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## Research on PISA, with PISA, and for PISA

PISA Research Conference  
Kiel, September 14<sup>th</sup>, 2009



### Overview

- 1 **PISA – a research programme?**
- 2 Structure of research on PISA
- 3 Research *with* PISA: How to extend a PISA cycle?
- 4 Some expectations for the conference



## The purpose of PISA



“Quality education is the most valuable asset for present and future generations. Achieving it requires a strong commitment from everyone, including governments, teachers, parents and students themselves.

The OECD is contributing to this goal through PISA, which **monitors results** in education within an **agreed framework**, allowing for **valid international comparisons**.

By showing that some countries succeed in providing both high quality and equitable learning outcomes, **PISA sets ambitious goals for others.**”

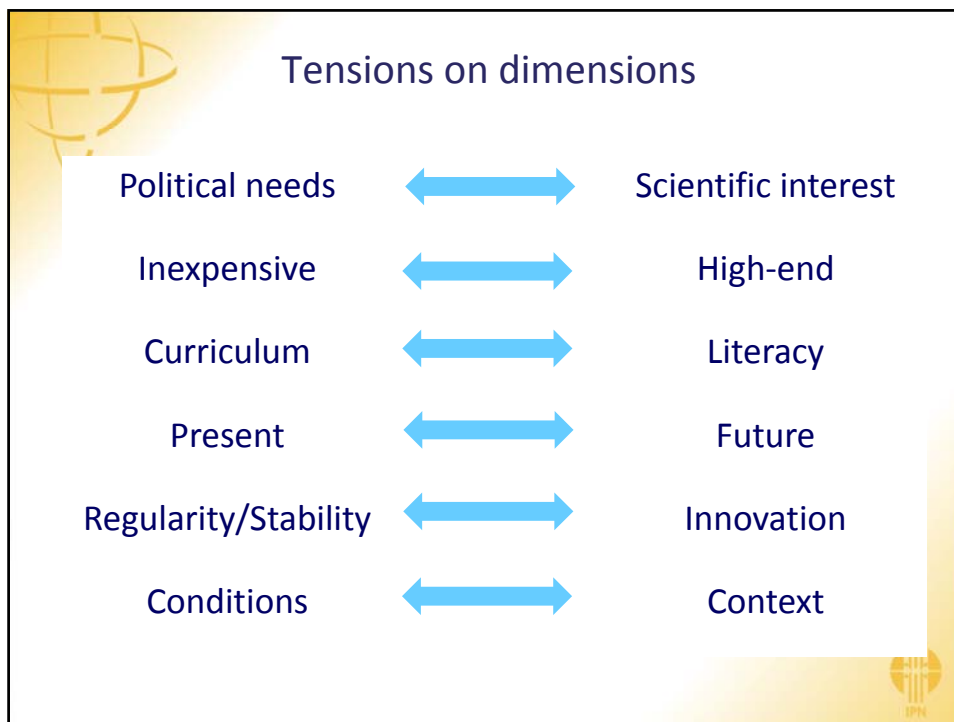
Angel Gurría, OECD Secretary-General

PISA Brochure (<http://www.oecd.org/dataoecd/51/27/37474503.pdf>)

## Key features of PISA



- Policy orientation, with **design and reporting methods determined by the need of governments** to draw policy lessons
- **Innovative “literacy” concept**, application of knowledge and skills to problems in a variety of situations
- **Relevance to lifelong learning**, including curricular and cross-curricular competencies as well as motivation, beliefs, learning strategies
- Regularity, enabling countries to **monitor their progress** in meeting key learning objectives
- Contextualisation within the system of OECD education indicators, which **examine the quality of learning outcomes, the policy levers and contextual factors**



### Functions of PISA and type of research

**Main functions:**

- Monitoring of educational systems, outcomes, and progress
- Establishing international benchmarks
- Providing data/evidence for policy and administration

**Type of research:**

- Survey (correlational study)
- Trend cross-sectional design
- Random samples
- Assessment component

(cf. Seidel & Prenzel, 2008)

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Limitations:  
No causal explanations!  
No prescriptive knowledge!



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Research can help to get over these limitations!






## PISA depends on research

- Framework for the assessment: What is relevant, what should be assessed (economically, reliably, validly), and how? What will be relevant in the future and in different situations (transfer)?
  - Which characteristics/ features / factors of an educational system are relevant in an international comparison? Could they have an impact on the outcomes? Are there interactions that have to be taken into account?
  - Which psychometric models are best suited for an international (literacy) assessment, for covering an optimal breadth of competencies?
  - Which models can be used for the analysis of change between assessment cycles?
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## Overview

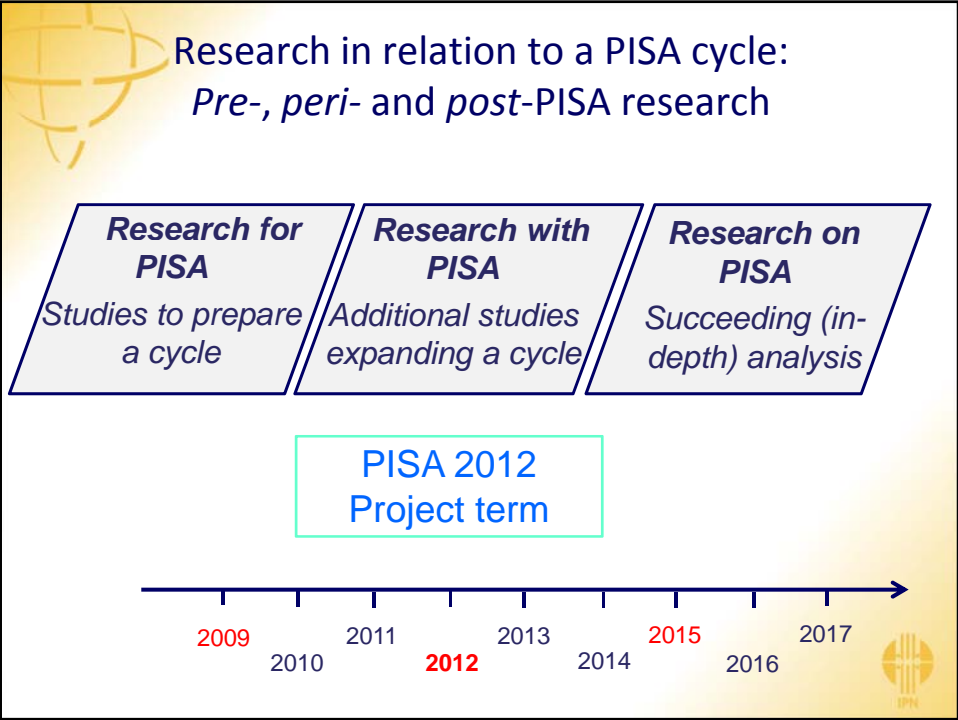
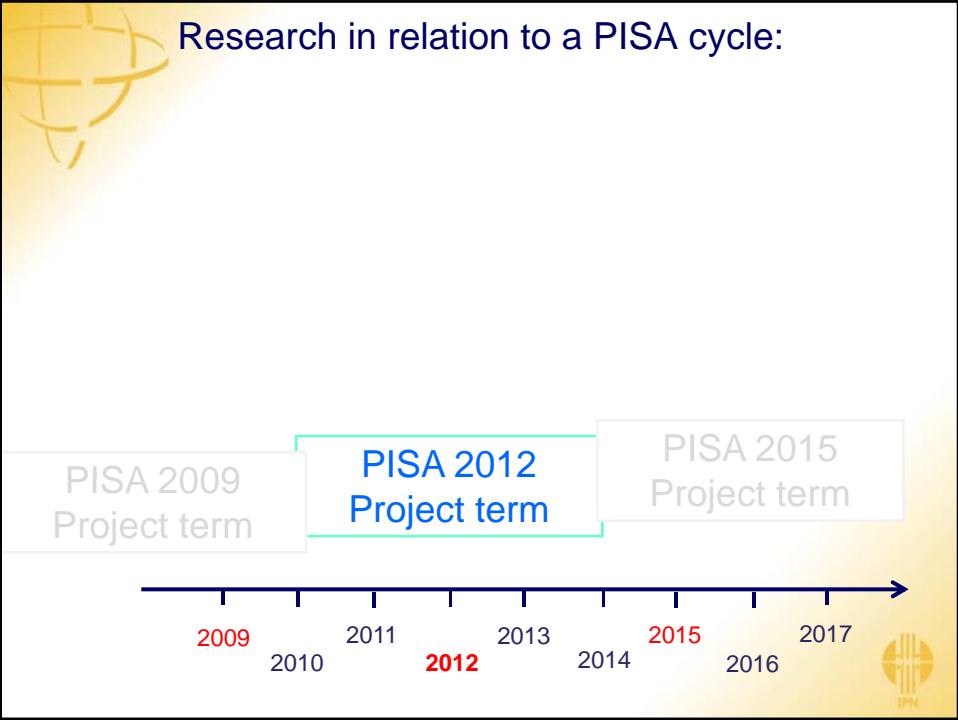
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## National reports - extending PISA from a research perspective

- Realizing international and national options
- Often in collaboration with universities and research institutes
- Oversampling (age-based, classroom, migrants, regions)
- Additional items/ additional questionnaires (parents, teachers, principals)
- Computer-based assessment
- Bilateral/multilateral extensions
- In-depth analysis of assessments/items
- Applying different/innovative methods for analysis
- Follow-up studies, longitudinal components...







## Some examples

### For PISA:

- Exploring a new domain (assessing social competencies)
- Exploring a new approach (computer-based, hands-on)

### With PISA:

- Oversampling (regions, target groups, classrooms)
- Additional instruments (teacher, national assessments)

### On PISA:


- Secondary analysis of certain groups of items
- Applying new methods of analysis to data
- Exploring new ways / constraints for trend analyses



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## Research **with** PISA: How to extend a PISA Cycle?

“PISA-I-plus” in Germany as an example

Base: the international PISA school sample (n=198)

- + Two complete classes per school, grade 9 (2003)
- + Additional (national) assessments (second day)
- + Parent questionnaire
- + Teacher questionnaire (Mathematics teachers)
- + Follow-up assessment (mathematics, science) in grade 10 (2004)



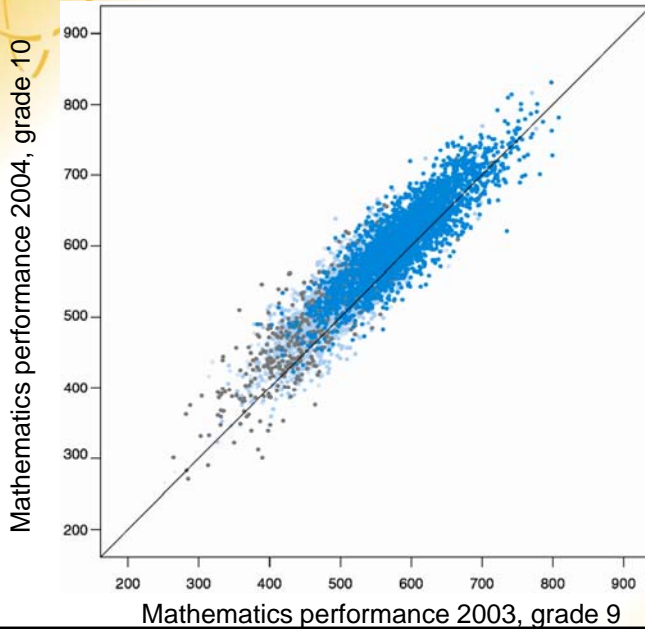
## Development of mathematical literacy over the course of one school year

The change was studied using two different kinds of assessment:

- (1) Literacy-oriented assessment (PISA-Items and PISA style items)
- (2) Curriculum-oriented assessment (items related to the national curriculum for grade 9 and 10)



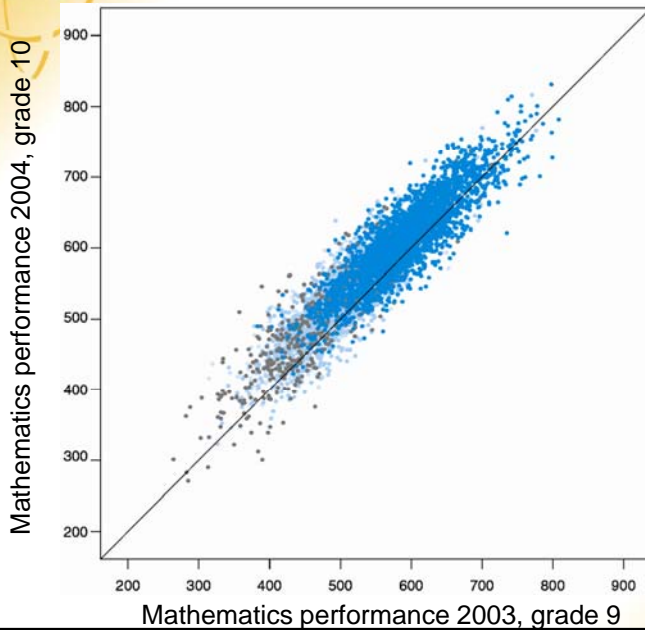
Mathematics performance at the end of grade 9 and grade 10 (individual level, latent growth)



For **58 %** of the students a relevant gain in mathematics performance in the course of one school year was found (for 34% of the students no change!)



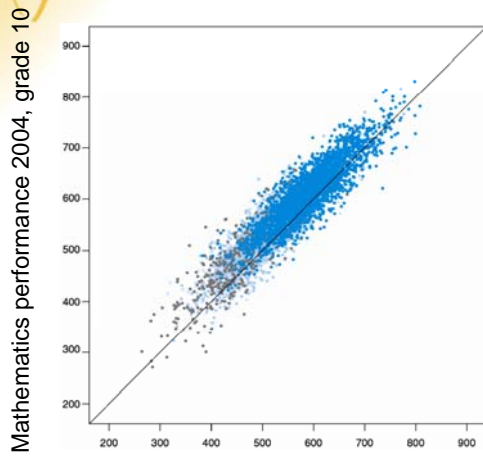
Mathematics performance at the end of grade 9 and grade 10 (individual level, latent growth)



The findings for the two types of assessment (Literacy vs. curriculum-oriented) are similar. The assessments correlate  $r=.90$ .



### Mathematics performance at the end of grade 9 and grade 10 (individual level, latent growth)



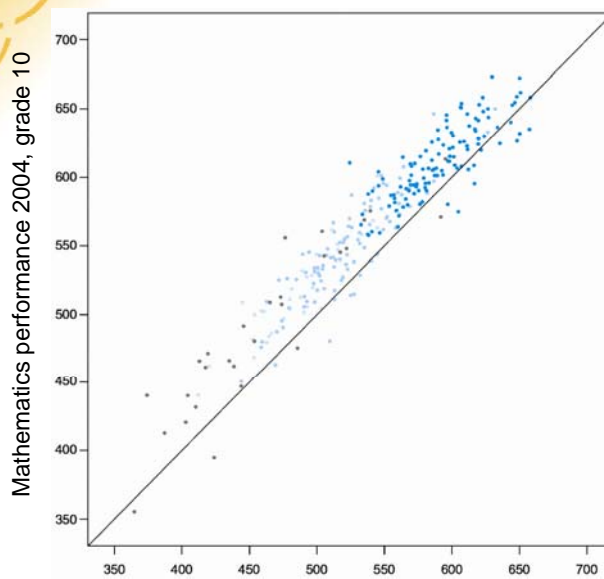
**No differences in growth depending on**

- Performance in grade 9
- School type
- Social background

Mathematics performance 2003, grade 9




### Mathematics performance at the end of grade 9 and grade 10 (classroom level, latent growth)



**Relevant gain in mathematics performance found in 89 % of the classes**

Mathematics performance 2003, grade 9








## Analysis of the PISA-I-plus data


Show that the following factors have effects on mathematics performance (grade 10, controlling performance at grade 9):

- Teaching approach (quality of tasks, classroom management)
- Teacher's expertise
- Teacher composition/collaboration on school level
- Students' leisure time activities
- Parental support




## Educational quality of schools

A priority programme of the German Research Council



- COACTIV (Baumert, Blum, Kunter, Neubrand et al.), : An in-depth assessment of mathematics teacher competencies linked to PISA-I-plus
- PALMA (Pekrun, Frenzel et al.): A longitudinal study, assessing mathematics competencies in terms of PISA framework from age 10 to 15
- How well do parents in PISA? (Ehmke), and how do they support their (in PISA assessed) children?
- IPN Video Study (Seidel, Prenzel et al.): Science Teaching and learning at grade 9, preparing national and international questionnaires for PISA 2006 on the basis of observations





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## Expectations for the conference

- An overview on PISA research: Issues, approaches, methods, findings (contributions for a report)
- Discussions on the relevance of PISA research from the perspectives of research, administration and policy
- Identifying challenges for PISA research, talking about research strategies
- Preparing the ground for projects, programmes and collaborations
- Strengthening international PISA research co-operations
- Messages for the PISA Secretary and Governing Board

