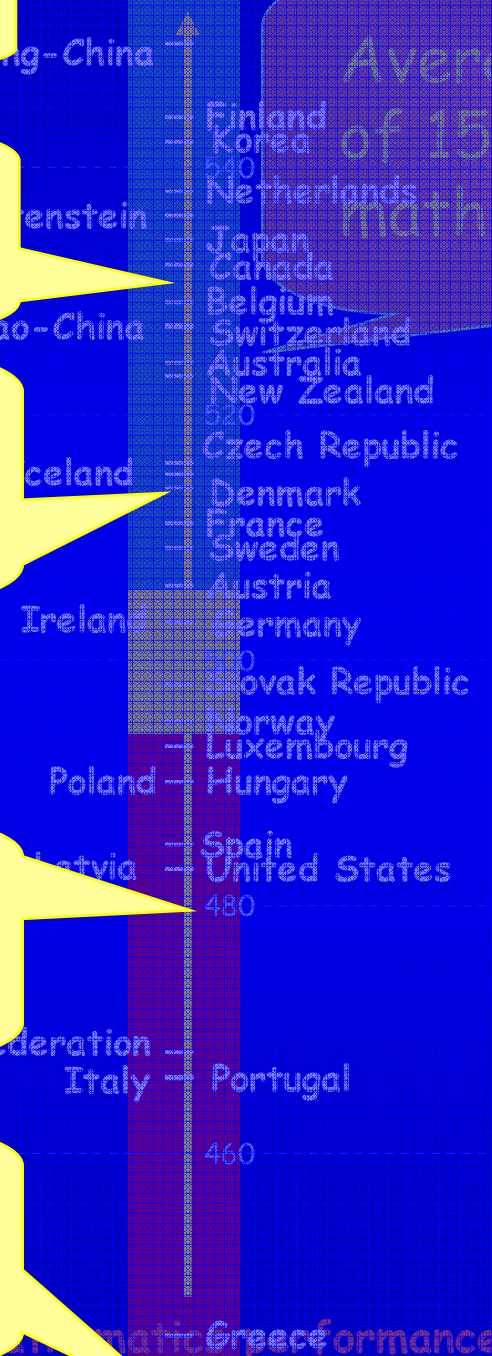
The 27% of students having between 3 and 5 years of computer experience scored at 514 points

The 26% of students having between 1 and 2 years of computer experience scored at 479 points

The 10% of students having less than 1 year of computer experience scored at 430 points

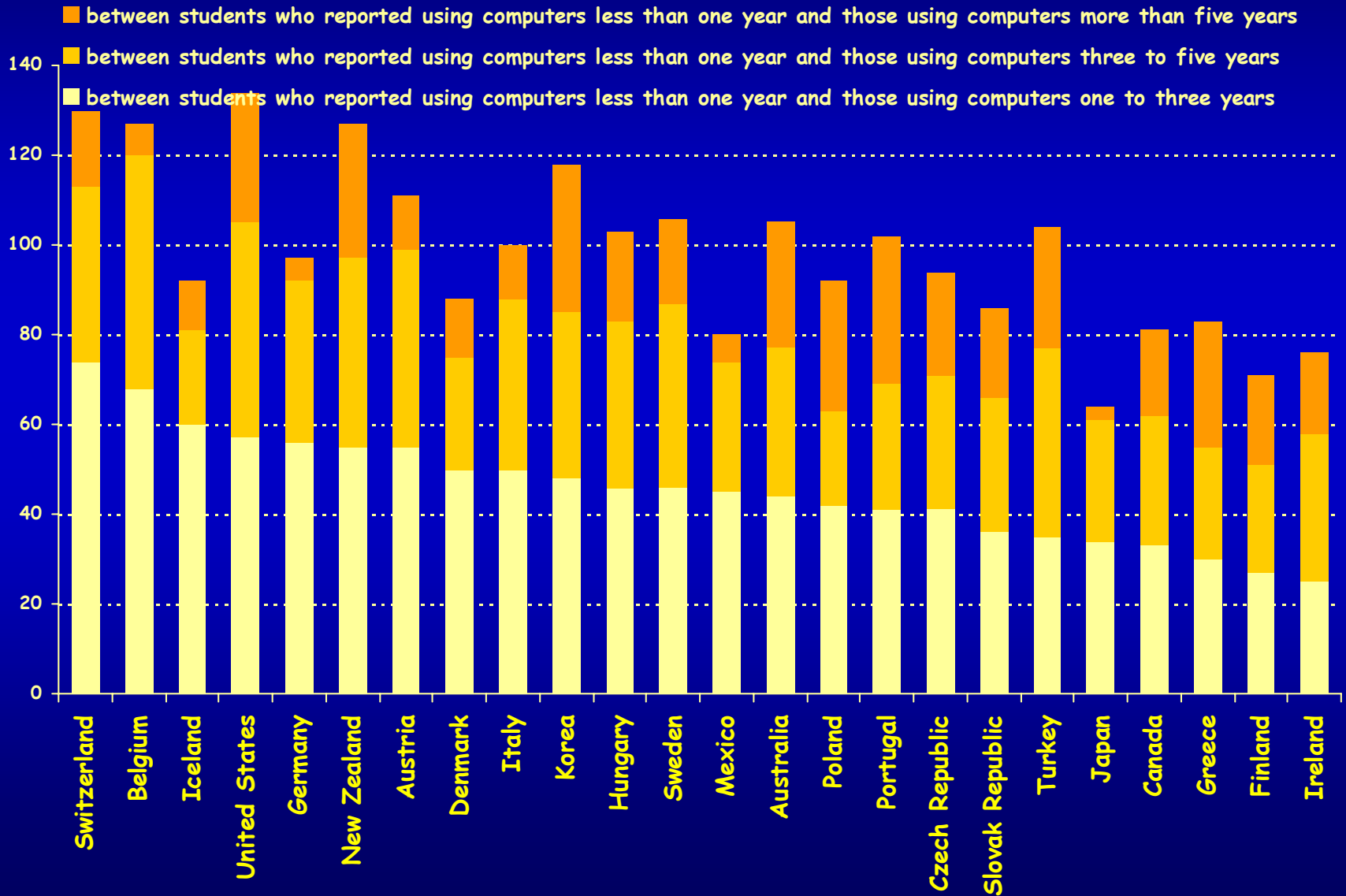
mathematics performance

Average performance of 15-year-olds in mathematics

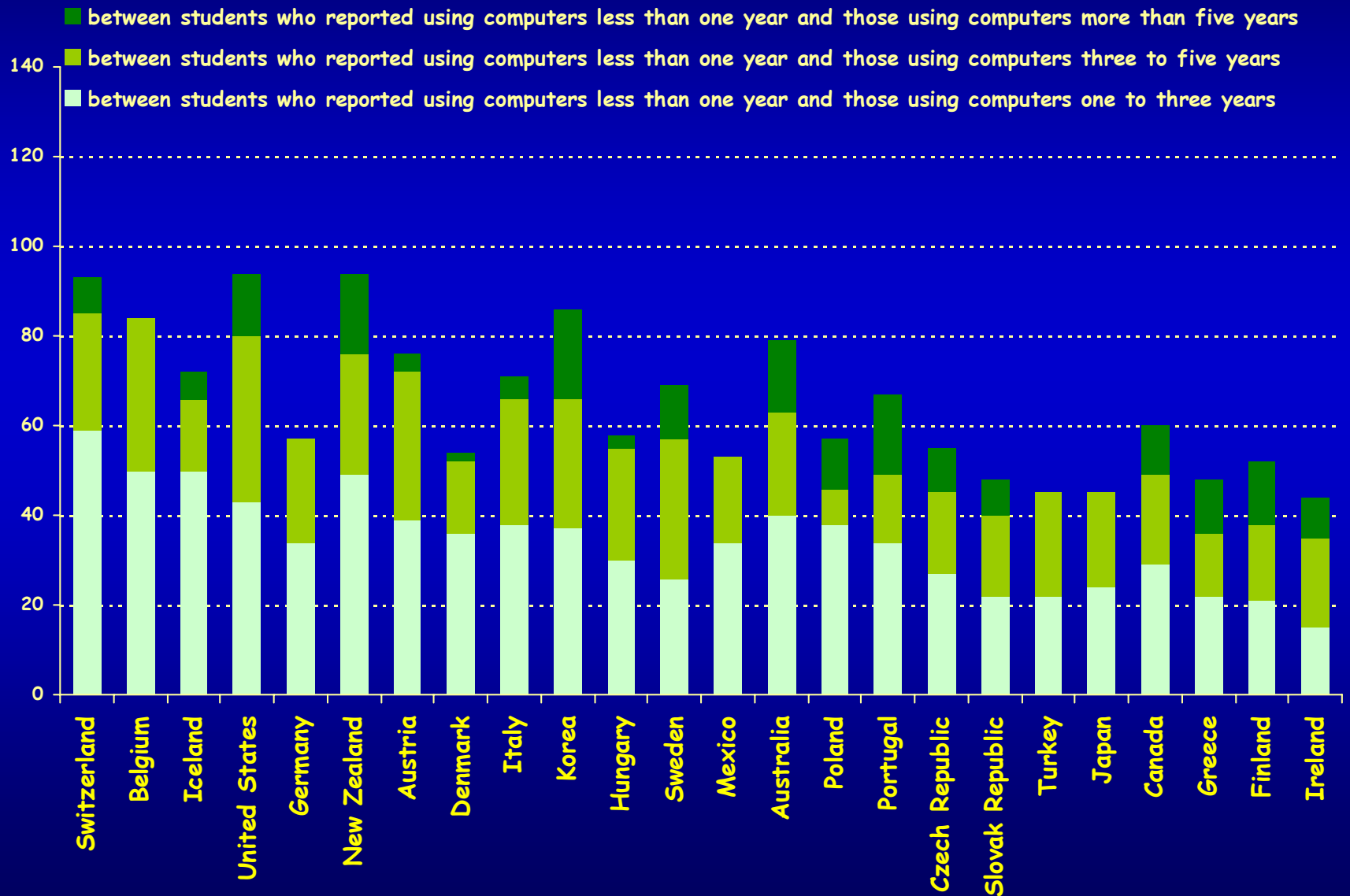


Does computing experience counts ?

... but the performance advantage varies across countries



... and diminishes somewhat when socio-economic background factors are taken into account



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What do we need to know?

- ❑ Much work has been done on the statistics of access and use of ICTs in schools, sometimes with an impressive array of details
- ❑ Most of these attempts have emphasised aspects such as quality of access, teacher preparation and time of actual use.
- ❑ Only a few, such as PISA (2005) have tried to connect these parameters with the desired effects on improving the quality of teaching and learning and educational performance.
- ❑ We therefore need to improve the available information in four specific areas

What do we need to know?

1. The ICT environment

- The environment can be defined as the technical conditions that enable the development and use of ICT. Some of the most relevant might be:
 - access: how easy is it to get access to ICT both in schools and at home.
 - ICT availability: how much ICT is available to users

2. The ICT user readiness

- This is the propensity of users to produce/use ICT . This propensity is linked to the level or ICT-related skills competence showed by teachers and pupils.

What do we need to know?

3. The use of ICT

- This refers to the actual use of ICT in teaching and learning activities, both by teachers and pupils, as well as the types of ICT used and for what purposes.

4. The effects of the use of ICT

- Any kind of measurable effect of the use of ICT either in the quality or in the output of the teaching and learning processes could be said to be the impact of using ICT.
- In addition, it could be reasonable to expect that an intensive use of ICT at large can result also in the learning of competences and skills not accounted for in traditional educational settings.

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How to proceed?

- The ongoing OECD/CERI project on Digital Learning Resources *(DLR) includes among its final outputs the delivery of a proposal for a system of indicators that will benchmark the development of DLR.
- This proposal will come as a result of a standing working group in this area.

* DLR are defined in the context of this project as “any digital resource that is actually used by teachers and learners for the purpose of teaching and learning”.

What do we need to know?

- Indicators would need to be developed in the four identified areas:
 - The ICT environment
 - The ICT User readiness
 - The ICT use
 - The effects of ICE use

How to proceed?

1. The ICT environment

- *access*: An indicator merging data such as ratios of pupils per computer connected to the Internet, percentage of networked homes and the like can provide a useful quick look but more detailed indicators can also be considered, such as for example separating the values for teachers, pupils and families;
- *DLR availability*: This could be restricted to DLR in the national language (most appropriate for early school years), but even so could only be measured nationally on the basis of proxies such as, for example, the number of DLR available in the top three devoted national websites or the total number of national websites devoted to DLR.

How to proceed?

2. The ICT user readiness

- Measuring readiness is a difficult task since no available data on this propensity exist (such as the precise answer to the question how ready teachers/pupils are to use/produce DLR). However, to start with it could be somewhat linked to the training or level or competence showed by different groups of users on the basis of already existing data, such as:
 - *teachers*: training hours on ICT related competences by teacher or surveys of ICT-related skills and attitudes;
 - *pupils*: surveys of ICT-related skills and attitudes (such as PISA data);
 - *families*: general population surveys of ICT-related skills and attitudes.

How to proceed?

3 & 4. ICT Use and effects

- There are no proxies available for the actual level of use of DLR at a national level, nor for assessing the effects.
- Therefore, a methodology has to be designed
 - to deal with the indicators in this area,
 - including, for example, different groups of users (teachers, pupils, parents) and places of use (school, home).

How to get there: two possible strategies

- Strategy 1: Questionnaires to a sample of main stakeholders, like government representatives, teacher associations, parent organisations, webmasters and the like.
- Strategy 2: Questionnaires to a sample of school teachers, pupils and, eventually, to parents.

Thank you

More information:

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