THE ROYAL SOCIETY

Working paper

# The Qualifications Assessment Framework and GCSE Mathematics resits

## Introduction

In 2014, a condition of funding for post-16 education in England was introduced which required students who attain grade 3 or below in GCSE English and/or mathematics to resit these qualifications until they achieve a grade 4 or above, or take an approved stepping-stone qualification. The reform was introduced with the best of intentions: to ensure that as many students as possible achieved the GCSE qualifications that are considered vital for progression in education and employment. However, by 2019, the Royal Society's Advisory Committee on Mathematics Education (RS ACME) was consistently receiving reports that the reform was causing significant problems, and that relatively few students were benefiting from it.

This is an important issue affecting many schools, colleges, further education and skills providers, and hundreds of thousands of students, so RS ACME set out to consider possible alternatives, as part of its longstanding interest in 14 – 19 mathematics pathways. As work progressed it became clear that analysis of what is a complex problem required a comprehensive framework; one that is holistic, that recognises the perspectives of different stakeholders, and is open about the nature and reliability of the evidence that supports such claims as can be made.

It was apparent that such a framework would have wide applicability and RS ACME has published a report, available at royalsociety.org/gcse-mathematics-resits, which sets out the Framework in general terms and explains the underlying rationale.

In this Working Paper the Framework has been applied to the issue of GCSE Mathematics resits for post-16 students. A small group including those with expertise in research and policy, as well as an experienced subject leader in a large post-16 provider, carried out the work.

The results are summarised below (table 1). A full account of the discussions from which this table is derived is accessible at royalsociety.org/gcse-mathematics-resits

# Achievement data

The GCSE resits policy has had some positive impact on overall student achievement in English and mathematics. The proportion and number of resit students achieving grade C/4 or above in both GCSE English and Mathematics post-16 more than doubled, from 9% (21,721) in 2014 to 21% (46,886) in 2018[1].

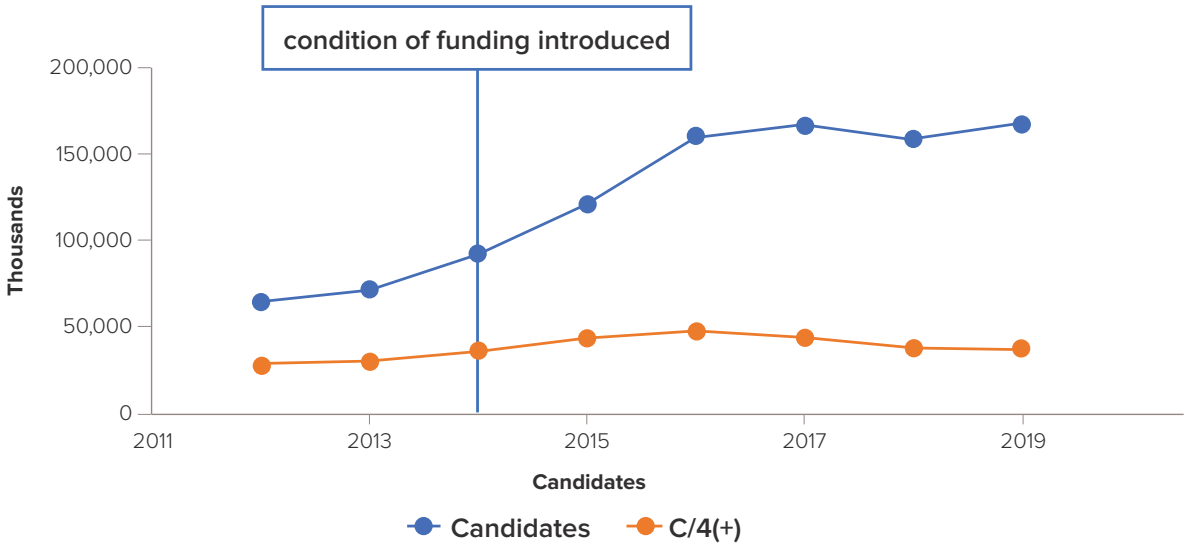
The majority of resitting students, however, continue to fall short of a grade C/4 in their GCSE Mathematics. Figures 1 and 2 show the trends in numbers of students resitting GCSE Mathematics, and their attainment over time.

Figure 1 shows that the number of those attaining a grade C/4 in GCSE Mathematics increased in the two years following the introduction of the condition of funding, but the number has since declined back to the 2013 level. Given that the number of resitting students increased substantially, the percentage of post-16 candidates achieving grade C/4 has decreased considerably over time. The proportion experiencing repeated failure has also increased.

In 2019, before the Covid-19 pandemic struck, over 180,000 students (up from about 160,000 in 2018) aged 17-plus were re-entered for GCSE Mathematics, but only 22.3% achieved the required grade C/4 or above[2]. However, back in 2012, before the condition of funding was introduced, 43% of the 64,494 resit entrants achieved grade C or higher. Indeed, as Figure 2 shows, there has been a steady decrease in the percentage of GCSE Mathematics resit candidates achieving grade C/4 or above since 2012[3].

**FIGURE 1**

Candidates aged 17+ sitting GCSE Mathematics students compared with the numbers gaining grade C/4 or above.




Source: Joint Council for Qualifications

1. Fino, J 2019 English and maths GCSE resit policy helping tens of thousands. FE Week, 3 May 2019. See https://feweek.co.uk/english-and-maths-gcse-resit-policy-helping-tens-of-thousands/, 3 December 2021.
2. Joint Council for Qualifications 2019 Provisional GCSE (Full Course) Results – June 2019 (All UK Candidates – aged 17 and over). See https://www.jcq.org.uk/wp-content/uploads/2019/09/GCSE-Full-Course-Results-Summer-2019.pdf, accessed 3 December 2021.
3. Joint Council for Qualifications 2012 – 19 Provisional GCSE (Full Course) Results (All UK Candidates – aged 17 and over). See https://www.jcq.org.uk/examination-results/, accessed 3 December 2021.

A range of factors may be responsible for this decline, for example:

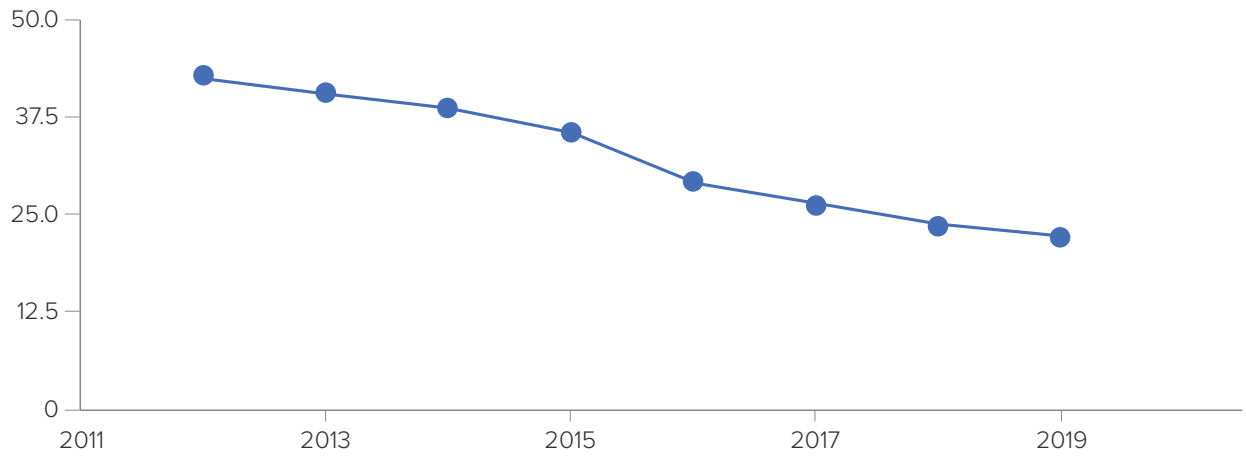
- Recent research has found that increasing numbers of students with grade 1 or grade 2 in GCSE Mathematics have been guided to resit the GCSE rather than study for a Functional Skills mathematics qualification[4]. Evidently these students face a particularly tough challenge in achieving grade 4 (or above) and their levels of motivation and confidence may well be lower than resit students who have already been awarded a grade 3.

Among the reasons suggested for this practice during the project were the following:

- A GCSE qualification is perceived as having greater currency among employers and higher education institutions.
- Achievement rates are significantly lower for Functional Skills qualifications compared to earlier iterations and to GCSE.
- GCSE grades allow for more graduated recognition of achievement and progress than do the pass/fail grades of Functional Skills qualifications.
- It is possible that students resitting GCSE Mathematics prior to the introduction of the condition of funding were generally more motivated – back then, there was an element of choice for students regarding resitting the examinations, rather than a funding imperative to do so.
- Experts consulted during this study suggested that students may struggle to see the relevance of the content of the GCSE Mathematics course to their study programmes and career aspirations, and therefore struggle to motivate themselves.

**FIGURE 2**

Percentages of candidates aged 17+ sitting GCSE Mathematics gaining grade C/4 or above.




Source: Joint Council for Qualifications

4. Noyes, A & Dalby, D 2020 Mathematics in further education colleges. Nottingham, UK: University of Nottingham. See https://www.nuffieldfoundation.org/wp-content/uploads/2019/11/Mathematics-in-Further-Education-Colleges-final-report.pdf, accessed 3 December 2021.

**TABLE 1**

Results of applying the Qualifications Assessment Framework to GCSE Mathematics resits policy

| Sector | Key issues | Questions | Findings | Example evidence source(s)[6] |
|---|---|---|---|---|
| **A. Students** | A1 Student market for the qualification | Which students is the qualification intended to serve? | Post-16 students, including adult learners (aged ≥ 18), who have not achieved a grade 4 in GCSE Mathematics by age 16. | SOG |
| | | What needs of students is the qualification intended to meet? | GCSE is a 'gateway' qualification, generally required for progression to additional study in level 3 further education programmes, higher education courses and many jobs. However, there are concerns that the content of the GCSE curriculum fails to provide students with the mathematical knowledge and skills they need for life and work. | ODI |
| | | What is the take up or intended take up of the qualification? | The latest (pre-pandemic) data published by the DfE record that 28.7% of 16-year-olds did not achieve grade 4 (or higher) in GCSE Mathematics and English. Students achieving grade 3 must resit the GCSE under the condition of funding. Increasing proportions of students with grade 1 and grade 2 are also resitting GCSE Mathematics. | ODI |
| | A2 Outcomes and progression | What proportion of students achieves the target outcome? | Data for 2020 (when the higher of grades awarded by teacher assessment or by a model developed by Ofqual were recorded) show that 70.8% of young people aged 19 in 2019/20 had achieved level 2 in English and mathematics. This compares with 71.3% in 2018/19, 71.0% in 2017/18 and 71.5% in 2016/17. However, on average, students who have not achieved a grade 4 by age 16 do not improve their GCSE Mathematics outcomes by age 19. Only 19% of all post-16 students resitting GCSE Mathematics attain grade 4. | ODI |
| | | What proportion of students improves their employment and educational prospects? | While research[7] shows the relationship between level 2 qualifications and wage returns, there appears to be no recent analysis showing whether the 19% who achieve a grade 4 under the condition of funding have improved employment prospects. | PR |
| | A3 Confidence, motivation and engagement | What impact does the qualification have on students' confidence, motivation and engagement? | Resit students' confidence is low, and they may become demotivated because:<br>• their confidence has been knocked by past 'failure';<br>• they have to resit the exams (perhaps repeatedly until they do attain grade 4(+), as is required by the condition of funding);<br>• the mathematical content of GCSE Mathematics is not necessarily relevant to their study programmes.<br>Students gain confidence from gaining grade 4(+), or from improving on their previous grade. However, the majority fail to make progress, which affects their motivation. | PEJ |

| Sector | Key issues | Questions | Findings | Example evidence source(s)[6] |
|---|---|---|---|---|
| **B. Education providers** | B1 Workforce capacity and capability | Are the teachers available to deliver the qualification to the appropriate standard? | Research shows there are too few mathematics teachers with at least an A level in mathematics teaching in colleges. | PR |
| | | Are teachers supportive or likely to be supportive of the qualification, and confident and motivated to teach it? | Although teachers are keen to provide all the support they can to help their GCSE Mathematics resit students succeed, they are not necessarily supportive of GCSE resits. This is because the GCSE curriculum content does not appear to fit well with students' vocational studies or their lived experiences outside college. | PEJ |
| | | What professional development do teachers need? | All teachers need sustained continuing professional development to teach the GCSE Mathematics curriculum effectively and confidently. This need is compounded by the large numbers of non-mathematics-specialist teachers deployed to teach resit students, particularly given the short amount of preparation time available for them to address gaps in their students' knowledge and build their confidence. | PEJ |
| | B2 Operational capacity and cost | Do schools and colleges have the operational capacity to deliver the qualification? | The size of the student pool taking GCSE Mathematics has created unprecedented organisational challenges for colleges, in particular around examination times. These challenges have intensified as the number of people resitting the GCSE has increased under the condition of funding. | ODI |
| | | What are the costs and resources needed by institutions to deliver the qualification? | The costs of provision and resource needs vary from one institution to another, as does budget (eg for professional development). The Covid-19 pandemic has increased the challenges providers face in meeting the educational needs of their students, including those resitting GCSE Mathematics, and the professional development needs of their teachers. | PEJ |
| **C. Education system** | C1 Educational coherence | How does the qualification fit into existing curriculum pathways? | Nationally, there is no consensus as to whether students with a grade 1 and 2 GCSE entering a further education college environment should resit the GCSE or else study for a level 2 Functional Skills Mathematics qualification. Although Functional Skills Mathematics is described as a 'stepping-stone' qualification, others see it as a different pathway. The relationship between GCSE and the General Mathematical Competences in the new T Levels is unclear. There remains no clear framework for mathematics pathways post-16. | PEJ |
| | C2 Regulation and governance | How well does the qualification fit into qualification frameworks? | GCSE Mathematics is included within the current Register of Regulated Qualifications. | SOG |

| Sector | Key issues | Questions | Findings | Example evidence source(s)[6] |
|---|---|---|---|---|
| **D. Society** | D1 Market validity | What is the exchange value of the qualification? | The UK Government considers GCSE to be the 'gold standard' of academic qualifications for students completing Key Stage 4, and universities and employers normally expect applicants to have obtained a minimum of grade 4/C in GCSE Mathematics.<br>Many T Level providers appear to be stipulating grade 4 in GCSE Mathematics as part of their entry requirements. | PR/PEJ |
| | D2 Higher education/ employer needs | What needs of HE and/or employers does the qualification meet? | This is not clear, partially because the specific mathematical needs of employers are not recorded, and partly because employer surveys do not shed light on the extent to which the skills gained from GCSE Mathematics meet their requirements. International comparisons (PIACC) highlight a significant problem in England's quantitative skills base. Given the average progress for condition of funding students taking mathematics post-16, it is unlikely this situation has changed. | NADA/PR |
| | D3 Social mobility | What effect does the qualification have on social mobility? | Very little information seems to be available on how GCSE resits impact social mobility. But evidence shows that students from socio-economically disadvantaged backgrounds are overrepresented among resit students. | PR |
| | D4 Social and economic impact | What is the impact of the qualification on society and productivity? | No information concerning the impact of GCSE Mathematics on society or productivity appears to be available. | NADA |

6. SOG, statutory/official guidance; PEJ, professional/expert judgement; ODI, official data/information; PR, published research; NADA, no authoritative data available.

7. E.g. Jenkins, A, Greenwood, C & Vignoles, A 2007 The returns to qualifications in England: updating the evidence base on level 2 and level 3 vocational qualifications (No. 89). London: Centre for the Economics of Education, London School of Economics and Political Science.

# Application of the Qualifications Assessment Framework to GCSE Mathematics resits: conclusions and areas for action

The following table summarises the conclusions of this case study. It identifies areas for action and suggests where responsibility for action rests. It is understood that others applying the Framework may reach different conclusions.

It was the clear view of those involved in undertaking this analysis that GCSE resits remain a public policy problem of significant concern that requires renewed attention and focus.

**TABLE 2**

## Summary of findings

| Quality of evidence indicator | Issue | Areas for action | Remit |
|---|---|---|---|
| 1 | Most students resitting GCSE Mathematics post-16 under the condition of funding do not attain grade 4 (or higher). Repeated attempts to do so can erode these students' confidence and motivation. | Alternative pathways | DfE |
| 2 | While some students do succeed at grade 4, and numbers have risen, the rate of increase is not fast enough. | Clarity on targets<br>Cost analysis | DfE |
| 3 | There are insufficient suitably qualified teachers of mathematics available to teach GCSE resit students. They do not have adequate access to continuing professional development (CPD). | ITT requirements<br>Funding for ITT<br>CPD | DfE |
| 4 | While colleges have adapted to the condition of funding, they are overburdened due to the number of students resitting GCSE Mathematics. | Funding for colleges | DfE/EFSA |
| 5 | There remains no clear framework for mathematics pathways post-16, in particular for those on technical and vocational programmes. | Coherence across mathematical pathways post-16 | DfE |
| 6 | Nationally, there is no consensus as to whether students with grade 1 or grade 2 in GCSE Mathematics entering a further education college environment should resit the GCSE or else study for a level 2 Functional Skills Mathematics qualification. Although Functional Skills Mathematics is described as a 'stepping-stone' qualification, others see it as a different pathway. | Clarity on pathways<br>Cost analysis | DfE |
| 7 | Many students are 'switched off' by GCSE Mathematics because the curriculum fails to provide them with the mathematical knowledge and skills they need for life and work. | Clarity on pathways | DfE<br>FE colleges |
| 8 | Many GCSE Mathematics resit students come from disadvantaged communities. | LEO data analysis | DfE |
| 9 | The views of employers on the GCSE resits policy and suitability of different qualifications. | Survey employers | DfE |
| 10 | The relationship between GCSE and the General Mathematical Competences (GMCs) in the new T Levels is causing concern. | Mapping between current GCSE and GMCs | DfE/IfA |
| 11 | Whether those who achieve a grade 4 under the condition of funding during their post-16 studies have improved employment prospects. | LEO data analysis | DfE |
| 12 | The impact of the condition of funding on social mobility. | LEO data analysis | DfE |

Strong evidence available from official data or published research | Moderate evidence available | Limited or no evidence available

# Acknowledgements


| Post-16 Mathematics Pathways Contact Group | |
|---|---|
| Professor Andrew Noyes (Chair) | University of Nottingham |
| Steve Brace | Royal Geographical Society |
| Professor Jeremy Hodgen | UCL-Institute of Education |
| Jane Imrie | National Centre for Excellence in the Teaching of Mathematics (NCETM)* |
| Eddie Playfair | Association of Colleges |
| Nicole Schnappauf | Newham Sixth Form College (NewVIc) |
| Karen Spencer | Harlow College |
| Anthony Tomei CBE | Royal Society ACME |
| Professor Sir David Spiegelhalter FRS | University of Cambridge (from January to December 2019) |
| Andrew Stanley | Institution of Civil Engineers |
| David Swinscoe | Independent consultant |
| Professor Geoffrey Wake | University of Nottingham |

*Retired from the NCETM in October 2019.

| Royal Society staff | |
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| Emma Blunt | Project Coordinator (from January 2018 until December 2019) |
| Dr Helen Harth | Senior Policy Adviser (from January 2019 until July 2021) |
| David Montagu | Policy Adviser |

| Additional experts consulted | |
|---|---|
| Jim Addison | Department for Education |
| Sam Antill | Education and Training Foundation |
| Natalie Arnett | National Association of Head Teachers |
| Caroline Chessum | OCR |
| Graham Cumming | Maths Adviser, Pearson Edexcel |
| Diane Dalby | University of Nottingham |
| Stella Dudzic | Mathematics in Education and Industry (MEI) |
| Dr Jenefer Golding | UCL Institute of Education |
| Hilary Gwilliam | City & Guilds |
| James Handscombe | Principal, Harris Westminster Sixth Form |
| Carol Haynes | Royal Statistical Society |
| Janet Holloway | Ofqual |
| Amanda Kelly | City & Guilds |
| Benjamin Kulka | British Academy |
| Jo Lees | Area Inspector, Hampshire Maths Advisory Centre |
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| Rebecca Perry | Her Majesty's Inspector, Further Education and Skills, East of England |
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| Alix Robertson | Centre for Education & Youth |
| Jenni Smith | Independent consultant |
| Sue Southward | Cambridge Maths Hub |
| Jill Stokoe | National Education Union |
| Charlie Stripp MBE | Mathematics in Education and Industry (MEI) |
| Andrew Taylor | Head of Curriculum, Mathematics, AQA |
| Carmen Vidal Rodeiro | Cambridge Assessment |