Overview of the studies I
PISA & TALIS

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Workshop on using PISA, PIAAC, TIMSS & PIRLS, TALIS datasets
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Note: These slides were prepared as part of the IEA training portfolio with the collaboration of IEA staff and resource persons.
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• Why international assessments?
• What are PISA and TALIS?
• The assessment design
• What do the studies provide?
• First steps ??
Why International Assessments?

- Benchmarking function
  - Provide comparable indicators on student performance and schooling practices across countries

- Analytic function
  - Suggest hypotheses about
    - Relationship between student or teacher performance and factors that may influence it
    - Areas where students or teachers have particular strengths or weaknesses
The Studies

• Two major organizations:
  • International Association for the Evaluation of Educational Achievement (IEA)
    • Conducts TIMSS & PIRLS
    • Data management
    • Major activity is comparative educational studies, research and training
  • Organization for Economic Cooperation and Development (OECD)
    • Conducts PISA, TALIS, PIAAC
    • Data collection in education and other fields
    • Collects indicators to inform governments
    • 30 member countries
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## Overview of the Studies

<table>
<thead>
<tr>
<th></th>
<th><strong>PISA</strong></th>
<th><strong>TALIS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects tested</td>
<td>Reading, Mathematics, and Science Literary</td>
<td>-</td>
</tr>
<tr>
<td>Grades/age tested</td>
<td>15-years old</td>
<td>Teachers ISCED level 1, 3 and 3</td>
</tr>
</tbody>
</table>
## Overview of the Studies

<table>
<thead>
<tr>
<th></th>
<th>PISA</th>
<th>TALIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle</td>
<td>3 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Last release</td>
<td>PISA 2012</td>
<td>TALIS 2013</td>
</tr>
<tr>
<td>Next release</td>
<td>PISA 2015</td>
<td>TALIS 2018</td>
</tr>
<tr>
<td>Test Booklets</td>
<td>13 interlinked booklets</td>
<td></td>
</tr>
<tr>
<td>(last cycle)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student testing time</td>
<td>120 minutes</td>
<td></td>
</tr>
<tr>
<td>Questionnaires</td>
<td>Principals, Students (Parents)</td>
<td>Principals Teachers</td>
</tr>
</tbody>
</table>
What is PISA?

- The main questions are:
  - Are students well prepared to meet the challenges of the future?
  - Are they able to analyze, reason, and communicate their ideas effectively?
  - Do they have the capacity to continue learning throughout life?
What is PISA?

• Measures how well 15-year-olds approaching the end of compulsory schooling are prepared to meet the challenges of today’s societies

• Does not focus on mastery of school curriculum, but on the ability to use knowledge and skills to meet “real-life challenges”
Purpose of PISA

- Provide directions for national policy
- Monitor student learning and raise aspirations

  Coupled with appropriate incentives, results can motivate students to learn better, teachers to teach better, and schools to be more effective

- Measure skills relevant to adult life
- Lead to a better understanding of causes and consequences of observed skill shortages
TALIS goal: Increase the international information available to OECD countries on teachers, teaching, and the impact that teachers can have on student learning.

Information on the teaching workforce and teaching conditions.

Increased emphasis on how these conditions affect the pedagogical aspects of teachers’ work, as well as schools’ and teachers’ effectiveness.
Innovations in TALIS 2013

• Some new questionnaire items and indicators
• Wider coverage: Elementary and upper secondary level options (ISCED 1 and 3)
• Linking to student outcomes: Optional school-level link to PISA 2012
Benefits for TALIS

- Provide a context for teacher and principal responses
- Allow policy issues to be analysed in the context of student performance and equity

Benefits for PISA

- Strengthen the school-level variable knowledge base in PISA
- Include new variables related to principals, teachers and conditions of teaching

Why a link to PISA 2012?
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How is PISA administered?

- Administered every 3 years
- Typically 3 major domains: Mathematics, Science and Reading
  - 2003 and 2012 tests included Problem Solving
- Every 9 years, there is a major emphasis on a domain
- One domain is assessed in depth during each administration, while the other two domains are expressed minorly
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Data Files

• There are two basic types of data files in these databases
  • Background Files
    • Student (PISA) - include test scores
    • Teacher (TALIS)
    • School (PISA, TALIS)
    • Home (PISA -optional)
  • Achievement Files
    • These include item responses (PISA)
Student Background Files (PISA)

• Student responses to a background questionnaire
  • Attitude towards the subject is measured
  • Personal/academic backgrounds
  • School experiences
  • Career/educational goals
  • Beliefs, values and attitudes
Teacher Background Files (TALIS)

• Teachers responses to the teacher background questionnaire(s)
  • Background and education
  • Instructional practices
  • Pedagogical beliefs
  • Beliefs about the subject tested
School Background Files (PISA, TALIS)

- School principals or administrators responses to the school background questionnaire
  - Curricula
  - School climate
  - Staffing levels
  - Availability of resources and services
Home Background (PISA)

• Optional

• Contains the responses of the parents/guardian of the tested students which are included in parent/home background questionnaire
Achievement Test Files

- Also called cognitive items files
- Contain the responses of students to the items administered
- Students are administered only a fraction of the items in test pool
- All students are administered multiple choice and constructed-response items
Data Almanacs/Compendia

• Files that display weighted summary statistics, by grade, for each participating country on each variable which are included in background questionnaires and test booklet
• One for each background instrument and by domain
• Extremely useful to elaborate a hypothesis
Data Almanacs/Compendia

• Categorical variables:
  • Sample size
  • Percent of responses by category
  • Mean achievement

• Continuous variables
  • Sample size
  • Percent missing responses
  • Points in the distribution (mean, mode, minimum, maximum, and selected percentiles)
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Where do I begin?

• Read the Technical Report and User Guide... Most technical questions you may have are already answered there
• Review the survey instruments and national adaptations document
• Formulate research question
• You will have to make decisions that depend on:
  • Your interests
  • Prior research
  • Your computer resources
  • Other resources available
  • Available data
Where do I begin?

• You are very lucky! There are several software packages out there that you can use to analyze the data
  • IDB Analyzer
  • WesVar
  • International Data Explorer
  • IEA Data Visualizer
  • Mplus, Stata, R and other software (using special routines)
Where do I get the Data?

- **PISA data:**

- **TALIS data:**
A Word of Caution...

- Some key points to keep in mind about PISA and TALIS
  - They are surveys
  - We know what students know and can do now, and the context in which this occurs
  - We mostly have current background information, while learning or effect might have occurred a while back
  - Cross-sectional, with repeated and independent measures over time
  - Can make statements about correlations, not causation
  - Surveys have an invaluable descriptive power
Interpreting Background Variables

- PISA and TALIS are not experiments
  - They do not control students into ‘treatment’ groups
  - They can not establish causality, or direct effect
  - Events have already happened and all we do is record what has happened
Interpreting Background Variables

• Important to know how to word statements about contextual variables correctly
• For example:
  • About how many books are there in your home?
    • Few (0-10)
    • Enough to fill one shelf (11-25)
    • Enough to fill one bookcase (26-100)
    • Enough to fill several bookcases (more than 100)
Interpreting Background Variables

• We could ask...
  • Is there a (statistical) relationship between the number of books in the home and reading achievement?
  • Are students who report having more books in the home more likely to do better in reading than those who report fewer books in the home?

• We should not ask...
  • Does having more books in the home have an effect (increase/decrease) on reading achievement?
Interpreting Background Variables

• We could answer...
  • Students who report having more books in the home tend to do better in reading than those who report fewer books in the home
  • Students who do well in reading are more likely to report coming from homes where there are many books

• We should not answer...
  • Students do better at reading because there are more books in the home
  • High reading achievement tends to have an effect on the number of books found in the home
Statistically Significant...?

• Any difference can be “statistically significant” if the sample is large enough
• But a “statistically significant” difference is not necessarily “substantively significant”
In Summary

• PISA assessed 15 year old students in mathematics, science, and reading. In addition students, school principals and parents/guardian answered a background questionnaire

• TALIS collected information form teachers and school principals about the teaching workforce and the teaching conditions
In Summary – *a word of caution*

• These studies have complex sampling and test designs
• If you do not take into account the sample and test design in your analysis you simply end up with the wrong answer
• Be careful with inferences of causality when using these data
Any questions?

Thank you for your attention!