ACME Advisory Committee on Mathematics Education

# Early and Multiple Entry to GCSE Mathematics

ACME is concerned at the increasing trend towards students being entered early for GCSE mathematics. The practice of early entry has a negative effect on most students' mathematical education, hindering their progression to a wide range of subjects post-16 and in Higher Education. It is an unfortunate example of how league tables and National Challenge status can encourage school leaders to put the interests of the school above those of the students themselves.

This paper explores the drivers and implications of this trend, and describes the serious educational risks that are the unintended consequences of early entry strategies. We believe that a target-driven culture based on league tables has skewed behaviour in schools and that action must be taken to correct this. The temptation to disregard the issue of early and multiple entry on the basis of the improving trend in GCSE results must be resisted.

Success in GCSE mathematics is used as a measure of educational quality, because of the unique role mathematics plays in the potential economic, intellectual and social contribution of individuals in the nation. A grade C in GCSE mathematics gained through 'tactical' entry does not indicate this educational quality. There is a trend towards achieving the measure by the easiest means possible rather than focusing on the underlying quality, which runs counter to the principles of education.

## 1. Background and data

*Early Entry* sees students as young as 14 being entered for GCSE examinations designed to be taken by 16-year-olds at the end of Key Stage 4.

Students are also sometimes entered for the same qualification with several different awarding organisations in an attempt to maximize their grades; we refer to this as *multiple entry*.

There is an increasing trend towards early entry to GCSE, particularly in mathematics. In 2010 almost 11% of those sitting GCSE mathematics were aged 15 or younger, compared to less than 5% in 2008.

The table below illustrates the recent trend in early entry to GCSE English and mathematics.

| | | 15-year-olds and younger | 16-year-olds | 17-year-old and older | Total |
|---|---|---|---|---|---|
| **English** | **2009** | 42,150 (6%) | 596,493 (85.1%) | 62,553 (8.9%) | 701,196 |
| | **2010** | 66,909 (9.5%) | 573,627 (81.3%) | 64,704 (9.2%) | 705,240 |
| **Mathematics** | **2008** | 32,908 (4.5%) | 631,655 (85.5%) | 73,888 (10%) | 738,451 |
| | **2009** | 60,712 (8%) | 613,253 (81.2%) | 80,773 (10.7%) | 754,738 |
| | **2010** | 83,179 (10.9%) | 595,828 (78.1%) | 83,785 (11%) | 762,792 |

**Source:** JCQ Exam Data - Bespoke analysis

Early and multiple entry is particularly common in National Challenge schools, and we believe that around 18% of students in such schools take mathematics early.

Early entry is being used as a strategy for whole cohorts as well as individuals: in 2009, 21 National Challenge Schools entered at least 90% of their students for mathematics early.

Early entry is more common in 11 to 16 schools, as the results of a recent survey conducted as a part of the Evaluating Mathematics Pathways (EMP) Project indicate.[1]

A related issue is the number of times a candidate re-sits an examination in order to improve their final grade. The issues are separate, in that a candidate entered at age 16 may still re-sit multiple times, but evidence suggests that over half of those students entered for GCSE mathematics early go on to retake at least once, and some up to four times. Retaking after early entry is particularly prevalent amongst students predicted to achieve a grade C or D.[2]

There is no doubt that the numbers gaining an A*-C grade rise year-on-year, and there are those that use this as a justification for early entry. However, there is an important distinction between achieving a good GCSE result and having received an appropriate education and achieved as highly as possible, as this paper will explore.

## 2. Drivers of early and multiple entry

Reasons for the current trend in early entry include:

- *'Getting mathematics out of the way'* – The practice of early entry is often predicated on the notion that mathematics can be 'completed' early on, leaving more time to

1 End of Year Report 2009, Evaluating Mathematics Pathways Project
http://www.nottingham.ac.uk/emp/summaries/qcareportdec09execsum.pdf

2 Noyes, A., Drake, P., Wake, G. and Murphy, R (2010). *Evaluating Mathematics Pathways: Final Report*. Confidential report to QCDA, December 2010. Nottingham: University of Nottingham. Over 350 schools responded to a survey on early entry, representing around 10% of examination centres.

focus on other subjects. In 25% of schools that enter students early for GCSE, students stop studying mathematics entirely once a grade C has been achieved.[3]

This is a fundamental misunderstanding of the underpinning role of mathematics within the curriculum. The KS4 Programme of Study for mathematics represents the mathematics that most 16 year olds ought to encounter. Fluent and robust mastery and consolidation of this material is important for continuation of the subject post-16, and supports many other subjects. The more experience of mathematics that any student has, the better equipped he/she will be to cope with mathematics in any future study, in everyday life and in the workplace.

- *Many bites at the cherry* – Borderline C/D students in particular are being entered for their GCSE with as many different examination boards as possible over the course of a year in order to increase their chances of obtaining a C grade with one of them. This is particularly prevalent in National Challenge schools, which are under pressure to produce a dramatic change in GCSE performance in a short period of time.
- *Targets and league tables* – ACME believes that an all-consuming focus on league tables is skewing behaviour in schools, to the extent that school leaders are placing the interests of their schools above those of the students.
- *It looks good on the school prospectus* - Many schools promote themselves on the basis of their ability to coach students to pass examinations earlier than their counterparts. Parents interpret early entry as a sign of a successful school, recalling accelerated sets from their own school experience.
- *Removal of end of KS3 tests* – Although widely supported, the removal of national testing at the end of Key Stage 3 has led some schools to offering early examination experiences to their pupils rather than taking the opportunity to deepen and broaden their mathematical experience.[4]

  The curriculum should be viewed as a coherent whole, with incidental summative assessment points, if students are to understand and be confident with the integrated nature of mathematics.

## 3. Existing guidance

The Qualifications and Curriculum Authority (QCA) noted in 2009 that

*Candidates who take GCSE early and achieve a lower grade than A* are less likely to continue their study of mathematics post-16 than students who achieve their full potential in mathematics at age 16. In other words, for candidates who may achieve lower grades through early entry, it would be better to delay entry and give them a richer experience of mathematics and the opportunity to achieve a higher grade.*[5]

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[3] See *Report on GCSE Mathematics Survey Summer 2010*, Evaluating Mathematics Pathways Project
[4] Ibid.
[5] QCA (2009) *Changes to GCSE* factsheet www.qcda.gov.uk/resources/assets/Maths_Factsheet__v0.3.pdf)

Ofsted recommended[6] in 2006 that schools should

*…focus on high levels of performance and secure understanding in GCSE mathematics as the most effective preparation for AS and A level study, rather than pushing students too rapidly on to other programmes.*

The Mathematical Association (2010)[7] suggests that

*Most students are best served by 'digging deep', building robust, fluent and confident use and understanding of mathematics and aiming at the highest possible grade, which for almost all students means entering GCSE at the end of Year 11. Appropriate pacing is essential.*[8]

The issue has also been a cause for concern in Scotland, prompting the Scottish Government to issue the following advice:

*Decisions about early presentation must be made in the best interests of an individual young person — not classes, cohorts or year groups. The Scottish Government would not support early presentation other than in exceptional circumstances related to an individual young person. It is important that the full period to the end of S3 is used to provide a rich curriculum allowing young people to study and have experiences that provide both breadth and depth of learning.*[9]

This advice draws the distinction between the targeted use of early entry for individuals and whole groups, but the issues are similar in both cases.

## 4. Causes for concern

Negative effects of misplaced early entry for GCSE mathematics include:

**Students' progress:** students do not fulfill their potential. Many could achieve a better grade but some 'settle' for the grade they get even when they are given an opportunity to improve it. A GCSE grade depressed by early entry can also have an adverse effect on a student's university application, particularly if they are applying for a popular course at a prestigious university.

**Student engagement and attitude:** students rushed towards the examination often express dissatisfaction with the subject. For too many students early entry simply provides early failure and a demotivating classroom experience. Over half of early entrants decide to retake GCSE mathematics one or more times to improve their grade, with continuing diminished horizons.

**Progression to post-16 study:** students who achieve a low grade at GCSE or are dissatisfied with mathematics are less likely to select a post-16 course which involves

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[6] *Evaluating mathematics provision for 14-19-year-olds* (HMI 2611), Ofsted, 2006; www.ofsted.gov.uk/publications/2611

[7] www.m-a.org.uk

[8] http://www.m-a.org.uk/resources/Policy%20on%20Early%20and%20Repeated%20Presentation%20for%20GCSE.doc Published June 2010

[9] *A Consultation on the Next Generation of National Qualifications in Scotland*, June 2008; http://www.scotland.gov.uk/Publications/2008/06/09084232/0

mathematics including courses with significant mathematics content such as engineering. They may not have studied any mathematics in Year 11 and so feel less confident in picking up the subject again. The same is true for those in a similar position who leave school at age 16 and find themselves ill-equipped to meet the mathematical demands of the workplace.

**Student entitlement:** pupils have an entitlement to be taught the full programme of study for mathematics at Key Stage 4. This programme of study is designed to be the essential mathematics that 16-year-olds ought to explore for future success. Any school that encourages early entry risks failing in its statutory duty to offer the full KS4 programme of study for mathematics, because it becomes easy to skip parts of the curriculum to achieve exam 'success' with a C-grade.

**Student understanding:** teaching for early entry is often characterised by focusing only on procedural performance at the expense of understanding by the average student.

**A crucial gap in learning:** Students stop learning mathematics altogether once a C-grade has been obtained – some schools treat this as being 'within the rules' if they can demonstrate that the whole programme of study has been covered, and it seems this practice is all too common. As the examination entry may be in Year 10, or even earlier, this can in some cases lead to one or two years of school education with no mathematics. Mathematical skills can atrophy without use, and so this gap can prove absolutely critical in a student's future education, undermining study at A-Level and university, and across a wide range of subjects beyond just STEM.

A strong **economic argument** can also be made against multiple entry, and the re-sits arising from early entry. Ofqual reports that schools now spend £281m on examination entry fees every year and highlights how this figure has grown from £154m in recent years[10]. The report does not discuss the extent to which this can be attributed to a growth in multiple entry over other factors (such as changes in the amount charged by awarding organisations, for instance), but any increase in expenditure arising from multiple entry and re-sits after early entry would constitute a very poor use of public money.

## 5. Is early entry ever justified?

Entering a few carefully-selected high-achieving individuals for an examination early is by no means 'new'; some of today's adults took O-level or GCSE Mathematics and then followed it up with deeper or broader mathematical study. In many schools such individuals were likely to be a small group, even within the top set.

[10] School expenditure on entry fees in England in 2008/09, increasing from £154m in 2002/03; *Annual Qualifications Market Report 2010*, Ofqual, 2010; http://www.ofqual.gov.uk/public-download/category/59-resourses?download=611%3Aannual-qualifications-market-report-2010

What *is* new is the recent trend towards entering average students and even whole cohorts early, driven by league tables and other factors described in section 2. Success at age 16 ought to be characterised by a sound grasp of fundamental concepts in mathematics and the confidence to apply them, not by the early passing of examinations.

Ofsted notes that "early entry can be successful in circumstances where the students all have the ability to achieve high grades and there is a carefully planned learning pathway available which ensures an appropriate depth of understanding of mathematics beyond GCSE."[11]

If any students are to be entered early, they must be confidently predicted to achieve an A* and must have developed a strong foundation for further study, through striving to get routine tasks (especially algebraic manipulation) completely fluent and robust. A suitable programme of further study *must* also be provided so that it is seen as a route of progression towards A-level. However, the data suggest that these criteria are being disregarded, by school leaders choosing GCSE results and league table position over the mathematical education of the students.

Even where these criteria are met, the vast majority would still be better served by studying further first and then taking the exam with the rest of the cohort in year 11, thereby maximizing not only their grade performance but their depth and robustness of understanding, together with their enthusiasm for further study: we believe that the Key Stage 4 curriculum offers scope for the mathematical fulfillment of virtually all students if proper opportunity is made for an enriched and challenging experience (which may on occasion offer glimpses of carefully selected higher mathematics). Few students would be missing out if they were forced to wait, as the exam itself is not a barrier to studying further than the usual GCSE syllabus. Working around and beyond the specified material should be part of good teaching, and can ensure that the talented are not held back, that strong foundations are built and that students can enjoy the intellectual experience of mathematics.

Other rare cases for early entry could include social reasons where there is a risk of non-completion of a course due to social factors – in which case an early examination is better than none at all – and where the strategy is used to raise aspirations.

## 6. Where do students' best interests lie?

Teachers are required to make difficult decisions on behalf of the individuals in their charge. It is easy for teachers to see their duty as ensuring by any means that their students achieve a grade C in mathematics, given that this is the gatekeeper qualification for students to move on to the next stages of their lives, providing access to a range of careers and further study. This can present a considerable moral quandary for a teacher.

However, it is not by chance that GCSE mathematics is held in such high esteem – many post-16 routes, including the world of work, require fluency in basic mathematics and engagement with it for further progression and success.

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[11] *Evaluating mathematics provision for 14-19-year-olds* (HMI 2611), Ofsted, 2006; www.ofsted.gov.uk/publications/2611

Achieving a grade C is not the finish line – it is the start of the next event, and encouraging an early sprint is an unwise approach in the long term. Neither the nation's nor the students' long term interests are served by early entry. It is in everyone's interest that more young people at age 16 possess a deeper and more secure understanding of mathematics.

## 7. Recommendations

ACME recommends that:

- All students should be required to participate in mathematics up to the end of Key Stage 4, irrespective of whether a GCSE has been achieved earlier. The government should review and update the wording of the current entitlement to the programme of study for mathematics at Key Stage 4 to reflect this.

- The Department for Education should commit to gathering and publishing data that measure the impact of early entry on progression post-16, and use this to issue further guidance to schools on the educational dangers of early and multiple entry. In particular, the Department should monitor the effect of the introduction of the English Baccalaureate and the removal of KS3 tests on this trend.

- Part of the Ofsted inspection process should include investigation of the justification for early or multiple entry where it is being used, even where the result is an improvement in GCSE grades, and noting that early entry should never be used for whole cohorts. Where a school is deviating from Ofsted's own advice it should always be expected to explain why. Artificial improvement of GCSE pass rates through multiple entry is a poor use of public money and does nothing to improve the true educational standards of any school.
- The rationale for performance tables needs to be revised to minimise the incentives for early entry, and to reflect broader educational objectives such as positive attitudes to mathematics and mathematics-related tasks, confidence to use mathematics, and the take-up of mathematics courses post-GCSE. We fear that the practice is likely to continue as long as schools are measured simply on their students' acquisition of GCSE grade C (or above).
- National Challenge status schools should be measured against a more meaningful measure of school improvement than GCSE pass rate per se, such as participation in STEM subjects post-16.

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