

## ICME-14: Analyzing mathematics education with large-scale assessment data

### Workshop

Instructor: Dr Christian Bokhove

### Agenda

July 12th, 2021

(8:30 – 12:00)

8:30 - 9:15	<p>1. An overview of the role of TIMSS and PISA (plus some other studies) in policymaking, including strengths, critiques and limitations.</p> <p>Link to recording</p>
9:15 - 9:45	<p>2. In-sight in the so-called ‘complex sampling design’ of these studies and what this means for data analyses.</p> <p>Link to recording</p>
9:45 – 10:00	Q&A first part
10:00 - 10:15	Break
10:15 - 11:45	<p>Hands-on demonstration (during which you can ‘click along’) of analysing TIMSS and PISA in the statistical packages R and Rstudio (<a href="http://www.rstudio.com">www.rstudio.com</a>). This will include some basic R knowledge, relatively simple statistical analyses including descriptive statistics, and some pointers to more advanced statistical techniques.</p> <p>3. R basics - Link to recording</p> <p>4. simple statistical analyses with dedicated R packages - Link to recording</p> <p>5. first steps some regression and mixed models... - Link to recording</p>
11:45 – 12:00	Q&A second part

### Recommended Pre-Course Reading:

Venables, W. N., Smith, D. M., & R Core Team (2014). An Introduction to R (pages 4-17).

Rutkowski, L., Gonzalez, E., Joncas, M., & von Davier, M. (2010). International large-scale assessment data: Issues in secondary analysis and reporting. *Educational Researcher*, 39(2), 142-151.

### Some additional reading

#	Source	Description
1	Stewart, W. (2016). Long read: Does Pisa really tell us anything useful about schools? <a href="https://www.tes.com/news/school-news/breaking-news/long-read-does-pisa-really-tell-us-anything-useful-about-schools">https://www.tes.com/news/school-news/breaking-news/long-read-does-pisa-really-tell-us-anything-useful-about-schools</a>	This is a general TES article from when PISA 2015 was released. It tries to formulate an answer to whether with studying it we can identify “what makes a difference to pupils’ achievements or is it simply confusing correlation with causation on a grand scale?”
2	OECD (2016), PISA 2015 Results (Volume II): Policies and Practices for Successful Schools, OECD Publishing, Paris. <a href="http://dx.doi.org/10.1787/9789264267510-en">http://dx.doi.org/10.1787/9789264267510-en</a>	It is useful to see what reports of international comparisons look like. There are multiple volumes; perhaps volume 2 received the most attention because of its focus on disciplinary climate and types of instruction.
3	Hopfenbeck, T., Lenket, J., El Masri, Y., Cantrell, K., Ryan, J., & Baird, J-A. (2017). Lessons Learned from PISA: A Systematic Review of Peer-Reviewed Articles on the Programme for International Student Assessment. <i>Scandinavian Journal of Educational Research</i> . <a href="#">Link</a> .	This article reviews articles on PISA and formulates what types of literature have appeared, utilising PISA data.
4	Drent, M., Meelissen, M.R.M., & Van der Kleij, F.M. (2012). The contribution of TIMSS to the link between school and classroom factors and student achievement. <i>Journal of Curriculum Studies</i> , 45(2), 198-224. <a href="#">Link</a> .	This article gives a useful overview of another large international actor in international comparisons, the IEA. TIMSS stands for the Trends in International Mathematics and Science Study.
5	Mullis, I. V. S., Martin, M. O., Foy, P., & Hooper, M. (2017). <i>PIRLS 2016 International Results in Reading</i> . Retrieved from Boston College, TIMSS & PIRLS International Study Center website: <a href="http://tims-sandpirls.bc.edu/pirls2016/international-results/">http://tims-sandpirls.bc.edu/pirls2016/international-results/</a>	PIRLS is the ‘reading and language’ of aforementioned TIMSS. It recently featured heavily in relation to the improving reading performance of England in year 4.
6	Rindermann, H., & Baumeister, A.E.E. (2014). Validating the Interpretations of PISA and TIMSS Tasks: A Rating Study. <i>International Journal of Testing</i> , 15(1), 1-22. <a href="#">Link</a> .	This article focuses on the types of questions students are asked to do. It turns out that “TIMSS tasks were seen as more curriculum-related” and “for solving PISA tasks, thinking/reasoning ability and general intelligence were rated as being more important.” (p.1) It further emphasises one needs to know what is actually measured.
7	Baroutsis, A., & Lingard, B. (2016). Counting and comparing school performance: an analysis of media coverage of PISA in Australia, 2000–2014. <i>Journal of Education Policy</i> , 32(4), 432-449. <a href="#">Link</a> .	The focus of this article is more the role the media plays in disseminating results of studies like PISA and TIMSS. This article looks at 14 years of media coverage of PISA in Australia.
8	Saltelli, A. (2017). International PISA tests show how evidence-based policy can go wrong. <a href="#">Link</a> .	The role PISA plays in education policy also invites critical views on PISA. A more extensive article is referenced in the article. One of the points highlighted again is what is actually being measured.
9	Rutkowski, L., & Rutkowksi, D. (2016). A Call for a More Measured Approach to Reporting and Interpreting PISA Results. <i>Educational Researcher</i> , 45(4), 252-257. <a href="#">Link</a> .	This article takes a more methodological look at the limitations of PISA, and how the complex design of large-scale assessments plays a role in this.
10	Leung, F. K. S. (2005). Some characteristics of East Asian mathematics classrooms based on data from the TIMSS 1999 video study. <i>Educational Studies in Mathematics</i> , 60(2), 199-215. <a href="#">Link</a> .	International comparisons do not have to be about numbers all the time. There also are more qualitative international comparisons, for example the 1999 TIMSS video studies which compared classroom practices in 100 maths lessons and 100 science lessons in seven countries. Some videos are still on <a href="http://www.timssvideo.com">www.timssvideo.com</a> .