The mathematically disadvantaged

Geoff Wake
## University of Nottingham

Two major problematic issues:

1. The problem of GCSE resits: a qualification that is based on coverage of a national curriculum designed for 11-16 year olds. A curriculum that has to be suitable for progression for academic and Vocational progression

2. Mathematics in vocational programmes of study

OECD report

We require a greater range of qualifications that lead to different routes that better meet their needs and aspirations.
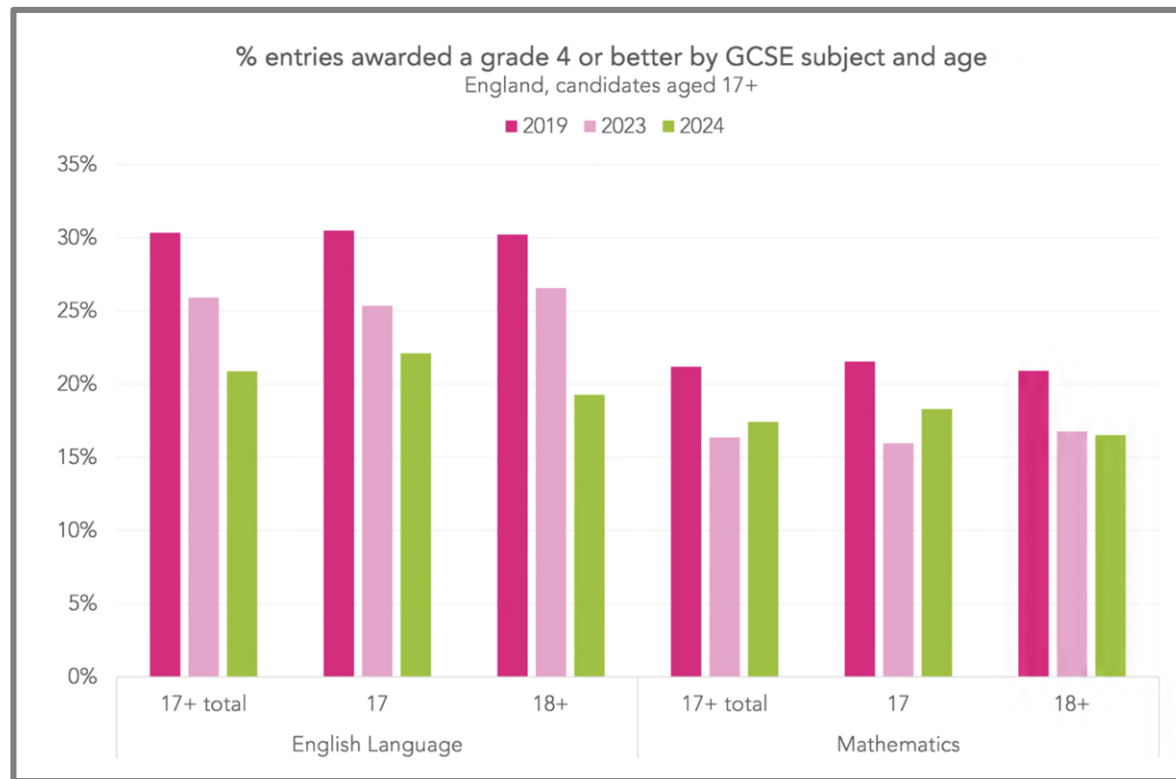
In current qualifications we demand greater depth and breadth than many other countries.
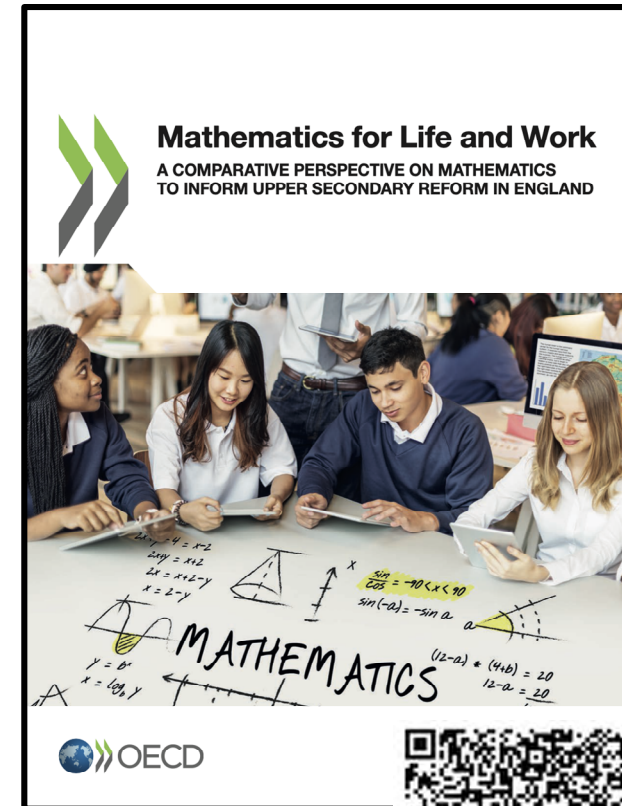
Resitting GCSEs

Resitting GCSE for students after the age of 16 is almost certainly not fit for purpose- far ALL students.

Post-16 – the mathematically disadvantaged

Our research of Mastering Maths programme fo GCSE resit students we found that nearly 50% of those resitting come from disadvantaged backgrounds.
Wake et al, 2022

""we know that by the end of secondary school disadvantaged pupils are 19 months of learning behind their peers in English and Maths "
EPI Annual Report 2024

""In GCSE English and maths disadvantaged pupils scare 1.34 grades worse than their peers, and this widens to 1. 70 grades for persistently disadvantaged pupils"
Nunes et al. 2017

Post-16 – the mathematically disadvantaged

We need to consider how we can develop courses that provide for students across the diverse needs of post-16 students that support them in their new courses of study and future intentions of study and work.

There are models we worked on in the 1990s – the Freestanding Mathematics Qualifications (FSMQs) and potentially Core Maths qualifications at levels 1 and 2 that might be helpful in considering suitable pathways.

Mathematics supporting vocational competence

(Non-school) Maths is an integral part of vocational competence.

Whilst basic ideas of school mathematics underpin and are necessary for vocational competence they are not sufficient.

The solution proposed by the 16-19 sub-group of the RS ACME committee was to propose a suite of general mathematical competences (GMQs)
- these act as boundary objects between mathematics as an academic subject discipline and authentic vocational situations

GMCs

- Measuring with precision
- Estimating, calculating and error spotting
- Working with proportion
- Using rules and formulae
- Processing data
- Understanding data and risk
- Interpreting and representing with mathematical diagrams
- Communicating using mathematics
- Costing a project
- Optimising work processes

Royal Society, 2020

In conclusion

- We need to consider carefully how we provide a variety of mathematical pathways for students post-16 that better meet their immediate and future needs and aspirations

- GCSE is unfit for purpose and we need to consider if any general mathematics qualification (maybe plus options) might be more suitable for 16-19 year olds.

- We should work with the GMCs as a useful model for a basis of courses that work at the boundaries of academic maths and vocational realities.