Post-16 Mathematics: Engaging the new cohort

Context and rationale

- The Advisory Committee on Mathematics Education (ACME) supports the aspiration that everyone should be actively engaging in mathematics until they are functioning at the equivalent of at least Level 2 in mathematics. The *Wolf Review* in 2011 recommended that all learners should continue to study mathematics until achieving a Grade C in GCSE or equivalent. [1]   However, the Review also notes that each year some 300,000 young people reach 18 without achieving this, either due to failure on re-sitting or dropping out of the system.

- GCSE Mathematics provides a measure of threshold mathematical functioning. It also is a gatekeeper qualification for employers and higher education institutions (HEIs). However, **ACME has been considering an alternative qualification to better meet the needs of those who reach 16 without GCSE Mathematics Grade C or equivalent**, and believes that there is a demand in the mathematics community for such a qualification.

- From 2015 all 16 year olds will be required to work towards a Level 2 Mathematics qualification. Those who reach 18 without achieving this will therefore make up a new and large post-16 cohort which is likely to increase, at least in the short term.

- Existing qualification arrangements for this cohort are not suitable: re-sitting a GCSE numerous times is not beneficial to students or to schools and colleges. Such students also have higher levels of experience and maturity than 14 year olds starting a GCSE. New good quality pathways, leading to well recognised qualifications, are required **to ensure that governmental aspirations are reached and that this new cohort is given need appropriate provision**. Given that Key Stage 4 and post-16 mathematics qualifications are under review, ACME advises investing in a new qualification, specifically for this cohort.

In this paper **ACME considers current qualifications and outlines proposals on how best to provide good quality learning for this new cohort**, drawing on ACME´s advice from position statements, policy reports and consultation responses across all key stages and post-16. [2] Additional primary research was carried out in Spring 2013, in the form of semi-structured interviews with teachers and students at a range of post-16 institutions, including schools, sixth form colleges and Further Education (FE) colleges, and informs the section on observations on current qualifications below.

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[1] https://www.education.gov.uk/publications/standard/publicationDetail/Page1/DFE-00031-2011
[2] http://www.great-learning.co.uk/wp-content/uploads/2011/03/Evaluation_of_the_Functional_Skills_Pilot_Summative_Report-feb-11.pdf

Aims for post-16 mathematics provision

ACME has similar aims for the new cohort of learners as for all learners of mathematics,[3] but also notes some specific objectives for these learners:

- all learners should gain skills in solving problems through developing conceptual understanding, reasoning mathematically and becoming fluent in the fundamentals of mathematics and should be able to apply this mathematical knowledge to a range of contexts
- students should use and enjoy mathematics which they recognise as relevant and empowering, and should increase in competence and confidence in doing mathematics
- assessment should recognise mathematics knowledge, skills and understanding of this cohort of learners and should provide good quality pathways leading to well recognised qualifications. Employers and other end users should recognise mathematics learning achieved post-16 and value a range of qualifications

Observations on current qualifications

Current qualifications are recognised as having strengths and weaknesses. Interview responses suggest that early success (for example from smaller-than-GCSE size qualifications), distinctive learning practices, coupled with substantial weekly learning sessions could bring successful engagement and progression for those who find it difficult to gain a GCSE Mathematics Grade C or equivalent.

- **GCSE** remains a recognised and valued qualification at the end of Level 2. However, many students who do not achieve Grade C are forced to re-sit the exam, sometimes many times, with very high figures not achieving Grade C in re-sits. However, interviews highlighted that rates rise to as much as 80% when entry is restricted to students with a D grade and if three or more hours of specialist, student-led teaching a week for a year is provided.

- **Functional Skills** are included in the Key Stage 3 and Key Stage 4 curriculum. Assessment is open-response and task-based requiring problem solving and transferable skills. Interviews with teachers and students highlighted that the variety of the qualifications on offer and the varied range of expectations can be problematic. However, they report success where active student-centred teaching is led either by mathematics specialists familiar with students´ main areas of study, or by non-specialists who have had substantial focused professional development. Most progress was noted where at least two hours a week is devoted to mathematics, for example at Entry Level (for those with G or no grades at GCSE), Level 1 (for those with E or F) or Level 2 (for those with D).[4]

- **Level1/2 Certificate in Use of Mathematics** has been developed as a GCSE equivalent qualification. Students choose two Free-Standing Mathematics Qualifications (FSMQs) focusing on Finance, Shape, Data and Algebra. Interviews highlighted that schools and colleges using **Level 1 or 2 Certificates**, for example in Finance or Data Handling, benefit from practical, applications-centred specifications. The small size of these qualifications and their relevance to real life situations or future career options can break down resistance to further engagement with mathematics. Together the units cover most National Curriculum areas and gaining the qualification encourages progression.

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[3] http://www.acme-uk.org/media/7627/acme_theme_b_final.pdf; http://www.acme-uk.org/media/7624/acme_theme_a_final%20(2).pdf
[4] http://www.great-learning.co.uk/wp-content/uploads/2011/03/Evaluation_of_the_Functional_Skills_Pilot_Summative_Report-feb-11.pdf

ACME's proposals

ACME has considered how best to meet the needs of those students in the new cohort without GCSE Mathematics Grade C or equivalent. ACME suggests that provision should integrate the following elements:

1. Students who embark on post-16 education, employment or training without a GCSE in mathematics should participate in a structured mathematics course, which employs active student-centred learning and offers opportunity for early success. The course would require 2 or more hours contact time per week in two sessions and should be taught by mathematics specialists.

2. Students who have a grade D in GCSE at 16 should study a GCSE level course in their first year of post 16 study. Ideally this will be a certificates-plus-core, or unitised, course, distinctively designed for learners who have increased experience and maturity, and would offer the chance to achieve beyond Grade C. This would enable them then to access a new post-16 course, as recommended by ACME in 2012.[5]

3. For learners without a Grade D there could be two possible pathways. Smaller centres might offer just one. Both pathways would usually take more than a year to complete.

    > ***Pathway*** 1: At Level 1 an applications-based Certificate course consisting of units in Finance and Data, together with another unit could be offered. Students might start with one or more Level 1 Certificates and then progress to level 2. At Level 2, Finance, Data Handling and Core would make up a new qualification and should also enable access to the new post 16 course.[6]

    > ***Pathway 2:*** Functional mathematics to entry level or Level 1 or 2 (over a part-year, year or more), followed by a transfer to the above Mature course.

4. There is notable risk of proliferation of qualifications. Each of the above qualifications should be accredited in no more than 3 versions, for recognition, maintenance of standards and credibility. Ways should be found to address the risk of proliferation.

5. Higher Education and employers should be involved in the development of such qualifications to ensure their credibility and legitimacy and to ensure that they are valued and asked for.

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[5] http://www.acme-uk.org/media/10463/acme%20response%20to%20the%20department%20for%20education%20consultation%20on%20keys%20stage%204%20qualification%20reform%20final_sent%20to%20dfe.pdf

[6] http://www.acme-uk.org/media/10463/acme%20response%20to%20the%20department%20for%20education%20consultation%20on%20keys%20stage%204%20qualification%20reform%20final_sent%20to%20dfe.pdf