



CAMBRIDGE ASSESSMENT

Research summary – Focus group findings on stakeholders' views on the new mathematics qualification for sixteen year olds

Dr Simon Child and Dr Sanjana Mehta

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**Research Division
Assessment Research and Development
Cambridge Assessment
1 Regent Street, Cambridge, CB2 1GG**

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1 The study

The Research Division at Cambridge Assessment conducted a series of focus groups with the aim of investigating teachers' and employers' views on the development of new qualifications for 16 year olds. Three of the focus groups had stakeholders present who were interested in the new GCSE for mathematics. Two focus groups contained mathematics teachers, with representation from independent, comprehensive and grammar schools. The employers' focus group had six participants and included: an employee of a large British bank responsible for the apprenticeship scheme in the organisation; an owner of a catering company used to employing 16 and 17 year olds; a representative of a large national recruitment company; an owner of a hair salon with experience of taking in 16 and 17 year olds for apprenticeships; and two representatives from large apprenticeship and training companies. The study investigated teachers' and employers' views in relation to the following themes:

- A. The important mathematical skills that 16 year olds require for later education and employment
- B. The important knowledge areas in mathematics that 16 year olds require when moving into further education or employment
- C. The views on effective examination questions in mathematics
- D. The assessment structure of the new qualification in mathematics
- E. Tiering of the new mathematics qualification
- F. Grading of the new mathematics qualification
- G. The use of examination aids in mathematics
- H. Selection of 16 year olds for employment.

2 Main findings

- A. The employers in the mathematics focus groups emphasised the importance of practical application of mathematics, such as data handling, interpretation, mental arithmetic and problem solving. They explained that it was very important for new employees to be prepared in basic mathematics and have some ability to analyse and interpret multiple sources of data, along with some understanding of statistics, such as mean, median, and mode.
- B. The mathematics teachers listed the following core knowledge areas for 16 year olds: algebra; trigonometry; shape; number; arithmetic; graphs; and normal distribution. Some teachers were of the view that more algebra could be incorporated into a new qualification to better prepare students for A Level.
- C. The teachers felt that an effective mathematics examination question should highlight the purposes and wider applications of mathematics to other subject areas. Teachers also suggested that examination papers should contain a balance of practical and abstract questions. Any context surrounding questions should not be artificial or contrived.
- D. Some mathematics teachers felt that it would be useful to have two separate qualifications; one on functional numeracy skills, and the other on pure mathematics. Other teachers thought it would be beneficial to separate statistics from mathematics, as this would allow more teaching time on pure mathematics.
- E. The majority of the mathematics teachers wanted tiering to be retained in some form. The main argument for this was that tiering can cater for different interests and strengths of the student. There were also concerns about the setting of an appropriate non-tiered paper. Teachers suggested that the structure of the qualification could alleviate issues with tiering, by offering an initial numeracy paper, with an extension-type paper for more able students.
- F. There appeared to be no clear consensus among the participants regarding the most effective grading model for the new qualifications. Teachers thought that grades were potentially unfair to students who scored near grade boundaries. However, some teachers were concerned that using marks or percentages may lead to extrinsic factors having an effect on how students' ability is judged (eg health on examination day). Finally, some teachers advocated dividing marks by topic area, as this may give useful information to help students decide future course or career choices.
- G. The mathematics teachers were generally in favour of providing students with calculators and formulae sheets in the examinations, as it allowed students to apply their mathematical knowledge beyond the simple manipulation of numbers. However, several teachers also emphasised the value of allowing students some opportunity to become comfortable with problem solving without the use of these resources.

H. The employers in the focus group reported not using grades as an indicator of their employees' mathematical ability, as they did not supply sufficient information about their capacity to apply mathematical skills to practical situations. They did note, however, that large companies use grades as an initial selection filter. Several other criteria, such as job applicants' previous work experience, team work and communication skills and professed motivation for a job role, influenced the selection process.