A new mathematics GCSE curriculum for post-16 resit students

Setting the scene

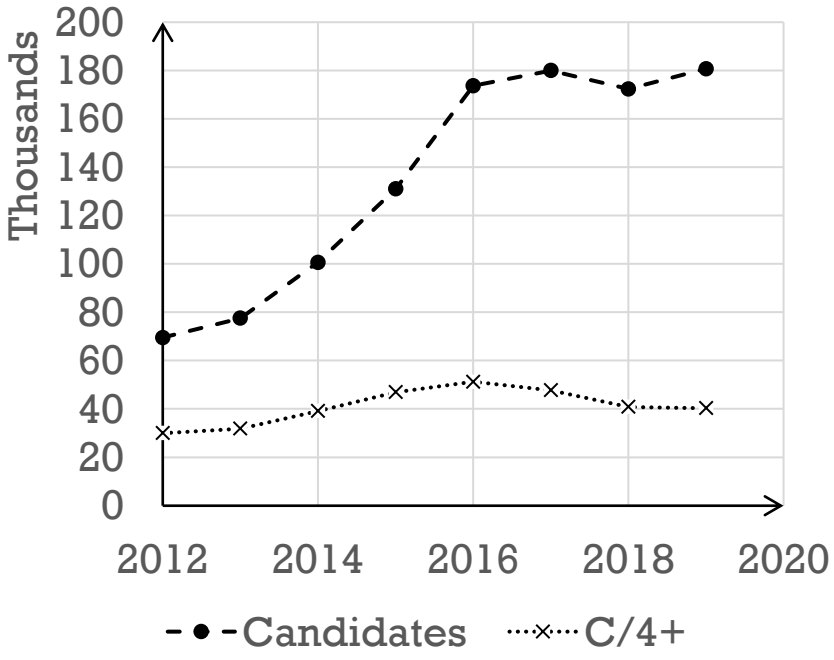
- Following recommendations in the Wolf Report, educational policy in England requires young people aged 16-18 who have not achieved grade 4 or higher in GCSE Mathematics to continue working towards it, with full-time students who achieved grade 3 required to prepare to resit it.
- Getting a standard pass in GCSE Mathematics opens doors to opportunities in HE and in the employment market but the success rate for GCSE resit is low.
- During 2019, with funding from the Nuffield Foundation, MEI worked on a project to investigate the feasibility of a new GCSE mathematics curriculum for resit students.

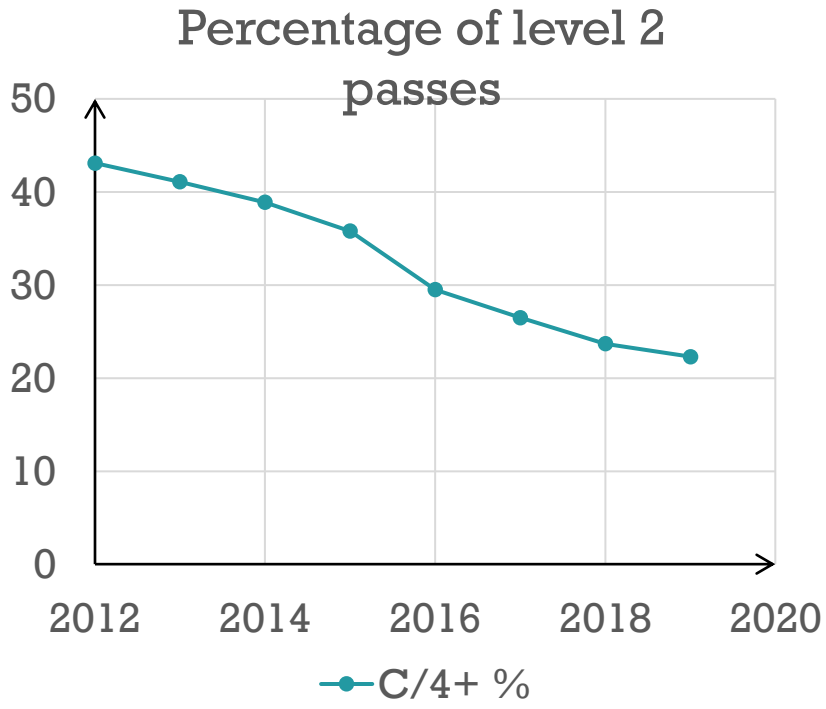
Changes since the project started

- Functional Skills qualifications have been reformed.
- Students doing T levels can aim to do Functional Skills rather than GCSE to achieve level 2 Maths (as for apprenticeships).
- From this academic year, students with grade 2 Mathematics GCSE, or below, at KS4 can also aim to do Functional Skills rather than GCSE to achieve level 2 Maths.
- FE Week for 15 Nov 2019 included an article about GCSE resit being more used than alternative qualifications due to the greater recognition of GCSE and the possibility of showing improvement by an increased grade.

STUDENTS PROGRESSING TO LEVEL 2

GCSE Maths, students age 17+ summer





GCSE resit, national outcomes

Table 2: English and maths progress (tables 11a and 11b). England, 2017 to 2019 (revised).

English	Number of students in scope	Average progress	Percentage entering an approved English qualification	Percentage making positive progress	Percentage achieving grade 4 (or equivalent) or above
2017	117,830	-0.02	79.2	33.7	21.5
2018	115,115	0.06	81.1	36.6	23.5
2019	108,007	0.13	81.7	37.3	23.0
Maths	Number of students in scope	Average progress	Percentage entering an approved maths qualification	Percentage making positive progress	Percentage achieving grade 4 (or equivalent) or above
2017	145,930	0.00	80.8	36.5	17.5
2018	145,448	0.05	83.4	37.9	18.7
2019	142,488	0.08	84.8	36.2	18.2

Source: 16 to 18 attainment data

"Positive progress": Improved point score in the subject between by the end of key stage 4/16 to 18 studies, compared to prior attainment in key stage 4

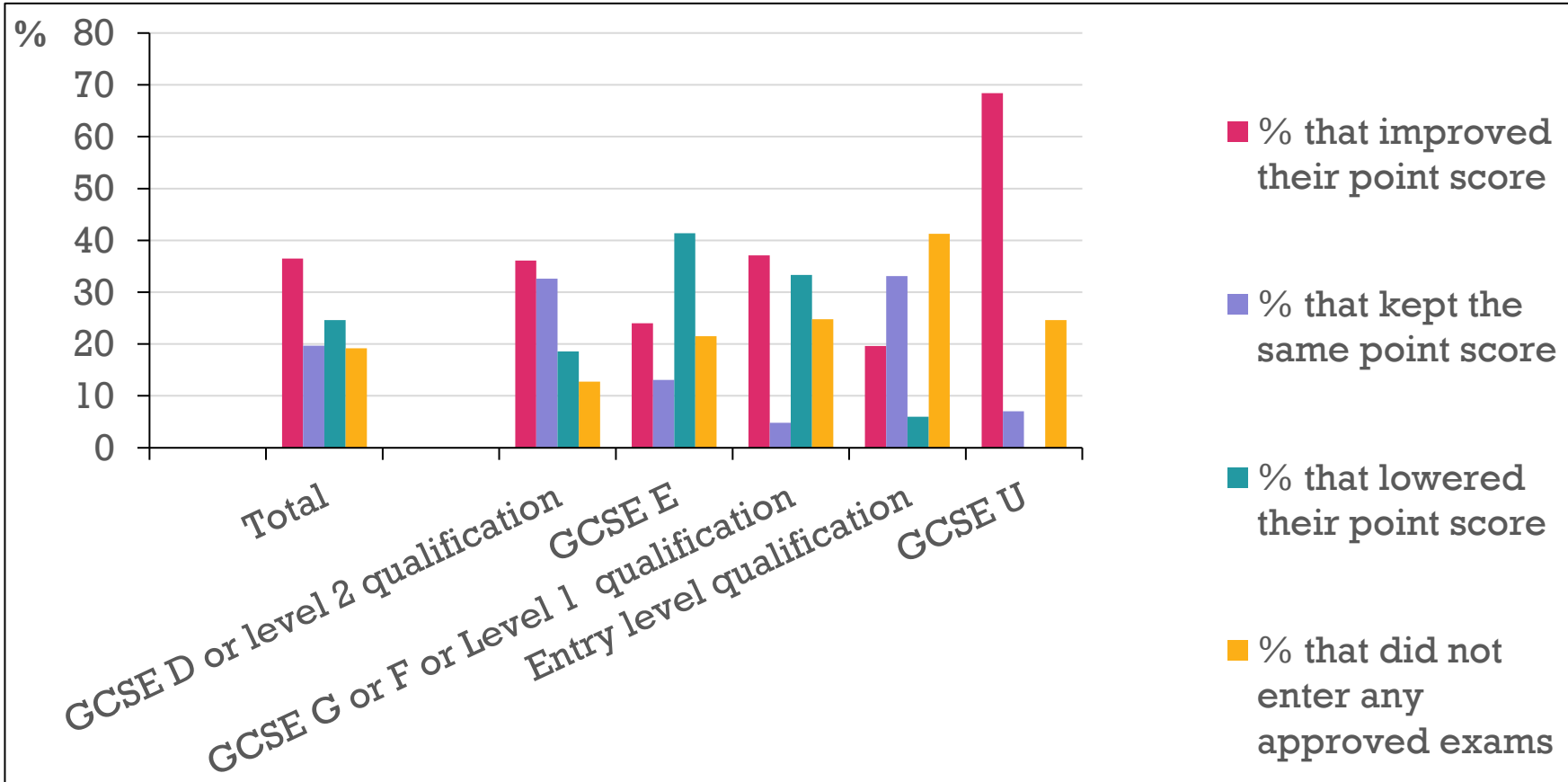
Calculating progress

- Progress measures are calculated for individual students then averaged to compare institutions.
- Students on apprenticeship programmes are not included in the measure.
- Students can make positive or negative progress.
- Negative progress is capped at -1 for each student.
- A student who does not take a GCSE or stepping-stone qualification post-16 would have a progress measure of -1.

Progress measures old and new

Current points: 2017, 2018 and 2019 tables				Future points: 2020 performance tables			
Points awarded	Grade achieved			Points awarded	Grade achieved		
	9-1 GCSEs	Legacy GCSEs	Functional Skills		9-1 GCSEs	Legacy GCSEs	Functional Skills
Rows for higher grades left out to fit on slide, other quals left out							
5.7	5			5	5		
5	4	C		4	4	C	
				3.5			L2
4	3	D	L2	3	3	D	
3	2	E		2	2	E	L1
2.5			L1				
2		F		1.5		F	
1	1	G		1	1	G	
0.8				0.75			EL 3
0.4			Entry level	0.5			EL 2
				0.25			EL 1

Proportion of young people who improved their maths attainment, kept the same attainment, and lowered their attainment, by prior attainment at Key Stage 4 (2014/15 KS4 cohort)



Velthuis et al (2018),The characteristics and post-16 transitions of GCSE 'lower attainers'

DEVELOPING AN ALTERNATIVE

Qualification design

- Initial thought – “like Core Maths but at level 2”
- BUT Core Maths students have a background of GCSE understanding to build on; the understanding of GCSE resit students is generally more patchy
- It is important that students resitting GCSE Mathematics gain a useful qualification. It is also important that they are enabled to use mathematics in a range of contexts which they are likely to encounter

Organising the curriculum

- Identifying what quantitative skills all adults should possess and ensuring the curriculum contains the appropriate mathematics

  Four themes:

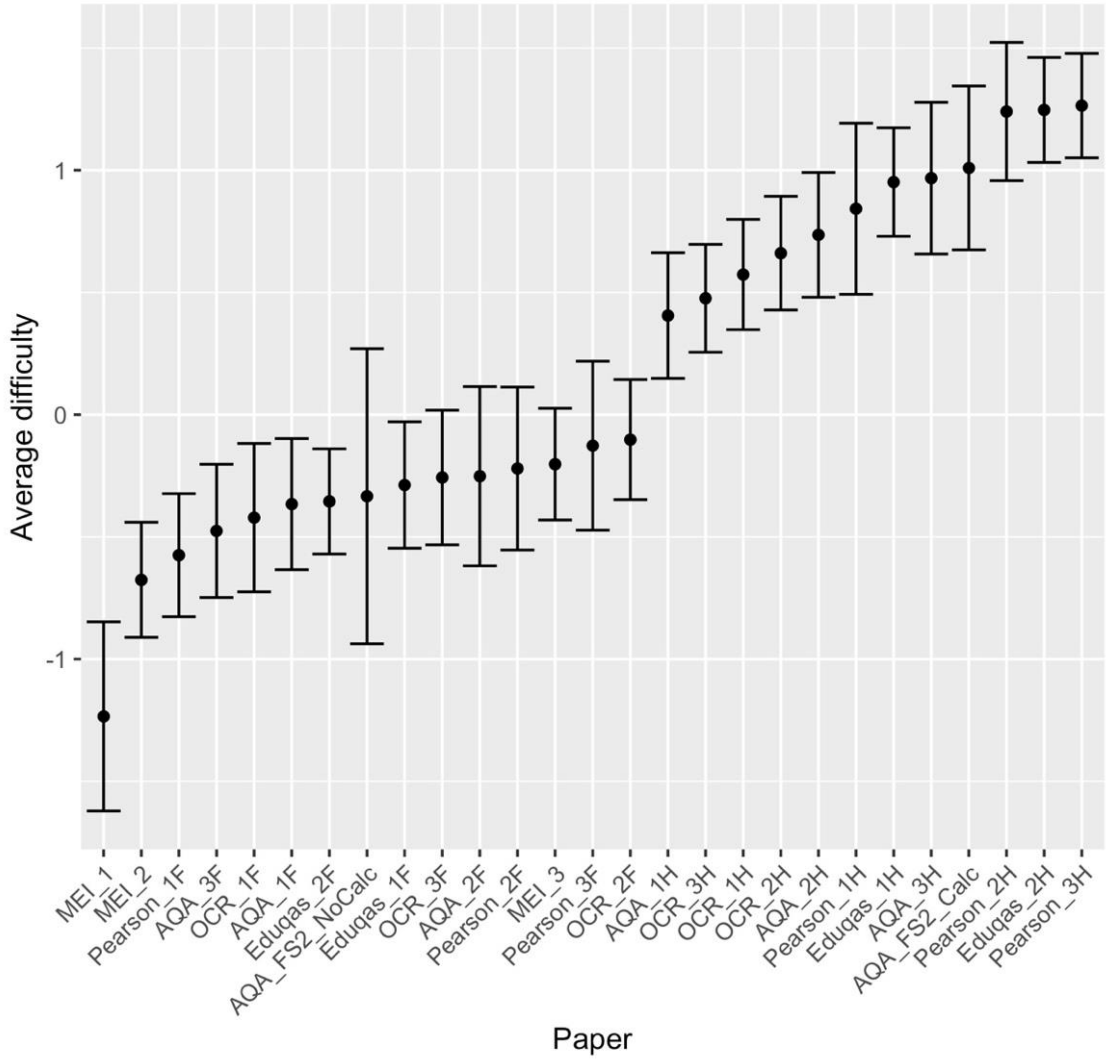
  - Financial understanding
  - Working with measures and shape
  - Planning activities
  - Understanding quantitative information
- Based on GCSE Foundation tier but only including content which supports the skills.
- Some new content: financial mathematics (including simple use of spreadsheets) and probability in contexts to do with health and risk – these attracted approval in the employer survey

	Paper 1	Paper 2	Paper 3
Style	Multiple choice questions assess basic skills. Questions may be in context or context-free. Results reported to centres for diagnostic purposes.	A mixture of short and long questions, all set in realistic contexts.	A mixture of short and long questions, all set in realistic contexts.
Time	1 hour	1.5 hours	1.5 hours
Number of marks	40	80 marks	80 marks
% of total qualification	20%	40%	40%
Calculator allowed?	Yes	No	Yes
Availability	Online? Or paper-based? Resitting once allowed.	Nov and June	In same series as paper 2

Some notes on the design

- Multiple choice paper 1 allows diagnostic information to be provided easily to centres. No marking costs.
- Paper 1 acts as a Stepping Stone which is also part of the qualification.
- Paper 1 could be online – this would allow use of interactive technology in future (similar to PISA 2021).
- There should be no more than two papers at the end of the course, to minimise the possibility that students who do not feel they have succeeded in one paper fail to attend the next paper.
- No paper should be longer than 1½ hours because students who need additional time will take longer than this; it is likely that a greater proportion of resit students need additional time than in the general population.

- 95% confidence intervals for mean difficulty of each paper
- MEI paper 1 is intentionally easier than papers 2 and 3 due to stepping stone/diagnostic purpose



RECOMMENDATIONS

Main Recommendation

- A new mathematics GCSE should be developed for post-16 students that focuses on the maths needed for everyday life and work. It should be clearly branded as a GCSE qualification and afforded equal status to a GCSE Mathematics qualification at the same grade, both for progress measures and for entry to employment or higher education.

The new mathematics GCSE should have the following features:

- It should be limited to foundation tier (grades 1 to 5) and available to post-16 students only.
- It should have higher grade boundaries than foundation tier GCSE Mathematics to ensure that students gain the qualification by demonstrating the ability to succeed in the mathematics they are likely to encounter in life and work, rather than by merely achieving a minimal number of marks.

continued

- It should incorporate a stepping-stone assessment element that can be taken before the final assessment, to test basic skills and provide a more supportive pathway for students who have experienced limited success with mathematics. This stepping stone should attract points in the post-16 maths progress measure. The whole GCSE should have the same progress measure points as GCSE Mathematics.
- It should exclude content from foundation tier GCSE Mathematics that is not directly relevant to everyday applications but should include a small amount of additional content that is not included in foundation tier GCSE Mathematics, such as risk, financial applications and the basic use of spreadsheets to perform quantitative tasks. This aligns with the skills students need in daily life and is consistent with feedback received from employers.

Some questions

- Who is it for?

  Post-16 students but current GCSE Mathematics or FS may be more appropriate for some students. Some students resitting GCSE are currently doing well and some students are making progress by taking FS – they can continue to do that. This is for students who are not well-served by the current options.

- Will it happen?

  Depends on government policy – recent focus of government policy has been on improving teaching and on allowing FS for students with grade 2 or below at KS4.

To find out more

- The executive summary, full report and supporting papers are available at https://mei.org.uk/post16-GCSEproject