Opportunity to Learn: Why Does Asia Outperform England?

Christian Bokhove

In international comparisons for mathematics in PISA and TIMSS, Asia outperforms England considerably at the secondary level. For geometry this difference is particularly large. In a recent study, I have investigated if these differences in geometry achievement might be attributed to differences in 'Opportunity to Learn' within a country's curriculum (Bokhove et al., 2019)[1] . 'Opportunity to Learn' originally is a construct popularised some decades back by the scholar John Carroll in his 'model for school learning' and more recently by William H. Schmidt and colleagues with International Large-scale Assessment data. The focus on geometry ensured that curriculum differences would be greater than with for example algebra. In our article, we see 'Opportunity to Learn' as a combination of curriculum content that is covered in the lessons, the amount of time spent on instructional hours and mathematics work, the education level of teachers and their preparedness to teach geometry topics.

Intended, implemented, and achieved curriculum

I use a conceptual framework that combines elements from educational effectiveness, a curriculum model and "Opportunities to Learn" for analysing curriculum effects. In that model we can see the 'intended curriculum' as the curriculum that a country intends to be given, for example enshrined in policy documents. At the school, classroom and teacher level we then have the actors that implement that curriculum. Finally, the students then (hopefully) attain the curriculum aims. At all

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[1] The paper received the IEA's Wolf Award. The article was written with colleagues from Hong Kong SAR and Japan in the context of the British Academy enGasia project, which compared geometry education in lower secondary school in these three countries.

these levels curriculum factors play a role.

The Trends in Mathematics and Science Study

We then proceeded to analyse this using multilevel models for England, Hong Kong SAR and Japan, augmented by three more countries, including Korea, USA and Singapore, with data from the 2011 Trends in Mathematics and Science Study (TIMSS). One research question aimed to see whether the framework could highlight meaningful distinctions at student- and classroom levels. There were meaningful differences within and between the six countries. We saw that Japan and Korea had almost all variance at the individual level, while the other four countries had a more equal distribution over individual and classroom levels. This result seems to indicate that classrooms in Japan and Korea are quite homogenous compared to the other four countries.

Content variables had little influence, but time did

Another research question turned to the role of 'Opportunity to Learn' in all of this. Results showed that socio-economic status (SES) was an important predictor in the classroom for all six countries. The two (geometry) content related variables surprisingly did not show a significant difference. Teacher variables barely played a role except in Korea where less years of experience had a negative effect. The two time-related variables had a differential effect, with in some countries, rather counterintuitively, less time predicted higher outcomes.

Bokhove, C., Miyazaki, M., Komatsu, K., Chino, K., Leung, A., Mok, I. A. C. (2019.) The Role of "Opportunity to Learn" in the Geometry Curriculum: A Multilevel Comparison of Six Countries. *Frontiers in Education*, *4*(63). https://doi.org/10.3389/feduc.2019.00063

This text has been posted on the blog international-education.blog and it is available in different languages on international-education.blog

Bokhove, C. (2021). Opportunity to learn: Why does Asia outperform England? Retrieved from https://https://international-education.blog/en/opportunity-to-learn-why-does-asia-outperform-england/

The blog International-Education.Blog is an outcome of the project OCCAM. This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 76500.