Department for Education

The independent evaluation of the pilot of the linked pair of GCSEs in mathematics (MLP)

Fifth interim research brief

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Introduction

Alpha*Plus* Consultancy Ltd was commissioned – originally, in March 2010, by the Qualifications and Curriculum Development Agency (QCDA) and then, from March 2011, by the Department for Education (DfE) – to evaluate the pilot of the linked pair of GCSEs in mathematics (MLP). The pilot programme and the evaluation run until January 2014.[1] This research brief reports interim findings from the sixth round of fieldwork, conducted in early 2013.

As at the end of March 2013 there were 271 centres participating in the pilot: AQA, 97; Pearson (Edexcel), 99; OCR, 65; WJEC, 10.

Background to the pilot and evaluation focus

The MLP qualifications are 'methods in mathematics' (Methods) and 'applications of mathematics' (Applications). The two qualifications together cover the entire Key Stage 4 (KS4) programme of study (PoS) for mathematics but with some additional content; neither qualification by itself covers the full KS4 PoS. A new single GCSE in mathematics – 'nested' in the paired MLP qualifications – was also developed for first teaching in September 2010. Candidates should be entered for either the single GCSE in mathematics or for both qualifications of the MLP.

The single GCSE and the MLP were developed with three aims:

- To increase engagement with and participation in mathematics at GCSE and beyond
- To enable understanding of the relevance of mathematics
- To offer opportunities to stretch and challenge all students.

There were additional wider aims for the MLP. These were to:

- increase students' commitment to mathematics and their engagement with the subject
- develop greater breadth and depth of subject skills and knowledge in students, by having them undertake two GCSEs, with additional content, that would prepare them for progression to further study
- develop students' recognition of, and capacity to use, the different methods of enquiry encouraged by having two distinctive GCSEs.

[1] The MLP pilot is funded by the Department for Education (DfE) in England and the Welsh Government in Wales.

The overarching research questions for the evaluation of the MLP are:

- How are the MLP qualifications being implemented?
- What has been the impact of the MLP qualifications on the teaching and learning of mathematics (including the impact on students' engagement, and on their skills, knowledge and understanding, in terms of their breadth and depth of understanding of mathematics)?
- To what extent are the MLP qualifications appropriate for different student cohorts and different centres?
- What is the impact of the MLP on students' participation, attainment and progression?
- What is the 'value' of the MLP qualifications over and above what is offered by the single GCSE?

The overall aim of the evaluation is to consider the extent to which the MLP offers a different experience of learning mathematics from the single GCSE. The evaluation has collected fieldwork data over the first two and a half years of the pilot and has included visits to case-study pilot centres, pilot-centre online surveys, and stakeholder telephone interviews and focus groups. The evaluation has also included statistical analysis of the assessment data provided by awarding organisations participating in the pilot, matched to the national pupil database (NPD) and data about schools from Ofsted and Edubase.

This report has used data from all six rounds of fieldwork with case-study centres, including new data collected in early 2013. A total of 13 case-study pilot centres, all of which had taken part in at least three previous rounds of data collection, were involved in the latest round of field research undertaken in early 2013. The new data comprises in-depth interviews and classroom observations at eight case-study pilot centres and in-depth telephone interviews with the head of mathematics (HoM) from five case-study pilot centres. The analysis and reporting focused on the learning journey for the schools involved in the pilot in terms of distance travelled and lessons learned. Given the relatively small number of case-study centres involved in the evaluation, the findings need to be treated with some degree of caution.

Key findings

- The qualifications themselves were broadly used as a vehicle to facilitate, rather than as a catalyst for, change. The introduction of the MLP qualifications and any measurement of impact must therefore be understood within the context of centres' cultures and ethos, and of their reasons for taking part in the pilot.

- The implementation of the MLP has had the greatest impact in those centres where the focus was on enriching students' experience of learning mathematics and increasing mathematical understanding rather than on increasing GCSE grade performance.
- Where HoMs in the case-study centres showed strong leadership, vision and implemented major changes in their own pedagogy, teaching staff followed suit, motivated by positive changes in student engagement and attainment.

Summary of findings

The learning journeys, together with case-study centres' perceptions of the value of the MLP, have been largely determined by centres' starting points and their reasons for taking part in the pilot. The data, considered over the lifetime of the pilot, suggests that variation in perceptions of the impact of the MLP is largely driven by these wider factors. The qualifications themselves were broadly used as a vehicle to facilitate, rather than as a catalyst for, change. The introduction of the MLP qualifications and any measurement of impact must therefore be understood within the context of centres' cultures and ethos, and of their reasons for taking part in the pilot.

Throughout the pilot, centres have remained enthusiastic about the breadth of learning that the MLP offers; there has, however, been less consensus on the extent to which the MLP has promoted depth of mathematical understanding. The introduction of a number of additional topics in the MLP was seen to support preparation for A level topics. Pre-calculus (area under a curve) and linear programming were cited as being most useful in stretching and challenging students and supporting progression. Some pilot centres, however, have continued to report the use of further learning materials or bridging qualifications to supplement the MLP; these include level 3 mathematics qualifications, which centres felt were useful and necessary for stretching and challenging higher-attaining students. Some case-study centres reported that, although they recognised opportunities for a high level of algebra in the specifications, they were disappointed that this was not always reflected in the examinations.

Students' engagement and motivation were felt to have increased significantly where new, innovative teaching methods had been prompted by the introduction of the MLP. Opinion continues to be divided, however, about how suitable the MLP is for the majority of student groups. Overall, case-study centres considered the MLP to be broadly appropriate for most student groups where there is enough curriculum time to teach the additional content. How much time the MLP requires appears to depend on student cohort, centres' mode of delivery and on when assessments are taken.

In terms of grade outcomes, and on the basis of statistical analysis of attainment data from the first two-year cycle of the MLP, students did a little better on MLP qualifications than on the single GCSE, particularly those students with high prior attainment (national curriculum level 5 at KS2), and particularly when the opportunity to select the better of two grades is taken into account. The implementation of the MLP has had the greatest impact in centres

where the focus was on enriching students' experience of learning mathematics and increasing mathematical understanding rather than on increasing GCSE grade performance. Centres focused on grade performance often reported limited change to pedagogy; several of these centres have withdrawn from the pilot because grades have not been as good as they had expected.

There was at times a clash between what mathematics departments would like to do and what centre-wide policy determined: for example, centres reported having to use a sequential model of delivery because it was centre policy that students complete one mathematics GCSE by the end of year 10 to allow for retakes, if necessary, in year 11. Other mathematics departments had a high level of autonomy, however, which allowed for greater personalisation of the learning for specific groups of students.

Where HoMs showed strong leadership and vision, and implemented major changes in their own pedagogy, teaching staff followed suit, motivated by positive changes in student engagement and attainment.

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The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

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