

International surveys: PISA, TIMSS, PIRLS

When working with international partners, Cambridge International Examinations (Cambridge) often hears about different countries' performance in, or curriculum alignment with, certain international surveys.

In the last 20 years, international surveys assessing learning in reading, mathematics and science have been headline news because they put countries in rank order according to performance. The three most well known surveys are TIMSS, PISA and PIRLS.

- The first to be run was **TIMSS** (Trends in International Mathematics and Science Study) in 1995, although it was a successor of international studies going back to the 1960s. TIMSS is now repeated every 4 years and tests learners of 10 and 14 years old. It is managed by the International Association for the Evaluation of Educational Achievement (IEA).
- Next came **PISA** (Programme for International Student Assessment) in 2000, with a survey that is repeated every three years. This survey assesses learners who are a little older – aged 15 – and are nearing the end of compulsory secondary education. It assesses performance in reading, mathematics, science and problem solving. Special focus is placed on one of these areas in each year of assessment. PISA is a project of the Organisation for Economic Cooperation and Development (OECD). Each participating country has an agent that runs the survey – in the UK, it is the National Foundation for Educational Research (NFER) – which invites a sample of schools to take part.
- Thirdly, in 2001 the IEA offered another international survey, which was called **PIRLS** (Progress in International Reading Literacy Study). This is repeated every 5 years and it focuses on 10 year old learners' abilities in reading, and on national policies concerning literacy.

What is the theory behind international surveys?

- The survey organisers say that they offer information about international performances for the use of others in order to drive up **education standards everywhere**.
- They also emphasise that their aim is to **facilitate dissemination of ideas** on which features of education systems lead to the best performances.

What are the benefits of international surveys?

- **Governments** need to know what is going on in the systems for which they are responsible. Leaders have to decide where to allocate resources according to greatest need. International surveys could help them to make better decisions based on clearer data. The announcement of performances has had a significant impact on national discussions about education systems and policies.
- **Schools and teachers** can reflect on a survey's global analysis and consider recommendations for good practice. The surveys obtain supplementary information through questionnaires and correlate this with the test results. For example, PISA 2012 states that lack of punctuality and truancy are negatively associated with test performance, and makes recommendations regarding learner engagement.
- **National research and professional development** programmes often use the data from the international surveys as a starting point.



Comparison Table: PISA – TIMSS – PIRLS

	PISA	TIMSS	PIRLS
Full name	Program for International Student Assessment	Trends in International Mathematics & Science Study	Progress in International Reading Literacy Study
Assesses	Reading, mathematics, science, problem solving	Mathematics and science	Reading
Age	15	10 and 14	10
Grade	Grade 9 (UK Year 10)	Grade 4 and Grade 8 (UK Years 5 and 9)	Grade 4 (UK Year 5)
Frequency	Every 3 years, since 2000	Every 4 years, since 1995	Every 5 years, since 2001
Last assessment	2012	2011	2011
Next assessment	2015	2015	2016
When	Autumn	March–June	March–June
Purpose	Evaluates education systems by assessing to what extent students at the end of compulsory education can apply their knowledge to real-life situations and be equipped for society	Measures trends in maths and science achievement - Describes educational context, including home support, students' attitudes, curriculum, teachers' training, classroom activities	- Measures trends in reading comprehension - Investigates the experiences young children have at home and school in learning to read
Focus	skills-based	curriculum-based	curriculum-based
Supplementary information	Background information obtained from learners in a questionnaire. Focuses on characteristics of learners, attitudes to subjects, motivation and learning strategies	Background information obtained from learners in a questionnaire. Information also collected about teachers, activities of schools and teachers' classroom behaviour	Background information obtained from learners in a questionnaire. Information also collected about teachers, activities of schools and teachers' classroom behaviour
Organisation	Organisation for Economic Cooperation and Development (OECD)	International Association for the Evaluation of Educational Achievement (IEA)	International Association for the Evaluation of Educational Achievement (IEA)
Countries	65 countries and economies in 2012	66 countries and 14 sub-national entities in 2011	55 countries and 7 sub-national entities in 2011

Continued

	PISA	TIMSS	PIRLS
Test Length	120 minutes, plus 15 minute background questionnaire	72 minutes at Grade 4 90 minutes at grade 8 plus 15 minute background questionnaire	80 minutes, plus 15 minute background questionnaire
No. Learners Assessed	More than 5,000 learners in each country/jurisdiction	At least 4,000 learners in each country/jurisdiction	About 3,500–4,000 learners in each country/jurisdiction
Development Process	Developed by international experts and PISA Consortium test developers. Test items reviewed by country representatives for cultural bias and relevance to PISA's goals	TIMSS Science & Math Item Review Committee and National Research Coordinators from participating countries develop frameworks through iterative process	PIRLS Reading Development Group and National Research Coordinators from participating countries update frameworks for each PIRLS administration and reviews test items for cultural bias
Variants	- A new PISA-based test for schools is being developed for 2014. It will provide results for schools but not aggregated at national level - OECD ran a new survey of adult skills (age 16-65); results released in 2013	TIMSS Advanced in maths and physics for age 18 – Grade 12 (UK Year 13) or 1st year of university	- Depending on country's educational development, can be taken later than age 10 - Pre-PIRLS version: less difficult

Websites:

<http://www.oecd.org/pisa/home/>

<http://timss.bc.edu/index.html>

What are the issues, challenges and criticisms of international surveys?

- **The rank orders of these surveys create a lot of public interest.** Those countries whose pupils come near the top – for example Finland and Singapore – are inundated by requests to study their systems. Countries that do not do so well find questions being asked by the press, and their politicians are required to give explanations and outline strategies to address the 'national shortcomings'. For example, in Germany the 2001 PISA results, which were lower than expected, caused 'PISA-shock'. Another example is the USA, where concerns about PISA performance led to development of national Common Core Standards.
- **International surveys can lead to simplistic conclusions** about education systems, which are unhelpful and do not do justice to the more detailed information provided by the surveys.
- **There are differences between PISA, TIMSS and PIRLS.** The latter two are curriculum-based and require certain content to have been covered by the nominated years. Therefore, a country's weaker performance in TIMSS may be a result of certain topics not having been covered. PISA, on the other hand, focuses less on curriculum content and more on skills required in the modern world.
- **There are technical challenges** in comparing the performances of learners from a wide range of cultural and language backgrounds. The tests must be translated into the first languages of the learners. Care is taken to exclude questions that for cultural reasons may prove difficult for some learners. However, there are still issues regarding whether questions are as difficult in one language as in another language.
- **It may be difficult to identify causes** of weaknesses or strengths. Does A cause B, or is it the other way around? Cause and correlation can often be confused and there are many causes of educational attainment beyond schools. For example, one reason for Finland's success is a culture that encourages reading from a young age in families.
- **Some say PISA cannot take account of social, cultural and economic differences.** Strategies used to bring improvement in one country may not necessarily do the same in other countries. Useful information gleaned from surveys therefore needs to be applied to the local context so that professionals are empowered to create improvements that are well-rooted in their educational culture. Some say such surveys create a global standard of education that threatens local traditions (Meyer, 2012).

- The rankings for individual countries will only be accurate within a certain range of probability, which may mean that a high ranking could have been an average ranking. For example, the UK's maths ranking for 2012 can be seen to be 26th but PISA acknowledge it could be anywhere between 23rd and 31st. Margins of error for the rank orders are published but often ignored.
- A particular country's ranking masks regional variations, which, even if reported by PISA, may not always reach the attention of the public. For example, in the 2012 results, Massachusetts has a high score for maths whereas Florida has a lower score.
- The statistical model of surveys such as PISA has been criticised (and refuted by OECD) – for example: Is PISA fundamentally flawed? (TES, 23 July 2013).
- The wider development of children might be compromised by excessive hours in the classroom, private tutors and increased stress in an attempt to increase rankings.

Practical tips

How can schools make the best use of data from International Surveys?

- The surveys identify strategies that enhance the education of learners. However, schools should not feel they must simply accept these conclusions; they should see the surveys as **opportunities to reflect on their practice** and ask whether the survey conclusions accord with their own professional conclusions about what changes could benefit their learners.
- The use of the surveys' data in a **research-based approach to teaching** could be a beneficial part of a teacher's professional development.



How are international surveys relevant to Cambridge?

- Cambridge partners may refer to surveys, for example, the 2012 PISA results show that Singapore is above average and that the UK is average in maths and reading and above average in science.
- National governments may request Cambridge collaboration in curriculum reform based on national performance in international surveys such as TIMSS.
- In relation to curriculum development, Cambridge Assessment cautions:
"Analysis of high performing systems, when treated with sophistication and sensitivity, can be used for determining which content should be placed where in a revised National Curriculum." However, "policy needs to be formulated in respect of **other 'control factors'** such as teacher expertise, teaching quality, learning materials and inspection." (Tim Oates, Group Director of Assessment Research and Development, 2010)
- International surveys are driving ambition for improvement and greater interest in learning from other countries' experiences. These are good things as long as we **keep league tables in perspective**.
- Cambridge provides educational solutions that meet the specific needs of our national partners and are informed by international standards, debate and practice. It is therefore important that Cambridge **understands the conclusions** that are being drawn by partners from international surveys.

How is Cambridge supporting partners with International Surveys?

Cambridge has conducted a curriculum mapping of TIMSS (Grades 4 and 8) with the Cambridge Primary and Secondary 1 maths and science curriculum (Stages 5 and 9). This was to enable us to determine to what extent our curriculum reflects the TIMSS curriculum. This will be helpful for partners who participate in TIMSS and who are considering incorporating aspects of the Cambridge curriculum as part of their curriculum reform.



Where can you find more information?

- PIRLS 2011: timssandpirls.bc.edu/pirls2011/international-results-pirls.html
- PISA 2012: www.oecd.org/pisa/keyfindings/pisa-2012-results.htm
- TIMSS 2011 (maths): timss.bc.edu/timss2011/international-results-mathematics.html
- TIMSS 2011 (science): timss.bc.edu/timss2011/international-results-science.html
- Baird, J.A. et al (2011) *Policy Effects of PISA*. Oxford University Centre for Educational Assessment
- Hutchinson, D. & Schagen, I. (2006) *Comparisons Between PISA and TIMSS*. NFER
- Is PISA Fundamentally Flawed? (TES, 23/07/2013) www.tes.co.uk/article.aspx?storycode=6344672
Response from OECD: www.tes.co.uk/article.aspx?storycode=6345213
- *Methods and Procedures in TIMSS and PIRLS* (2011). OECD timss.bc.edu/methods/index.html
- Meyer, H.D. and Benavot, A. eds. (2012) *Pisa, Power and Policy: The Emergence of Global Educational Governance*. Oxford Studies in Comparative Education
- Oates, T. (2010) *Could Do Better: Using International Comparisons to Refine the National Curriculum in England*. UK: Cambridge Assessment.
- Videos about the effects of PISA in different countries: www.pearsonfoundation.org/oecd/
- Welsh Government (2012) *A Guide to using PISA as a Learning Context* gov.wales/docs/dcells/publications/120629pisabookleten.pdf

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