ACME

Advisory Committee on Mathematics Education

International comparisons and maths education

maths Snapshots

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International comparisons offer opportunities to learn from others.

- Media and political focus on international league tables is putting maths education in the spotlight. League tables do not give the full picture about a country's education system.
- Care should be taken when looking at international comparisons and when using them in policy making.
- National models of education need to be developed holistically within their social and cultural context.

- **Ensure international comparisons in policy development are informed by evidence-based research and expert analysis.**
- **Establish transparency and coherence in the way policies are imported, adapted and implemented.**

Where are we now?

England's maths performance is ranked differently by different types of index.

- Two international surveys measure mathematics attainment: Trends in International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA).
- TIMSS assesses understanding of core curriculum content, whilst PISA assesses the application of knowledge to real-life problems.
- Results from TIMSS and PISA give different messages about students' performance. (1)

There is much media and political attention on international education policies.

- England's mathematics performance is often portrayed as below par.
- Different countries are drawn on for inspiration. Currently there is much attention on the policies and practices in Asian Pacific Rim countries. (2)
- Policies that are considered successful relate to teacher quality and subject specialism (Japan, Singapore; Shanghai), problem-solving pedagogy (Japan), strong professional development (Singapore), and mixed ability models (South Korea, Japan). (3, 4, 5)

The Government has looked abroad to inform its policies on maths education reform.

- For example, in 2014, a national network of Maths Hubs was set up with the goal of raising standards to match those achieved in high-performing East Asian countries, such as China, Japan and Singapore. The Shanghai Teacher Exchange programme is managed through the Maths Hubs programme. 60 maths teachers from Shanghai run master classes so that local schools can "learn from world-class teaching approaches". (6)
- The Department for Education noted that it looked to Singapore and Hong Kong to reform England's primary curriculum. The breadth of subject knowledge in the maths curriculum has been extended with the aim of matching international standards. (7)

What are the challenges?

International models of education are complex and it is difficult to understand all elements.

- Positions in international league tables are useful, but they only give limited insight to understanding the quality of an education system and the success of its policies.
- Models of education are constantly evolving. South Korea, Singapore and Finland acknowledge that, despite their high rankings in international tables, their mathematics education practices still require improvement. (5)
- Policy effectiveness is strongly linked to a country's historical, cultural, social, political and economic context. The causes of high performance are very difficult to identify. Culture and learner attitudes are likely to be important factors. (5)

Education policy systems are complex.

- Policies in education are interdependent. A change in one policy can have unexpected effects elsewhere in the system. Some unintended effects may take years to emerge.
- For example, curriculum reform that aims to match international standards will also require other policies, such as teacher education and professional development, to be successful. Transferring one policy without making structural changes can be problematic.
- Understanding interactions and interdependencies in education policy is challenging, particularly within short political timescales. (See **Maths Snapshot: Maths education policy**.)

What needs to happen?

1. Use of international comparisons in policy development must be underpinned by expert analysis and research.

- A world-class maths education can be developed by incorporating ideas from many places in the world. However, there are no easy solutions and ideas that work elsewhere may not work here.
- To gain an understanding of the local context and the implications of adopting new practices, academic and policy experts should work with policy makers before conclusions from international comparisons are drawn and used to inform policy developments.

2. Adoption and implementation of policy ideas should be well-designed, transparent and coherent.

- Expert design and trialling is necessary to understand whether a borrowed policy will work in a new context, to see how a new policy interacts with other policies and to understand potential effects that this might have on the system.
- Developments must be planned with a realistic budget and given sufficient time. There needs to be transparency and engagement with all stakeholders throughout this process.

The **Trends in International Mathematics and Science Study (TIMSS)** is a series of international assessments of the mathematics and science knowledge of students aged 9-10 and 13-14. It has been carried out every 4 years since 1995.

The Programme for International Student Assessment (PISA) aims to evaluate education systems worldwide by testing 15 year olds. Tests have been carried out every three years since 2000 and are designed to assess to students' application of knowledge to real-life situations.

1. http://www.ioe.ac.uk/Study_Departments/J_Jerrim_qsswp1109.pdf
2. http://mckinseyonsociety.com/downloads/reports/Education/Worlds_School_Systems_Final.pdf
3. http://www.cambridgeassessment.org.uk/Images/153113-using-international-comparisons-to-refine-the-national-curriculum-tim-oates.pdf
4. http://www.ascd.org/publications/educational_leadership/oct08/vol66/num02/Learning_from_World-Class_Schools.aspx
5. http://www.nuffieldfoundation.org/sites/default/files/Values_and_Variables_Nuffield_Foundation_v__web_FINAL.pdf
6. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/288817/DRAFT_Maths_hubs_guidance_doc_v10.pdf
7. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/184064/DFE-RR178.pdf

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