Durham University

Centre for Evaluation and Monitoring

Education Evaluation Group

Evaluation of the Further Mathematics Network

Final Report

Stage 3 of the Evaluation

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Scope of Stage 3 of the Evaluation

The evaluation of the Further Mathematics Network (FMN) has been carried out in three stages.

Stage 1 took place during 2006 and was reported in Interim Report 1 (September 2006)
Stage 2 took place during 2007/08 and was reported in Interim Report 2 (February 2008)
Stage 3 took place during 2008/09.

Stage 3 of the evaluation focused on four aspects of the Further Mathematics Network

1. A Model of the Further Mathematics Network

Centre Managers were interviewed for their views of the network in its third year to ascertain the extent to which the reality of the FMN fitted the idealised model.

2. Schools and colleges where there has been substantial growth is student numbers.

Heads of Mathematics Departments or teachers responsible for Key Stage 5 were interviewed concerning the growth of Further Mathematics in their institution.

3. Schools and colleges where the teaching of Further Mathematics is largely done by their own teaching staff "in house"

Heads of Mathematics Departments or teachers responsible for Key Stage 5 were interviewed concerning the management of Further Mathematics in their institution.

4. Data analysis in take up and achievement in Further Mathematics 2004 - 2008

An update of the analysis that was carried out in Stage 2 of the evaluation.

Scope of this interim report

1. Introduction and review of the evaluation of the Further Mathematics Network (FMN) in stages 1 and 2 of the evaluation.

2. Report on the interviews with Centre Managers and assessment of the FMN Model.

3. Report on the interviews with Heads of Mathematics departments concerning growth in student numbers.

4. Report on the interviews with heads of Mathematics departments concerning management of Further Mathematics in their institution.

5. Data analysis for the six years 2004 to 2008 to assess the changes in take up and performance in AS Level and A Level Further Mathematics.

6. Points to consider in developing the role of the FMN in England.

Key findings of this final report

1. Model of the Further Mathematics Network.

The model of the Further Mathematics Network proposed by the Central Team captures the complexity and diversity of the Network and is an accurate reflection of how the Network operates in practice.

Centre Managers generally consider that the Network is working well, and providing support for schools and colleges and their students in a variety of ways.

2. Institutions where there has been substantial growth in student numbers

There are several factors largely common in the schools and colleges which have seen substantial growth in student numbers studying Further Mathematics.

(i) The good reputation of the school and department in the locality of the institution.

(ii) Changes to timetable and option block structures which recognise Further Mathematics as a timetabled option for sixth form students.

(iii) Recognition by students that a qualification in Further Mathematics is a career asset, particularly for entry to Higher Education.

(iv) Positive support for students and a general enthusiasm from the teaching staff for Mathematics.

(v) Recognition by the staff and acceptance by the students that the changes made to Mathematics specifications in 2004, have made Further Mathematics accessible to a greater number of students.

3. Institutions that are teaching small cohorts of students in house

The factors in 2. above were also factors in these institutions. In addition the following factors were prominent.[1]

(i) Commitment from the staff, particularly the teacher responsible for Key Stage 5 that Further Mathematics will be offered as a timetabled option, even if on reduced time.

(ii) Support from the Senior Management Team, particularly in the kudos that offering Further Mathematics brings to the institution and thus helping to attract and retain able students.

(iii)The flexibility of the modular structure of the current AS Levels and A Levels in mainstream Mathematics and Further Mathematics that allows application options to be available to both qualifications. This enables flexible teaching arrangements between years 12 and 13.

(iv) The provision of a variety of enrichment activities throughout a school and the encouragement of Year 11 students to consider continuing their study of Mathematics at advanced level.

(v) The support of the FMN was generally valued including access to the MEI online resources and opportunities for students from different institutions to meet each other at revision and enrichment events. Some teachers noted that Further Mathematics would not be running in their institution if it wasn't for the support of the local Centre Manager.

[1] It should be noted that the samples in Sections 2 and 3 are relatively small, with 22 interviews being conducted for Section 2 and 33 for Section 3, compared to about 3000 secondary schools and colleges in England. The teachers concerned all indicated a willingness to be interviewed so they and their institutions may not be totally typical of institutions as a whole.

4. Data Analysis 2004-2008

4.1 The impact of the FMN, and other STEM initiatives, is seen in a sustained growth in numbers of students taking Further Mathematics. (Tables 5.1(a) and 5.1(b))
Entry numbers in A Level Further Mathematics have continued to grow, with nearly 1300 more entries in 2008 than 2007, a growth of approximately 18%. Since 2004 numbers have increased by about 66%, to about 8500 entries in 2008.
Entry numbers in AS Level Further Mathematics have also continued to grow but less so, with about 770 more entries in 2008 than 2007, a growth of approximately 16%. However, since 2004 numbers have risen by about 112% to about 5500 entries in 2008.
About 60% of the A Level entry in Further Mathematics continues to achieve a grade A, whereas this is about 40% at AS Level.

4.2 There has been little change in the gender balance between 2007 and 2008, with about 70% of the A Level entry being male, and 63% of the AS Level entry being male. This compares with a gender balance of about 60% male in 2008 for mainstream Mathematics. Thus there is still scope to attract relatively more female students into taking Further Mathematics. (Table 5.2)

4.3 The number of candidates taking only the main A Level in Mathematics rose by over 3000 between 2007 and 2008, whereas those taking the main A Level together with A Level Further Mathematics rose by about 1350 candidates with a rather smaller rise of 200 candidates taking the main A level in Mathematics together with the AS level in Further Mathematics. Thus there is still scope to encourage those candidates capable of A Level Mathematics to take a Further Mathematics qualification as well. (Tables 5.3(a) and 5.3(b))

4.4 In comparing the state and independent sectors, the bulk of the growth in numbers of students taking Further Mathematics has been in the state sector. Between 2004 and 2008 about 74% of the growth in A Level Further Mathematics entries has been in the state sector, and even more so for AS Level Further Mathematics at about 90%. (Tables 5.4(a) and 5.4(b))
This is reflected in the number of institutions entering at least one candidate. For A Level Further Mathematics, in the state schools sector this has risen by over 50% between 2004 and 2008 to over 900 schools, with about a 20% rise in the number of post 16 colleges to about 170 in 2008. This compares to about a 17% rise to just over 400 schools in the independent sector. For AS Level Further Mathematics, in the state schools sector this has risen by nearly 60% between 2004 and 2008 to 865 schools, with about a 20% rise in the number of post 16 colleges to about 170 in 2008. This compares to about a 21% rise to about 280 schools in the independent sector. (Table 5.5)

4.5 The increase in the number of institutions offering Further Mathematics to at least one student probably goes some way to accounting for the fact that the bulk of students are taught as a small cohort. In 2008 for A Level Further Mathematics about 65% of schools and colleges had cohorts of 5 students or less compared to 69% in 2007[2]. In 2008, only about 3% of institutions had cohorts bigger than 20 students. (Table 5.6(a))

[2] It should be noted that although some schools and colleges may have very small entry numbers the students themselves may have been taught in larger groups with students from other institutions through tuition by the Network at a FMN Centre.

For AS Further Mathematics there are even more small cohorts, with about 78% of schools and colleges having cohorts of 5 students or less compared to 80% in 2007. In 2008, only about 2% of institutions had cohorts of AS Level Further Mathematics students bigger than 20 students. (Table 5.6(b))

4.6 The number of institutions offering Further Mathematics compared to the number of institutions offering A Levels and AS Levels in any subject has risen steadily between 2004 and 2008. In 2008, over half of the institutions in England entered candidates for Further Mathematics at A Level and this is proportion is fairly consistent across the nine regions of the country, varying from 44% in the West Midlands to 60% in the South West. (Table 5.7(a)). For the AS Level in Further Mathematics a little fewer than half the institutions in England entered candidates with this varying from 43% in the West Midlands to 53% in the South West. (Table 5.7(b))

4.7 Comparison of the performance of the students taught through the FMN with that of all students using the CEM Centre's ALIS project indicates that for A Level Further Mathematics there is no significant difference between the two. However, this is not the case for AS Level Further Mathematics, where the ALIS analysis indicates that students taught through the FMN are significantly under performing.

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1. Introduction and Review of Evaluation Stages 1 and 2

The Further Mathematics Network evolved from a project entitled *Enabling Access to Further Mathematics* which was initiated by MEI in 2000 in response to a drastic decline in the number of students taking Further Mathematics in the 1990s. The Project was funded by the Gatsby Foundation and aimed to make Further Mathematics available to all sixth form students who could benefit from studying it. The Project started with about 50 students and by 2004 MEI was planning for up to 200 students to be studying Further Mathematics through the Project. However, 2004 saw the publication of the report by Professor Adrian Smith into post 14 Mathematics, in which the need for more students to have the opportunity to study Further Mathematics was highlighted. The response from the DfES was to agree to expand and replicate the MEI initiative by funding a Further Mathematics Centre in each of the 47 Learning Skills Council areas in England. Ultimately 47 such Centres were established each with a Centre Manager, and they together with a central team of professional officers from MEI, formed the nucleus of what became the Further Mathematics Network; (more detail is given in Interim Report 2).

The CEM Centre at Durham University had been appointed by the Gatsby Foundation to evaluate the *Enabling Access to Further Mathematics Project.* A continuing formative evaluation formed an integral part of the development of the FMN, and the CEM Centre continued as evaluators of the FMN, now funded by the Network via the DfES funding. Stage 1 of the evaluation, which reported in September 2006, focused on the initial setting up of the Centres and the issues and problems encountered in doing so. The evaluation was based on interviews with 24 of the Centre Managers, their Centres being amongst the first to be set up. The outcome was ten points for the FMN Central Team to consider in developing the Network. The response of the FMN Central Team in terms of action taken to address each of these ten points was reported in Interim Report 2, published February 2008. These same 24 Managers were interviewed again for Stage 3 of the evaluation, to assess their views on how the Networked had developed since the initial establishment of their Centres. The results of these interviews are reported in Section 2 below.

During stage 2 of the evaluation, the evaluators were invited to attend a Network tutor training event and a regional meeting of Centre Managers. Although some recommendations were made, such events as these were considered to be working well, and certainly the regional meeting fully illustrated the commitment of the Managers to making the operation of the Network a success. The main focus of stage 2 of the evaluation was, however, to assess the impact of the FMN on the take up and achievement of students in both A Level and AS Level Further Mathematics. This was done largely through an in depth data analysis of the examination entry results in Further Mathematics between 2002 and 2007 inclusive using data from the National Pupil Database supplied by the DfES. This analysis indicated year on year substantial growth in the number of student studying Further Mathematics and it was considered that this growth reflected very positively on the work of the FMN in attracting and supporting students. This analysis has been updated to include 2008 in this current report, with the analysis now focusing on the years 2004 to 2008, this five year period reflecting the time that the FMN has been in operating.

2 Report on Interviews with FMN Centre Managers

Introduction

In Stage 1 of this evaluation in 2006, the managers of the first 24 FMN centres to be set up were interviewed to seek their views on any problems and issues that had arisen during the process of getting their centre established. These interviews and the problems and issues they highlighted were reported in Interim Report 1. In particular in that report, 10 points were identified that it was recommended be addressed by the FMN Central Management Team. The response to these points was reported by the Network Programme Leader, as part of Interim Report 2.

The managers of the same 24 centres[3] have been interviewed again in April 2008, two years after the initial interviews, to assess their views on how the Network has developed and the extent to which problems and issues raised then have been resolved, and whether any others have arisen. The managers had largely remained in post for this period of time, only four of the centres have had a new manager in post. The interviews were again conducted by telephone based around a series of questions that had been made available to the managers in advance of the interviews. They were thus able to consider and prepare their responses.

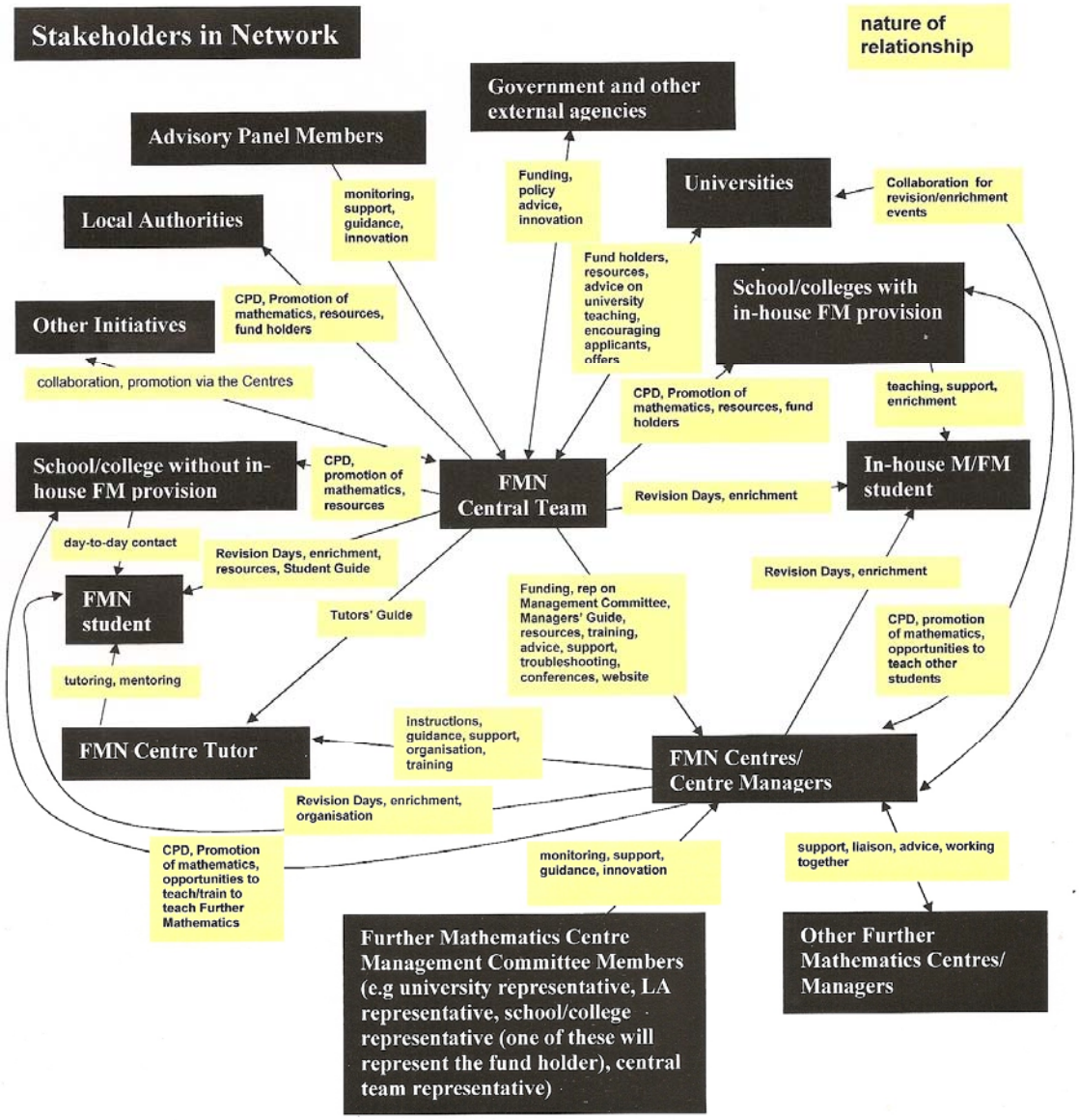
These interviews also had another principle purpose and that was to ascertain how representative the idealised model of the Further Mathematics Network is of what actually happens in the operational functioning of the Network in the regions. The idealised model had been given to the evaluators by the FMN Central Team. The FMN is a complex and distributed organisation involving interactions amongst many stake holders, all of whom are involved in the Network to varying extents and in different ways. Although it is recognised there are variations within the 47 regions in which the FMN operates across England, the conclusion is the model does accurately represent the operation of the Network. The model is reproduced here as Figure 1.

The interviews with the Centre Managers covered eight aspects of their role :

1. Registration and enrolment
2. Relationships with schools colleges, local authorities and universities
3. The Management Committee of the Centre
4. Tutors
5. Students
6. Relationships with the Central Management Team
7. Publicity and media
8. Future development

[3] There was one exception to this where a manager from a centre in a similar area was interviewed in place of the manager of the original centre who was not available.

Figure 1 Idealised model of the operation of the Further Mathematics Network



Each of the above eight aspects of the role of a Centre Manager is reported on in turn.

2.1 Registration and enrolment

It was reported in Interim Report 1 that the use of the term registration and enrolment had caused some confusion as to precisely what was meant. This was clarified to Managers by the Network Programme Leader and no such problem remains.

Managers generally have made contact with the all the all the secondary schools and colleges in their region, usually by initial letter followed up with e mail contact and a personal visit if invited. Approximately half the schools and colleges in a region are registered with the FMN although the proportions vary widely, as do the number of schools and colleges that are located within any one of the 46 regions. As well as the opportunity for support and tuition in Further Mathematics, Managers stressed the other benefits of registration such a access to the MEI online resources, and being kept informed of news and events relating to enrichment and revision opportunities. Several Managers reported that some 11-16 schools and independent schools had registered with them.

Manager s gave a variety of reasons when asked why some schools or colleges may not have registered. These included schools where further mathematics has been a viable subject for many years and the school, or head of department considers that the network has nothing to offer the mathematics department. Some Managers talked of long established Heads of Department who did things *their way*, and weren't interested in other possibilities. Some Managers thought some Heads of Department just to busy to respond to the request to discuss the FMN with them. Some still continued to mention that the FMN was seen as a threat in removing minority subjects from their school or college curriculum although this was considerably less than two years ago. Some Managers said they talked to school and colleges in terms of developing a partnership, not a competition for students.

The Managers all demonstrated the strength of the FMN in its versatility. Managers would clearly discuss with schools and colleges how the local Centre could help them to meet their needs whatever they were in terms of support for Further Mathematics, be this supplying a tutor for a single module for an individual student, or delivering a whole course to a sizeable cohort of students or simply advising on the teaching of Further Mathematics in their institution. There were many instances where the teaching of Further Mathematics is shared between a centre and the school or college.

Most centres offered support beyond tuition in Further Mathematics. Some gave support to students studying for the STEP award or AEA award, even if this just amounted to putting the student in touch with the Network's remote learning team, who were delivering a course for the STEP award electronically using the *Elluminate* virtual classroom software. This was generally reported as working very successfully. Some Mangers also gave support for the free standing additional mathematics qualification (FSMQ). It was mentioned by some that it wasn't just post 16 students being supported, many year 11 students, or younger, were studying AS modules or the FSMQ under the Centre Manager's guidance.

There is essentially only one outstanding issue regarding registration and that is re- registration. Although the Programme Leader had clarified that once registered a school or college was registered indefinitely, the Central Team did want schools and colleges to re-register annually, updating details such as the school contact and student numbers. This would guarantee continued access to the MEI online resources. Some Managers found that schools were not re-registering, thinking this may be due to Heads of Department not finding it a priority and thus creating the time to complete the necessary form. They might not have the required figures readily available. Some made the point that if a school or college was not making any great use of the resources,

what was the point in re-registering. There was concern amongst Managers that they didn't consider it constructive to keep pestering Heads of Department where the school or college hadn't re-registered. Some simplification of the re-registration process would appear to be needed.

2.2 Relationships with Schools, Colleges, Local Authorities and Universities

Once contact has been established relationships with schools and colleges are generally described as being very positive. Most Managers, but with some exceptions, also state the local authorities in their region (of which there is often more than one) are very supportive. For instance Managers are invited to attend meetings of Heads of Department and the local authority advisors or consultants are willing to promote the Network. Some local authority personnel are members of the Centre Management Committees.

Most Managers reported that their centre has good relationships with their local university. This may be through the Mathematics Department or the university's more general schools outreach and liaison department but again the support is positive, with again several university people often being members of a management committee. The university contact is also valued as a source of speakers for events and accommodation for events, often involving up to 200 students. There certainly seems a great willingness and desire to promote Mathematics by the university based people and to help students both pre and post 16 to see Mathematics beyond the classroom. Talks with titles such as "let maths take you further" and "I'm a mathematician, what do I do", were generally found stimulating by the students.

All Centres offer revision and enrichment events to some extent, varying from little to large scale and frequent events. A variety of speakers, including members of the FMN Central Team, have been used, made available through various contacts. The one on juggling seemed to be very popular. Similarly most centres have been instrumental in organising UK Team Challenges in Mathematics, in which students have enjoyed the challenge of competing with each other. It was commented by some that a lot of schools from the independent sector get involved through the Team Challenge; apparently they like to win!

What is also clearly apparent is the way in which the Managers from neighbouring regions collaborate in putting on events. A good example is the Eastern regional group (Norfolk, Suffolk, Essex, and Cambridge) where, for instance, there being no university in Suffolk, students from there can attend at Cambridge or UEA at Norwich. Clearly a lot of joint planning goes on which results in successful events. The only reported problem with such events is that some school Head Teachers are reluctant to release students and staff to attend, so the timing of such events has to be carefully planned.

CPD for teachers is often an integral part of revision and enrichment events. Teachers attend with their students and get a lot out of it themselves in terms of ideas for content and presentation. Some Managers reported that some teachers attend tutorial sessions as well. Some Managers have run more formal CPD for teachers offering particular modules for both main stream Mathematics at A-level and Further Mathematics modules, with varying degrees of take up.

Some Managers have made teachers aware of the Teaching Further Mathematics course, and supported teachers participating in that.

2.3 Centre Management Committee

In the first interim report (2006) it was reported that there was considerable variation in the Centre Management Committees in terms of membership and the frequency with which the committees met and the role they took in centre management. These have all been resolved and no Manager reported any issue with his or her Management Committee. In fact quite the opposite; Managers valued their committee and the regular meetings with a chance to get feedback on their reports and reaction to ideas for future planning. Attendance at meetings was generally very good. Membership was drawn from the fund holder and a member of FMN Central Team, together with some representatives of university departments, local authority mathematics advisors or consultants / teachers from senior management, heads of department and class teachers. Student representation was rare, but where this did occur, it was said that input from the students was very valuable. However, some Managers were reluctant to involve students because of possibly sensitive issues or the discussion of confidential matters. Another problem relating to student involvement was generally the time and location of the meeting not being suitable for students. Student feedback on how the Network operates and the service they receive is clearly important, and such a feedback mechanism needs to be considered.

Meetings were reported as being run formally with a pre-set agenda and minutes taken. Managers would typically present their termly report and seek feedback. They would also seek ideas and advice about future plans and clearly valued the feedback and advice offered. Similarly there was a clear impression, that members of the Management Committees saw their role as important in supporting the FMN in their region. It was clear that as well as the formal meetings there was considerable discussion between members of the Management Committees and the Centre Manager outside of the meetings so that there were no unnecessary delays in any developments.

2.4 Tutors

The number of tutors involved at Centres varies widely across the country depending on local needs. A lot of the tuition is carried out by the Managers themselves, but most are able to call on well qualified and experienced tutors to fulfil a need for a particular module or go to a school or college, when required. These tutors are often retired or semi-retired Heads of Department or experienced mathematics teachers in some way, and as such have needed little by way of training. Managers tend to do an induction into how the FMN operates themselves, showing tutors the online resources and advising on the management of students and the handling of a particular module using face to face contact, and distance learning support such as e mail. Managers generally make the Tutor's Guide available to their tutors, but doubt little use is made of it. If there are any issues tutors tend to discuss them with the Centre Manager and resolve them that way.

Some Centre Managers, who had close contacts with their local university, involved undergraduates or post graduates as tutors, especially at events. The universities themselves value their "undergraduate ambassadors" who can discuss with potential students what it is like to be a mathematics undergraduate.

2.5 Students

There is considerable variation amongst the Centres as to how students are actually taught, this very much depending on numbers and where students are located. Typically a tutor will go to a school and teach students based in that school, or they might be joined by students from other schools. Alternatively, all the students may travel and meet in a central location as such as a university department. Face to face tutorial sessions were typically one or sometimes two hours per week. Most Managers indicated a preference for face to face tutorials but they are now far more familiar with the distance learning and virtual classroom software *Elluminate*, all being aware of it and its potential and some using it, particularly in the geographically large shire counties. It was reported that generally students take to it readily.

It was also reported that students receiving tuition through the FMN are highly motivated and have high expectations of their tutors. Managers noted there was very little by way of problems with any students, but if there was an issue over non-attendance or poor work rate or similar, all FMN tutors had a point of contact at the school or college who would deal with it usually following an e mail contact. Heads of Sixth Form would often be notified, who would act to rectify a potential problem. It was sometimes the case that tutors would judge a student as not being up to the demands of studying Further Mathematics and the personal responsibilities involved and the school contact would probably advise the student that it was in his or her best interest to discontinue the course.

Managers and tutors were rarely asked for any formal reports other than requests for estimated UCAS grades. Generally they were willing to respond to requests from schools so if a parent wanted a report they might give it informally by 'phone or attend a parents evening if requested to.

The induction of students into what was expected of them in studying through the FMN was much the same in all the Centres. Managers would generally strive to make personal visits to schools and colleges which would potentially be providing students, in September, and meet the students and the mathematics and / or sixth form pastoral staff. Students were generally given the Student's Guide, but Managers had little knowledge of the extent to which it was used. Students would generally discuss any problems they may have with the Manager or their tutor and get them resolved that way.

What is clear from the range of students and the schools and colleges that they come from that one of the great advantages of the FMN is the flexibility it offers. Managers can usually meet local needs, whether it is just advice on setting up Further Mathematics in house and using the resources or providing a tutor to teach a single module and maybe just support one student, to providing whole course tuition for a large cohort of students.

2.6 Relationships with The FMN Central Management Team

The support from the Central Team, including both those supporting the delivery of the Mathematics and the administration and finance officers at the Central Office was highly valued by all Managers. Managers felt they were very well supported and all members of the Central Team and said that time was given freely to advise on any problems. The speedy response to any queries was commented on by many.

All Managers are aware of the Manager's Guide, many saying they read it when they first came into the job, but not recently. They all make extensive use of the Manager's area of the website. They like the news bulletins and being kept up to date with what's going on in the Network, and clearly valued the calendar reminding them what they should be doing each month. Most made some use of the Manager's forum, although Managers tended to fall into two camps, regular, contributors and regular readers. The sharing of resources through the website was thought to be very valuable.

Regional meetings varied widely in their nature and the frequency with which they are held. Indeed some regions seemed to be better defined than others, such as the South West, Eastern and the North East. These regions tended to hold regular meetings with the same Managers attending. In other areas although there are regional groupings and meetings are held, these are not so regular; it being said it is often difficult to find a time when all who wish to can attend. Some Managers choose to attend regional meetings essentially outside their region, some often going to more than one meeting. Whatever the opportunity to meet, Managers valued it, many saying that the role of being a Centre Manager was often an isolated one, in that were often geographically remote from each other. They liked having the chance to meet and share experiences and reassure each other they had similar problems and concerns. The meetings also gave opportunity to share ideas and plan events together with input from a member of the FMN Central Team.

This was similarly the case with the national conference where again the chance to meet with other Managers from across the country and just "network" is clearly valued. Managers talked about being enthused and reenergised through meeting with other Managers and the Central Team. The format of the conference was generally liked including opportunities to learn something new or get fresh ideas in teaching the content of some of the modules as well as getting support sessions on administrative matters. . Some did comment that it was quite a demanding programme and would appreciate it being lightened up, particularly late afternoon although all Managers considered the national conference to be effective and that they got a lot out of attending.

In the first interim report (2006) many Managers complained at the lack of administrative support and thus putting work load onto themselves when they would rather be teaching. There were no such complaints in this round of interviews. What has transpired is that as Managers have gained experience they are now generally much more confident in maintaining their part of the data base and now prefer to do this themselves. Many commented in that way they have control and it would actually be time consuming to teach someone else to do it. Some did query why so much was required in terms of data and wouldn't it be possible to slim down the data base and so make it easier to maintain it. However, most Managers were happy to let the finance department of

their institution deal with the finical matters with most saying this generally worked well, although things often were rather slow, such as payments to tutors, although this was not felt to be a problem. Administrative help for more routine tasks such as photocopying or posting out flyers and information for events was generally available, if only for a couple of hours a week and this was appreciated by the Managers.

Generally the Managers are very content with the support they get and no one reported any outstanding managerial issues. Many commented on the time the job took, but this was not a complaint. The job is bigger than the time available, but Managers generally reported that they really like being a Centre Manager and the work they do, and that their time is given willingly to do the job effectively. Some did have concerns over a wish to know "how am I doing", as compared to other Centres; some asked who should be judging and assessing their performance and to whom are they accountable. Some advice from the Central Team would seem pertinent here.

2.7 Media and Publicity

Managers generally reported little success in trying to get their Centre in to the local news. Some considered it now to be a waste of time trying, although others reported there had been coverage of UK Team Challenge events. Managers generally saw other aspects of publicity as more important, such as continually making contact with all schools and colleges in their region, and making use of university based newspapers where the local university press officer would often give space and help with an article. Many Managers produced a centre newsletter, which would be distributed to schools and colleges, often with the support of the local authority. Some Managers commented that they get contacted directly by parents looking for tuition for their son or daughter.

2.8 Development

Many Managers made a comment along the lines that they are proud to be part of the FMN and that it is a privilege to work for the Network and with so many dedicated and committed individuals. They generally do believe that the profile of Mathematics has been raised and career opportunities for many students clarified and students having had the opportunity now to study Further Mathematics have gone onto study STEM related courses at university. Many managers noted this would not have happened with out the FMN. Thus they put forward firm arguments for the Network continuing.

Some Managers were moving on after three years or were approaching retirement, and there was some concern over who might replace them. They weren't being pompous in noting it does need a certain calibre of individual to successfully run a Centre. They identified the people needed as being well qualified and experienced teachers of mathematics who can take on all the administration involved, delegate where appropriate and have good networking skills. Whether there were such individuals "out there" was a question raised by some. Although, as said earlier, most Managers were very pleased with the tutors they had to work with, it was noted too that there is generally a lack of younger ones.

The biggest concern re the future was insecurity related to funding. Although most felt secure until 2010, they did note the funding level would drop. Some Managers were motivated to seek out more students to help their financial viability, believing there are stills schools and colleges in their region where the students could benefit, but there has been no positive response from their school or college as yet. Others noted how they were becoming "victims of their success" in that if schools took Further Mathematics back in house, then the revenue from those student was lost to the Centre. However, some questioned whether taking it back in house was really sustainable for some schools and colleges, as they were aware of acute shortages of well qualified and experienced mathematics teachers in some of the regions.

Many Managers highlighted a related funding problem, this being the ceiling that the Learning Skills Council place on the number of AS Level and A Level course they will fund. Managers felt there were many students in the regions who were being denied opportunity to study Further Mathematics through a school's or college's concern over financing it. There was clearly some frustration at the perceived conflict of the government wanting more students studying Mathematics and the STEM related subjects, but not being willing to fund it. There was fear that if funding drops, the level of activity will drop and with it the level of interest in Further Mathematics, taking the "problem back to square one". Some wondered if local authorities might see a role for consortia of schools in providing Further Mathematics, although noting the purpose of these consortia is primarily to deliver the new diploma qualifications.

The conclusion for most Managers was that the FMN should continue doing what it is doing and a funding mechanism must be found. Some noted there are other initiatives such as *Aim Higher* and *More Maths Grads* and SETpoints, but that the FMN was already achieving what these initiatives had set out to do. That is providing tuition in the Further Mathematics modules to who ever wants it and can benefit from it whilst continuing to promote and stage events that will enthuse younger students into wanting to take Mathematics further. Although some Managers considered that some rationalisation might be necessary asking are 47 Centres really needed taking the Warwick Centre as a model of what could happen, the general feeling is that the Network operates very successfully and as such the government should fund it to ensure its continues to do so.

3 Interviews with Heads of Mathematics Departments on Growth in Numbers of Students taking Further Mathematics in their Departments.

Approaches were made by letter to the Head of Mathematics at 40 schools or colleges in May 2008. These schools and colleges were selected because they had shown an increase in the number of students entered for either AS Level Further Mathematics or A Level Further Mathematics during the last few years. The number of students studying Further Mathematics was taken to be the number of graded entries for the AS Level qualification and / or the full A Level qualification as recorded on the National Pupil Database (NPD) for the years 2004-2007 inclusive; the analysis and the associated interviews were carried out before the 2008 results were available in the NPD. The criterion for selection was that an institution had entered 5 or fewer students in 2005 and 10 or more in 2007 at either AS Level or A Level in Further Mathemtics.

This criterion was met by 32 institutions at A Level and by 39 institutions at AS Level. The sample was drawn from these institutions and was also chosen to include state comprehensive school, state grammar schools, post 16 colleges and independent schools.

Tables 3(a) and 3(b) show the number of graded entries at all of the institutions that met the criterion for both A Level and AS Level Further Mathematics, updated now with the 2008 results. The Tables also give an indication of the type of institution, its geographical location by FMN Region, and whether or not the institution was registered with the FMN. The institutions in Table 3(a) were selected on the basis of A Level graded entries and those in Table 3(b) were selected on the basis of AS Level graded entries, as defined above. These institutions do not show continuous growth in their Further Mathematics entries. They met the above criterion but a different criterion would have found other institutions. What these Tables do illustrate is that numbers of students taking both A Level and AS Level Further Mathematics do vary quite considerably year on year at particular institutions, and no discernable pattern in apparent. This should be borne in mind when considering the interviews that took place with the teachers responsible for Key Stage 5 Mathematics, who was usually the Head of Department. They were asked the general question of why they considered Further Mathematics to be successful in their institution.

Tables 3(a) and 3(b) indicate which institutions were approached for interview, and which agreed. The response rate was 9/20 for the A Level (45%) and 13 /20 for the AS Level (65%). Although the institutions were selected on the basis of AS Level Further Mathematics or the full A Level according to the above criteria, the Heads of Department were asked to comment on both levels with respect to their departments.

Heads of Department were asked to respond to the following questions concerning Further Mathematics during the interview:

1. Whether they agreed the number of students had grown in their school / college.

2. What their current numbers are (2007/08) and the outlook for next year (2008/09).

3. What factors did they consider had contributed to the increase in numbers

With regard to question 3, Heads of Department were asked in particular about

- General attitudes to mathematics in the school /college
- Any advice about further study of mathematics offered to year 11 students
- Enrichment activities available to students studying mathematics at the institution
- Backgrounds of the current teachers of mathematics.
- The view of senior management towards further mathematics
- The extent to which they as an individual or their department was involved with the FMN

Main reasons given as to why the number of students has increased :

1. The reputation of the school and department in the locality.

2. The changes made in 2004 to the mathematics specifications by the awarding bodies.

3. Changes to timetable and option block structure

4. Recognition by students of a qualification in Further Mathematics as a career asset, particularly for entry to Higher Education.

5. Support for students and a general enthusiasm from the teaching staff for Mathematics.

3.1 The reputation of the school and department in the locality.

It is not surprising that if a department that has built up a reputation for providing good quality teaching that leads to good results at A Level, it attracts students. Most schools and all colleges have an open access entry post 16, so students can chose where to study, and not necessarily stay in the sixth form of an 11-18 school. It was apparent that once Further Mathematics became established, it attracted students. Some Heads of Department had started by offering the subject as extra curriculum using a post 4:00 pm slot or a sports afternoon to make time available for lessons. With growing interest and success, senior management had eventually allowed Further Mathematics onto the timetable. The commitment of the Head of Department was notable here, particularly those who had been appointment fairly recently, in wanting to offer Further Mathematics to their students.

3.2 The changes made in 2004 to the Mathematics specifications by the awarding bodies.

Many Heads of Department noted that Further Mathematics had become accessible to a much greater range of students due to the changes in the specification in all Mathematics modules introduced in 2004. Some departments are now able to offer a 9 module course in Mathematics, in which students aim for both A-level Mathematics and AS Further Mathematics within one class over a two year period. In some schools and colleges where numbers made it possible, there was considerable flexibility in that students were able to continue to the full Further Mathematics A Level if they wished to or drop back to just mainstream Mathematics. Most Heads of Department noted that the 2004 changes had done much to dispel the image of Further Mathematics as difficult and demanding and thus only for the most able. Indeed, some Heads of Department put the view to year 11 students, that if you can attain a grade B at GCSE, you should be able to take Further Mathematics. In this context fears were also raised about changes that may be made again to the modular structure in 2011; the fear is that such changes will be Curriculum 2000 revisited and it could well result is numbers in A-level Mathematics and Further Mathematics plummeting again just as they are becoming re-established and growing steadily.

3.3 Changes to timetable and option block structure

Most post-16 institutions which offer A Levels operate a timetable based on option blocks, in which the more popular subjects will appear in more than one option block, thus enabling more students to study them. In some schools and colleges the popularity of Mathematics has grown to where it appeared in several option blocks, and if numbers warranted it, Further Mathematics would also be an option with an intention that those students who study both would take at least 12 modules. Again the flexibility of the modular structure of Mathematics / Further Mathematics was stressed in meeting particular student's needs, especially if the student did change his/her mind about how many modules he/she wished to study. As mentioned in (3.1) above, some Heads of Department had struggled to get Further Mathematics onto the timetable, and it was apparent that the view of the senior management to Further Mathematics was essential to this. Often, where numbers had grown and senior management gave full support to the development of Further Mathematics, a member of the team was a mathematician or scientist. Senior management in general would endorse Further Mathematics once it was seen to be bringing success to the school or college, as seen in the examination results.

3.4 Recognition by students of a qualification in Further Mathematics as a career asset, particularly for entry to Higher Education.

Many Heads of Department spoke of a general growing enthusiasm for Mathematics in their institution, which is probably related to enrichment type activities. (see below). At post-16, it was reported that many students went on to study Mathematics related degree courses in Higher Education, such as engineering, computer science and economics. Students were coming to see the value of studying Further Mathematics, at least to AS Level, as being an asset on their application forms, but also of being of benefit to their studies once their degree course had begun. Some Heads of Department had taken the initiative to introduce Further Mathematics, because they had some students who were asking for it.

3.5 Support for students and a general enthusiasm from the teaching staff for Mathematics.

Many of the Heads of Department did note they were lucky in that they largely had a well qualified staff, with mathematics degrees or a mathematics related qualification such as a background in engineering. Although most noted no problems at present, there was some general concern about future recruitment as current staff members approached retirement age. However, most staff were involved in supporting students in some way. For A Level study itself, this often involved some sort of drop-in clinic, or a specified time when staff would be available for help with any problems. Some schools and colleges had introduced mentoring systems, in which older students would help younger ones. More generally, staff would facilitate involvement in competitions. Nearly all Heads of Department spoke enthusiastically of the involvement of their students in the UKMT challenges, at junior, intermediate and senior level. This often involved teams entering in face to face competitions. Some Heads of Department spoke of their aim in their department to make Mathematics both challenging and fun. Thus from year 7 onwards, they would have extra-curricula activities like puzzle solving, or they would extend the mathematics

curriculum through for example, GCSE statistics or FSMQ in year 11. Opinion was split re the latter as to whether it was a beneficial idea to introduce the AS Level Mathematics core work in year 11. Some thought this gave students an insight into sixth form study and a helping start, whilst others thought it premature and better to pursue other aspects of Mathematics. However, all departments were active re year 11 students in encouraging suitable students to consider their study of Mathematics after taking GCSE. This would involve activities like taster days for the A Level curriculum and talks from external speakers on the importance of Mathematics and the career opportunities a qualification in Mathematics can bring.

3.6 The Further Mathematics Network

No Head of Department put the development of Further Mathematics in their department down specifically to the FMN. However, they were all aware of it to some extent. This varied from acknowledging its existence, to having had contact with the local FMN Centre Manager, to those making full use of the online resources and revision and enrichment events in their area. Most commented that they thought the Network was important and they valued it, noting it was doing a good job in raising the profile of Mathematics, but for their departments they didn't need the FMN for tuition purposes. However, some saw the potential for *Elluminate* based courses, where they noted it is demanding on a teacher's time to prepare material for some of the less popular Further Mathematics modules, or tuition in preparation for STEP.

4 Report on the interviews with Heads of Mathematics Departments concerning the management of Further Mathematics in their Institution and the "in-house" teaching of Further Mathematics to small cohorts of students

Towards the end of 2008, Centre Managers were invited by the Network Coordinator to nominate any schools or colleges they had contact with where the department had taken a decision to teach at least some of the Further Mathematics modules themselves in 2008/09 despite having relatively small numbers of students, rather than using FMN tutors. In total, contacts at 52 such schools and colleges were notified to the evaluators with a view to interviewing a sample of them re the management of Further Mathematics in their institution and their involvement with the FMN. Tables 4(a) and 4(b) shows these schools and colleges identified by type and region of England. Table 4(a) shows the graded entries for Further Mathematics at both A Level and AS Level for 2004 to 2008, and Table 4(b) shows the corresponding graded entries for mainstream A Level and AS Level Mathematics. Interviews were conducted during January 2009 with the teacher responsible for Key Stage 5 Mathematics in 33 of these institutions as indicated. They were somewhat self-selective in terms of the availability of the teacher concerned to conduct a telephone interview. However, those interviewed do cover a wide range of types of school and colleges and most areas of England. Interviews typically lasted from 15 to 30 minutes depending on how much the teacher wanted to say or discuss.

All interviews were of a semi-structured nature following a pro-forma covering the following areas:

1. the current situation re number of students taking Mathematics and Further Mathematics at both A Level and AS Level.
2. the nature of any involvement with the FMN
3. Mathematics in the institution as a whole, including student attitudes; enrichment activities; advice to students; qualifications and experience of department staff and the perspective from the senior management.
4. development of the FMN

The main points arising from these interviews are summarised below. The interviewees are all referred to as HoD (Head of Department), whether or not this was strictly the case. Due to the diversity of the responses, indicating the unique nature of each institution, each interview has also been summarised and these summaries, together with some quotations, are at Appendix 1. The outcome from these interviews should be looked at in the context of Tables 4(a) and 4(b). Table 4(a) shows the graded entries of these schools and colleges in A Level and AS Level Further Mathematics for the five years 2004/05 to 2007/08. Table 4(b) shows the graded entries for As Level and A Level Mathematics. The most striking feature of Table 4(a) is that it is sparsely populated with some institutions having very few graded entries to date and in two cases none at all. This is consistent with the interviews in that many teachers said that in the past demand has been met on an ad hoc basis and/or they were just starting out on getting Further Mathematics organised as a timetabled option in the institution. Table 4(b) indicates that most of these institutions are well established in the teaching of A Level and AS Level Mathematics.

Main Points from the Interviews

4.1 Managing provision in Further Mathematics

Most HoD's had persuaded their senior management that Further Mathematics should be in the sixth form option blocks and given timetabled time. However, this was rarely a full allocation of A Level time. Typically established A Levels or AS Level subjects would have 5 hours, whereas Further Mathematics would be allowed 2 or 3 hours. This was often said to be adequate as the teacher was working with a small group of able and committed students; in some institutions the time was supplemented with voluntary extra time. Some senior managers supported Further Mathematics as it brought kudos to their institution and as such, was a good marketing tool in both attracting and retaining able students.

There is an apparent difficulty for HoDs as to when students actually begin their study of Further Mathematics. For some it is only offered as an AS Level course in year 13, whereas others "parallel run it" with the main Mathematics course in both year groups. These are the extremes of a lot of flexible arrangements that allow students to go as far in Mathematics as they want to. The main problem encountered is the pre-requisite knowledge required for some of the Further Mathematics, particularly in the pure mathematics. This is often needed before it is met on the mainstream Mathematics courses, but generally it is said able students in small groups can cope with this. Some believed only high calibre students could successfully begin Further

Mathematics at start of Year 12. It was noted that for some students who wish to take extra modules beyond examination requirements, that funding is not available to cover any teaching.

Some schools were working in collaborative arrangements for sixth form provisions, outside of the FMN and this included Further Mathematics. This did raise an issue of "whose students are they" when it came to student census and results.

4.2 Involvement with the Further Mathematics Network

All these institutions were registered with the FMN and were to some extent in contact with their local Centre Manager, even if this meant just receiving information through e mail, and not acting on it. Some HoDs had appreciated the help and advice they had received from the local Centre Manager in initiating Further Mathematics. In some institutions the HoD did comment they would like more involvement with the FMN at a local level but weren't sure how to go about it, if they could find the time. This was particularly true of those from the independent and FE sectors where there was some feeling the FMN "wasn't for them".

Many HoDs said they encouraged their students to attend revision and / or enrichment events. It wasn't always clear (to the HoD) whether all such events had been organised through the FMN. When such events had been attended students had largely found them enjoyable and useful. However, other commitments often prevented attendance. Some HoDs noted that the events were generally more effective for students if a member of staff accompanied them, but this wasn't always possible. Others noted the bureaucracy and associated paper work of organising out of school visits, and this detracted from attendance. The timing of these events was raised by many; is there a best time? Points such as "not too close to examinations" or "term time as opposed to holiday time", were raised by some. Some wondered as to how much scope there was for negotiation as to when the events might take place. Also it was noted small local events might be preferable to large regional events.

4.3 Mathematics in the Institution as a Whole

In general the HoDs considered the attitude of pupils and students in their institution to be positive towards Mathematics particularly amongst the more able. In all schools there was some sort of enrichment in the Mathematics programmes for all year groups. Involvement in the UKMT Maths Challenge and Team competitions was common and also in some more local competitions. Pupils clearly enjoyed taking part of in these. Many schools had "maths days" or similar in which pupils would solve puzzles or be given "real world" problems. External visits, or visitors to the school, were occasionally organised, with *Maths Inspiration* and *Murderous Maths* being mention by several HoDs.

In many schools the Year 11 students' perspective on Mathematics was broadened through them taking GCSE in statistics and / or a FSMQ often involving some of the AS Level Mathematics topics. In most schools either the HoD or an A Level teacher would visit year 11 classes and encourage suitable students to think about studying A Level Mathematics. All held open evenings

and some also held taster days, or similar, to promote the post-16 courses. In some colleges access to year 11 students was limited or in some cases not possible at all.

All schools and colleges had at least some members of the department who well qualified in Mathematics and able to teach A Level Mathematics and some, if not all, of the Further Mathematics modules. Many noted the need for CPD in this respect, particularly for younger members of staff.

4.4 What do these Institutions want from the FMN?

Many of the HoDs said they want more of the same. Many find the MEI resources very valuable and want to see them go on developing, many wishing they could be made available to their students; ie without charge. HoDs would also like to see the use of revision sessions using *Elluminate* continue to develop. Similarly they do want face to face revision events and enrichment opportunities in which students have opportunity to meet students from other institutions to continue.

Many did make a comment that they find the general support of the FMN invaluable, with some saying that they couldn't have initiated Further Mathematics in their institution without the help and guidance of the local Centre Manager. Others made individual requests, such as CPD relating to certain modules, using *Elluminate* at times when they can participate in the session.

5. Data Analysis 2004 to 2008

The analysis of the achievement data in AS Level and A Level Mathematics and Further Mathematics has been updated to include the result of 2007/08. The achievement data records the grade awarded to every candidate who entered for certification, and thus is also a measure of the number of entries to the qualifications. This data will be referred to as "graded entries".

The data that has been analysed is that supplied by the DCSF from the National Pupil Database (NPD) for Key Stage 5.

The analysis consists of two principal strands.

1. Comparing the uptake and performance in Mathematics and Further Mathematics in the year 2007/08 with previous years 2004 to 2007. The previous report, Interim Report 2, compared the years 2002 to 2007; the year 2004 is now taken as baseline as that is when the FMN was essentially formed. This comparison uses the AS Level and A Level results for these qualifications extracted from the NPD. This analysis includes take up of Further Mathematics by gender, by type of educational institution and by region. The regions are defined (below in 5.1.5) to be generally in accord with the nine regions of the Further Mathematics Network, which in turn are generally in accord with the nine regions of the Learning Skills Council.

2. A comparison of the performance of students who studied for their qualification through the FMN with the national performance using the CEM Centre's ALIS (A Level Information System) database. This analysis covers the three years 2005/06, 2006/07 and 2007/08.

5.1
Take up and Performance in Further Mathematics 2003/04 to 2007/08.

Firstly it should be noted that the DCSF data supplied for both 2007 and 2008 was the unamended version, which means it used performance grades as supplied by the examination awarding bodies, but schools and colleges had not had opportunity as yet to challenge these if they wished to. It is considered that any later amendments made to these results would have no effect on the generality of the analysis here.

Table 5.1(a) and Table 5.1(b) [4] show the grades achieved in both Mathematics and Further Mathematics in the academic years 2003/04 to 2007/08 for the A Level and AS Level qualifications respectively. (For convenience academic years will be labelled by the summer examination year; thus 2003/04 is year 2004) The grades A to E are pass grades, grade U is a fail, grade X indicates the entered candidate did not attend for one or more of the examinations and grade Q indicates there is an unresolved query on the result. Tables 5.1(a) and 5.1(b) also show the percentage change year on year in the total entry for these subjects and the percentage change relative to 2004.

From Table 5.1(a) it is seen that the total graded entry in A Level Mathematics has continued to increase steadily by about 8% a year from 2006 onwards with an increase off about 4500 between 2007 and 2008 bringing the total to 57251 in 2008. The proportion of the entry achieving each of the grades has remained fairly steady for the last three years, with about 44% of the entry gaining a grade A and 98% of the entry gaining a pass grade. In Further Mathematics the large increase in take up is seen in the results between 2005for 2006, dipped some what the next year, but in 2008, graded entry numbers were up by about 1200 on 2007, or about 18%. It is notable in A Level Further Mathematics that well over half the candidates achieve a grade A (58.3% in 2008) and very few candidates fail to achieve a pass grade (1.4% in 2008). It would appear that initiatives, like the FMN are having a substantial impact on the numbers taking up and succeeding in A Level Mathematics and Further Mathematics.

From Table 5.1(b) it is seen that the growth in graded entries in AS Level Mathematic has continued into 2008 although there has been a decrease in the growth rate of about 3%. The apparent huge growth between 2004 and 2005 is anomalous, due to the DCSF reclassifying which qualifications counted within the umbrella called Mathematics. The number of graded entries in AS Level Further Mathematics has continued to increase steadily with an increase of about 16%, or 771 entries, compared to 2007. This again reflects the impact of the various STEM initiatives and that of the FMN in particular in raising the take up and achievement in Further Mathematics.

[4] All Tables are shown in Appendix 2 to this report.

It was notable from the interviews reported in Section 3, above, that many schools and colleges now offer a 9 module course comprising A Level Mathematics and AS Level Further Mathematics. Further Mathematics is an attractive extra subject for those students who apply to university, for not only does it enhance their personal CV, it will benefit any student who goes on to take a Mathematics related course at university, through increasing and developing their knowledge of Mathematics.

5.1.1 Gender differences in graded entries in Further Mathematics

Table 5.2 shows the breakdown of the entry and achievement for 2004 to 2008 by gender. It is seen that for the A Level the ratio of males to females has remained steady at about 7:3 (or 70% male) over these years although 2008 saw a small decline in the relative number of male entries. The female entry showed a bigger year on year increase of 22.5% compared to 16.1% for males. For AS Level Further Mathematics, the gender balance has remained more or less constant at a ratio of around 6:4 (or about 60% male) with 2008 seeing a small increase in the proportion of males entries. For main stream A Level Mathematics the gender balance was about 60% male. There would thus appear to be little progress towards the aim of a 50:50 gender balance in the take up of Further Mathematics and it would appear that there is more to be done to encourage females to enter the qualification.

A more detailed analysis for both 2008 and 2007 is shown in Tables 5.3(a) and 5.3(b) respectively, the latter reproduced from Interim Report 2 for ease of comparison. For both males and females, Tables 5.3 show the number of students who were entered for both Mathematics and Further Mathematics at A Level in the same year, and for Mathematics at A Level only and for Further Mathematics only. Those students who completed Further Mathematics on its own will probably have completed a Mathematics A Level qualification a year earlier. Similarly, some students who have taken only A Level Mathematics may take AS Level or A Level Further Mathematics at a later date. A small decrease in the male to female ratio of about 1.3% is seen between 2007 and 2008 for those candidates who took both subjects together. However the ratio is static at about 59% male for A Level Mathematics taken alone, and the ratio increased by 2.6% male for those taking A Level Further Mathematics on its own. The number of students who completed both Mathematics A Level and Further Mathematics AS Level in the same year is still relatively small, there being 3762 such candidates in 2008 compared to 3552 candidates in 2007; there is about a 1% decrease in the proportion of males candidates.

The number of candidates who took both AS Level Mathematics and AS Level Further Mathematics is also relatively small, although the 1587 such candidates in 2008 is about a 50% increase on the previous year. However, the proportion of male candidates has increased from about 64% to over 68%. Thus there is a very large cohort of students taking Mathematics and not Further Mathematics, and so there is potential for further growth in student numbers and particularly so for female students.

The FMN aspires that the proportion of students studying Mathematics at A Level who also study Further Mathematics is 25% for A Level and 35% for AS Level. In 2008 there has been a small movement towards these targets. In 2008, for A level Further Mathematics the proportions are 14.4% for all students, 16.6% for males and 11.2% for females. The corresponding figures for

2007 are 13.1%, 15.4% and 9.6%. For AS Further Mathematics, in 2008, these proportions are 21.0% (6.6%) for all students, 23.2% (6.6%) for males and 17.6% (6.5%) for females. The corresponding figures for 2007 are 19.8% (6.7%) 22.3% (6.9%) and 16.1% (6.5%) respectively. The calculations for AS Level include students who have taken AS Level or A Level Further Mathematics as well as A Level Mathematics; the figures shown in brackets are for students who took AS Level Further Mathematics only. Although there clearly is some progress towards the proportions the FMN hopes to see, the figures support the above arguments that there is still considerable scope to increase the take up of Further Mathematics, and again particularly by female students.

5.1.2 Distribution of the share and growth in entries in Further Mathematics

In this section of the report, a comparison is made of the growth of graded entries in Further Mathematics between state schools and colleges and the independent sector and also between selective schools compared to non selective schools in both these sectors.

The first two rows of Table 5.4(a) show the number of graded entries in A Level and AS Level Further Mathematics from 2004 to 2008, together with the percentage increase relative to 2004. Here it can be seen that although there have been steady increases in student numbers in both the A Level and AS Level, this is more so with the latter. Graded entries at A Level have increased by about 66%, whereas the graded entries for the AS Level have more than doubled since 2004. These figures are reproduced on Table 5.4(b) for clarity.

The rest of Table 5.4(a) shows the share of the entries in each of the years from 2004 to 2008, broken down firstly between the state and independent sector and secondly within each sector by whether or not the institution is selective. For A Level Further Mathematics, with the exception of 2006, about one third of the entries have been made in the independent sector. [5] For the AS Level since 2006, the proportion of the entries made in the independent sector has been falling and in 2008 is approximately one sixth of the total entry. When looking at the share of the entries by admissions procedures (selection) it is no great surprise that the selective schools dominate in the independent sector; however it is notable that non selective schools in this sector do have a share of the entry in both A Level and AS Level of just under 10%. In the state system the non selective schools have a much larger share than the selective schools, this being fairly consistent at about 68% for the A Level and 80% for the AS level. [6]

The share between sectors in the growth in graded entries in Further Mathematics is shown in Table 5.4(b) for the years 2006 to 2008 relative to 2004. First the percentage increase relative to 2004 is repeated for comparison from Table 5.4(a). When looking at all schools and colleges, it is evident that the bulk of the growth has taken place in the state sector. For the A Level the proportion has risen by about 1% each year, so that in 2008 the state sector accounts for a little less than three quarters of the growth. For the AS level the proportional increase in the growth has been a little higher so that in 2008 the state sector accounts for just under 90% of the growth

[5] In 2008 there were about 560 independent schools with at least one AS entry in mathematics compared to about 2000 schools and colleges in the state sector.
[6] The number of state selective grammar schools in England has been 164 since 1997.

in entries. These figures indicate that the STEM initiatives and the FMN in particular, have had a very significant impact in the state sector which has been maintained over the last three years.

The growth calculations have been repeated to compare selective schools with non selective schools. In the independent sector it is seen that selective schools account for virtually all the growth in A Level although this has been dropping from 98% in 2006, to around 90% 2008. In the state schools, about 70% of the growth in A Level in the last two years relative to 2004 has taken place in the non selective sector. For the AS Level qualification the share of the growth in the non selective independent schools has been variable between about 15% and 5%, and was 10% for the period 2004 to 2008. The state schools and colleges account for about 83% of the growth in the take up of AS Level over all the time periods considered.

The growth figures show that the most significant impact in the growth in graded entries to Further Mathematics is taking place in the state non selective sector. Whereas Table 5.4(a) shows the share in the entries between the various sectors, this can be deceptive as when assessing the impact of the FMN, the institutions in which the growth is actually taking place are the more important. Table 5.4(b) shows that the real impact of the FMN initiative is seen in where most of the growth is taking place, and that is in the state non-selective system

5.1.3 Types of educational institutions offering Further Mathematics

Table 5.5 shows a breakdown of the number of schools and colleges in England that have offered Further Mathematics at AS Level and / or at A Level between 2004 and 2008. The classification of the schools is that as defined by the DCSF. Thus state schools are classified as Community, Foundation, Voluntary Aided or Voluntary Controlled schools, or as Academies or City Technology Colleges. Post-16 institutions are classified as Sixth Form Centres, Sixth Form Colleges or Further Education Colleges. Some types of institution could not be identified from the available data, and are classified as unknown / other.

It can be seen that the biggest increase in the type of institution involved is in state sector schools which reconciles with the increases in graded entries seen in Tables 5.4(a) and 5.4(b). For A Level, the increase in state sector schools offering Further Mathematics increased by 304 schools between 2004 and 2008, compared with an increase of 27 colleges, and 58 independent schools. In the state sector it is notable that the largest year on year increases have been in Community Schools although all types of school have shown an increase.[7] A similar pattern is seen in the institutions offering AS Level Further Mathematics. The number of state schools offering the AS Level qualification increased by 318 schools between 2004 and 2008, compared with 25 colleges and 49 schools in the independent sector. The largest increases have again notably been in the Community Schools. These figures thus support the findings of Section 5.1.2, that the impact of the FMN is being seen significantly in the state sector.

[7] The figures for City Technology Colleges (CTC) are an exception to this, but the number of these institutions has been declining whilst the number of Academies has been growing. It should also be noted that although the types of institution here are as deemed by the DCSF, some FE colleges and some schools refer to their 16-18 provision as a sixth from college.

However, large increases in all the types of school can be seen including the independent sector. In 2008 there were 389 more schools or colleges (using the all institutions figures) delivering A Level Further Mathematics than in 2004. The corresponding figure for AS Level Further Mathematics is 392.

5.1.4 Cohort sizes or number of entries at different institutions

Table 4.5 shows that considerably more schools and colleges have been involved in offering Further Mathematics over the past five years, but it is informative to consider the number of graded entries in the various institutions offering the A Level and AS Level qualification to their students.

The tables Table 5.6(a) and 5.6(b) show an analysis of the size of the entry cohort from all institutions entering students in the years 2005 to 2008 for the Further Mathematics A Level and AS Level qualifications respectively. The column headed *graded entries* is the cohort size and the column headed *school and colleges* is the number of institutions that entered that number of candidates. Thus, for example, Table 5.6(a) shows in 2008 that there were 304 institutions who entered one candidate for A Level, whereas 115 establishments entered 5 candidates for A Level. The number of institutions with 10 or more students entering for A Level falls off rapidly in each of these four years, although it is not a uniform decrease in numbers. For example, in 2008 the 17 institutions that had 15 graded entries bucks the trend as does the 11 institutions in 2007 that had 21 graded entries. Of the 55 institutions in 2008 that had more than 20 graded entries, the majority were either colleges or sixth form colleges (24), or selective independent schools (24), with some state selective schools (8) and only two comprehensive schools. The column headed *cumulative percent of schools / colleges* shows that the vast number of institutions entering candidates for the A Level qualification had small cohorts, with, for example in 2008, 65.5% of institutions with cohorts of 5 candidate or fewer, and 87.2% of institutions with cohorts of 10 candidates or fewer. In comparing the highlighted grade entries at 5, 10, 15, 20, 25 and 30, it can be seen that the cumulative percentage of schools and colleges very gradually gets smaller indicating a very gradual increase in cohort size during this time.

The column headed *total graded entries*, is the number of graded entries in the national total attributed to that size of cohort. Thus for example, in 2008, 470 of the 8523 entries in A Level Further Mathematics were in a cohort of 10 candidates and this cohort size was found in 47 schools or colleges. The column headed *cumulative percent of graded entries* is of particular interest in this analysis. In 2008, it is seen that 28.7% of the total graded entries came from cohorts of 5 candidates or fewer and 70.2% of the entry from cohorts of 15 candidates or fewer. It is notable that in the highlighted cohorts of 5, 10, 15,20, 25 and 30 candidates the cumulative percentage in the A Level entry has gradually been getting smaller and more notably than in the institution numbers, as might be expected. For example, in 2005 about 70% of the entry was in cohorts of 10 students or fewer and by 2008 this had become less than 60%. This reflects the general increase in the take up of A Level Further Mathematics, but it also illustrates that Further Mathematics is still very much a “minority subject” in that many institutions are clearly offering the subject with very small cohort sizes. Some of these very small entries will have been taught through one of the FMN Centres, whereas some schools and colleges are able to accommodate

such small numbers into their own teaching programmes. (see Section 4) However, there would still seem to be considerable scope for the Network to support more small entry institutions, either through tutoring or more general support, especially as a similar pattern is seen in the entry cohorts to the AS Level qualification.

The above two paragraphs are repeated here for the AS Level figures shown in Table 5.6(b). Table 5.6(b) shows that in 2008 that there were 445 institutions who entered one candidate for AS Level Further Mathematics, whereas 72 institutions entered 5 candidates for the AS Level. The number of institutions with 10 or more students entering for AS Level falls off rapidly in each of these four years, although similarly to the A-level, it is not a uniform decrease in numbers. Of the 25 institutions in 2008 that had more than 20 graded entries, the vast majority were colleges or sixth form colleges (20), the other institutions being three selective state schools, one selective independent school and one state comprehensive school. The column headed *cumulative percent of schools / colleges* shows that the vast number of institutions entering candidates for the AS Level qualification had small cohorts, with, for example in 2008, 78.2% of institutions with cohorts of 5 candidate or fewer, and 92.8% of institutions with cohorts of 10 candidates or fewer. In comparing the highlighted grade entries at 5, 10, 15, 20 and 30, it can be seen that the cumulative percentage of schools and colleges very gradually gets smaller indicating a very gradual increase in cohort size during this time.

The column headed *total graded entries*, is the number of graded entries in the national total attributed to that size of cohort. Thus for example, in 2008, 200 of the 5485 entries in AS Level, were in a cohort of 10 candidates and this cohort size was found in 20 schools or colleges. In the column headed *cumulative percent of graded entries* it is seen in 2008, that 40.1% of the total graded entries came from cohorts of 5 candidates or fewer and 78.5% of the entry from cohorts of 15 candidates or fewer. It is notable that in the highlighted cohorts of 5, 10, 15,20 and 30 candidates the cumulative percentage in the AS Level entry has gradually been getting smaller and more notably than in the institution numbers, as might be expected. For example, in 2005 about 77% of the entry was in cohorts of 10 students or fewer and by 2008 this had become about 66%, reflecting the general increase in the take up of AS Level Further Mathematics, but also similarly to the A Level, it illustrates that Further Mathematics is still very much a “minority subject” in that many institutions are clearly offering the AS Level subject with very small cohort sizes. So for the AS qualification as well, there would still seem to be considerable scope for the Network to support more small entry institutions, either through tutoring or more general support.

5.1.5 Regional variation.

The 47 Centres of the Further Mathematics Network are located in nine regions across England. These regions are geographically similar to those of the Learning Skills Council. Although it is appreciated that these regions do not have strict borders, the Further Mathematics Centres located in each of the regions is taken as follows (from the FMN website).

North East - 4 Centres
Northumberland / Tyne & Wear / County Durham / Teesside and North Yorkshire

North West - 4 Centres
Lancashire & Cumbria / Greater Manchester / Cheshire / Merseyside

Yorkshire and the Humber - 3 Centres
Hull, York and East Riding / West Yorkshire / South Yorkshire and North Nottinghamshire

West Midlands - 7 Centres
Staffordshire and Shropshire / Keele and the Potteries / The Black Country / Birmingham / Solihull / Coventry and Warwickshire / Herefordshire and Worcestershire

East Midlands - 5 Centres
Lincolnshire / Nottinghamshire / Derbyshire / Leicestershire / Northamptonshire

Eastern - 5 Centres
Norfolk / Suffolk / Essex / Hertfordshire / Cambridgeshire

South West - 7 Centres
Cornwall and West Devon / Devon / Somerset / West of England / Gloucestershire / Wiltshire / Dorset

South East - 7 Centres
Hampshire and the Isle of Wight / Berkshire / Oxfordshire / Buckinghamshire / Surrey / Sussex / Kent and Medway

London - 5 Centres
Central and North / East / West / South East / South West

All the DCSF performance data from the NPD is associated with a particular school or college which in turn is located in a particular local authority.Thus, in order to consider regional variation as defined by the FMN, the 150 local authorities in England needed to be identified as part of a region. Without discussing it here, the detail of how this has been done is given in Table 5 8. Table 5.8 also indicates the number and type of institutions in the regions that entered 10 or more A Level and / or AS Level candidates in any subject in 2008. The criterion of 10 or more was chosen as a level at which an institution might reasonably offer Further Mathematics. Table 5.8 is split into Tables 5.8(a) and 5.8(b) for A Level and AS Level Further Mathematics respectively. Tables 5.8(a) and 5.8(b) show the number of institutions who entered candidates together with the total number of graded entries between them, in each of the local authorities for the years 2005 to 2008.

Tables 5.7(a) and 5.7(b) are regional summaries of the data in Tables 5.8(a) and 5.8(b) for A Level and AS Level Further Mathematics respectively. Tables 5.7(a) and 5.7(b) also show the year on year percentage increase from 2004, and the increase relative to 2004, for both the numbering of institutions that entered candidates for Further Mathematics and the total graded entries in the region. These percentage increase figures give a measure of the impact of the STEM initiatives, and the impact of the FMN in particular in these regions. The Tables 5.7(a) and

5.7(b) also show the number of institutions in a region who entered candidates for Further Mathematics in 2008, as a percentage of all institutions in that region that might have offered Further Mathematics. These figures too reflect the impact of the FMN in increasing participation.

Although when assessing the regional variation, the number of schools and colleges within a region that could offer Further Mathematics should be taken into account and this is indicated in Tables 5.7(a) and 5.7(b), there is none the less notable variation between the regions.

For A Level Further Mathematics Table 5.7(a) indicates that the number of institutions entering at least one candidate has risen substantially over the last 5 years in all regions, with a 36% increase altogether across England. For institutions the biggest increases have been in the North East and London where the percentage increase relative to 2004 is over 50%. The smallest regional increase was in Yorkshire at 18%, and this is the only region to suggest any flattening out of the growth in number of institutions offering Further Mathematics, there being a small drop of about 2% between 2007 and 2008. In terms of graded entries, the increase relative to 2004 is again substantial in all regions, the smallest being about 43% in both the North East and the East Midlands. The largest growth has been in the London Region with an increase of over 90% since 2004, closely followed by the Eastern Region. In three regions, North East, West Midlands and London, the year on year percentage increase from 2007 to 2008 is over 25%, with only the Yorkshire Region showing a much more modest again of 2.5%.

For AS Level Further Mathematics Table 5.7(b) indicates that the number of institutions entering at least one candidate has also risen substantially over the last 5 years in all regions, with a 41% increase altogether across England. The biggest increases in the number of institutions have again been in the North East and London where the percentage increase relative to 2004 is over 60% and 80% respectively. The smallest regional increases were again in Yorkshire at 25% and also in the South East at 27%. In terms of graded entries, the increase relative to 2004 is again substantial in all regions, and more so compared to the A Level. Six of the regions show more than a doubling of numbers compared to 2004, ranging from over 159% in the North East to 110% in the West Midlands. The number of graded entries was close to doubling in the other three regions as well, the smallest being about 84% in the North West. In the same three regions as for the A Level, North East, West Midlands and London, the year on year percentage increase from 2007 to 2008 is about 25% or more, with growth figures of under 10% in the Yorkshire Region, West Midlands and the Eastern Region, suggesting growth in numbers for the AS qualification is now beginning to flatten out.

For both A Level and AS Level Further Mathematics the growth in participation both in terms of institutions and students has been quite outstanding right across the country, and this can be due in no small part to the regional work of the FMN. Those candidates who gained their grade in Further Mathematics in 2008, would have been in Year 9 in 2004, and this suggests that the activities of the FMN, along with other enrichment providers, is having a substantial effect on young people in schools and their attitudes to and aspirations in Mathematics. However, from Tables 5.7(a) and 5.7(b), if the number of potential institutions is compared with the number currently offering a Further Mathematics qualification, it is seen there is still considerable scope for further growth, and thus for the FMN to stimulate and support such growth. The detailed figures for every local authority in England in Tables 5.8(a) and 5.8(b) should be helpful to

Centre Managers and the FMN in general, as to where to direct effort in striving to sustain the take up of Further Mathematics.

5.2 Comparison of the performance of FM Centre taught students with that of all students, using the CEM Centre's ALIS Project

The Advanced Level Information System (ALIS) provides performance indicators for post-16 students across all sectors of education and includes analysis of A Level, AS Level, Applied A Levels, BTEC National and International Baccalaureate qualifications. ALIS is the original member of the family of value-added monitoring systems developed at the Centre for Evaluation and Monitoring (CEM) (formerly the Curriculum Evaluation and Management Centre), which is based at Durham University. ALIS started from twelve schools in the North East of England in 1983 but now covers over a third of all A Level entries in England, the UK as whole and international schools.

ALIS uses a value-added approach to comparing student performance in any subject area. The value-added approach provides fair comparisons between the progress made by a particular group of students and all other students in a subject area that are participating in the ALIS project. In order to make these value-added comparisons, all students need to be measured against a common baseline that represents their ability before starting their post-16 courses. The average GCSE score, across all GCSE subjects taken by a student, is the baseline for ALIS. This has repeatedly been found to be the best single indicator of post-16 performance. For students with no GCSE results, the CEM Centre provides two alternative baselines, the Test of Developed Ability (TDA) and the Adaptive Test.

The principle of the value-added approach is to compare a student's actual performance in a subject, with that predicted using his or her baseline score. If the student has done better than predicted then value has been added as a result of taking the course.

The value-added comparisons made here are for the years 2005/06, 2006/07 and 2007/08. Not all students who studied through a FMN Centre had an average GCSE score recorded, so such students couldn't be included in the analysis. However, the number of students with known GCSE baseline scores is considered large enough for a comparison to be made sensibly. In Further Mathematics over half the national entry were involved in the ALIS project in 2005/06 and 2006/07. The number of students for A Level was 5109 in 2008, 3761 in 2007 and 3865 in 2006, with the corresponding figures being 5307, 3815 and 3379 for AS Level Further Mathematics. Although these figures are greater than 50% of the graded entries shown in Tables 5.1(a) and 5.1(b) these figures are for England and it should be noted that the ALIS figures includes all students anywhere who have completed the qualifications and are part of the ALIS project.

In the comparisons shown here, students who studied Further Mathematics through a FMN Centre are regarded as one group of students for comparison with the whole cohort. The comparisons with all students in the ALIS project are best shown graphically

Figure 2: A Level Further Mathematics

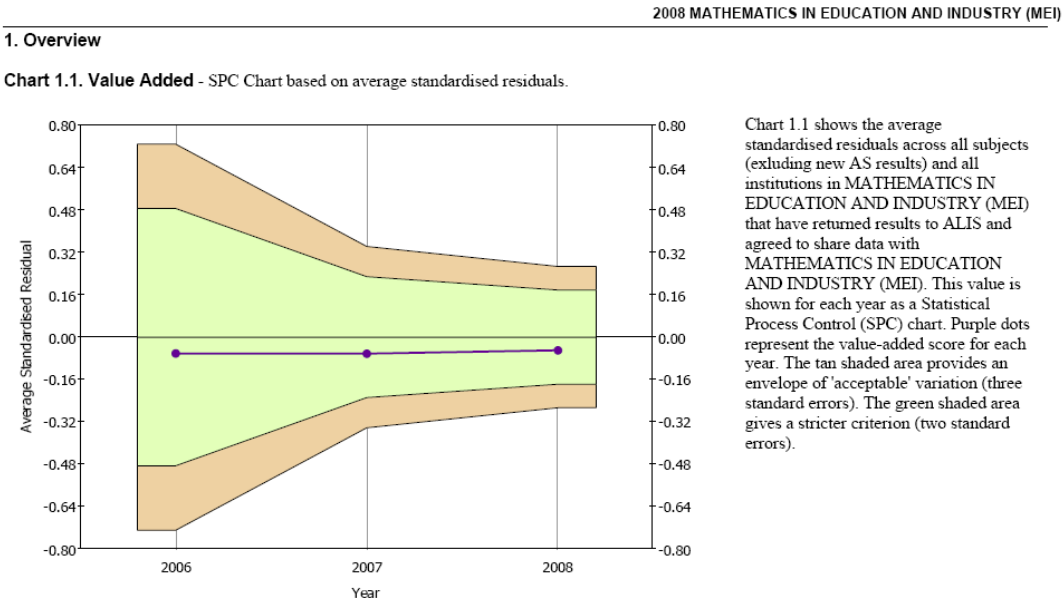
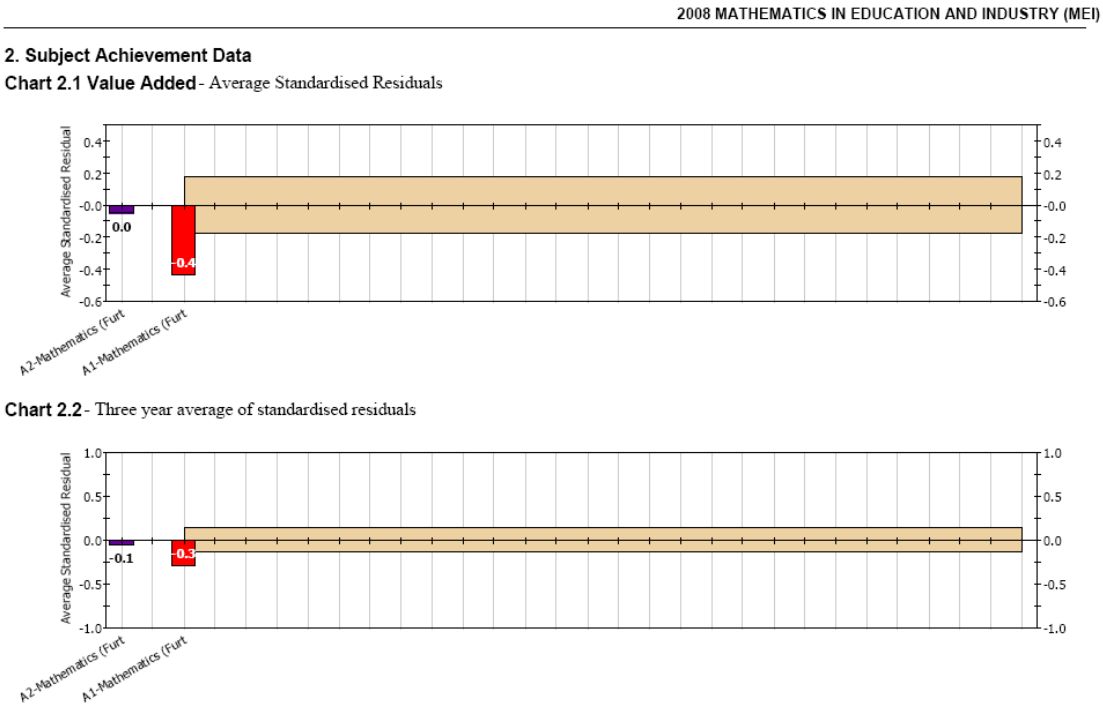


Figure 2, above, is a statistical process control (SPC) chart, shown here for A Level Further Mathematics for the three years 2006, 2007 and 2008. The SPC chart would normally develop over many years and show how progress of a particular cohort of students has changed against the whole of the cohort. In Figure 1 it is seen that the line representing the FMN Centre taught students is just below the zero line, and is more or less horizontal with a slight upward trend in 2007/08. This means they are slightly underperforming compared with all students, but this is not statistically significant and there is a small indication of some improvement this year. The spread of the SPC chart is narrows in 2007 and again a little more in 2008 reflecting the increase in sample size of students taught through FMN Centres.

There is no SPC chart available for AS Further Mathematics, although Figure 3 below shows a value added measure of performance for both the A Level and AS Level qualification.

Figure 3 : Value added performance in A Level and AS Level Further Mathematics

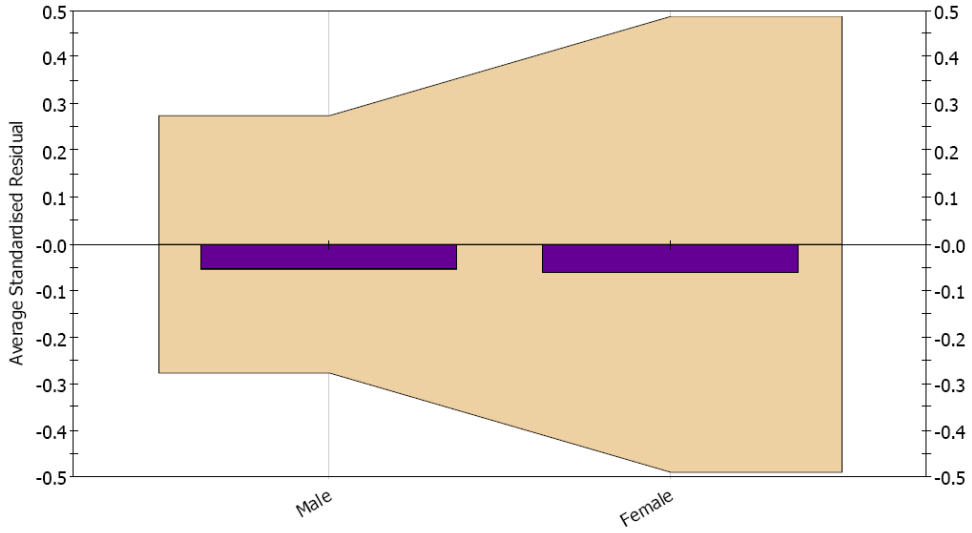


The A Level is shown as the small purple rectangles, which are both slightly negative, for both 2008 and the three year average over 2006-2008 as would be expected from the SPC chart. When the value-added performance is considered for the individual FMN Centres, there is considerable variation. There are some Centres where the value-added is positive, but not sufficiently significant to indicate an outstanding performance and some Centres where the value-added is effectively zero, meaning students have performed more as less as expected based on their GCSE results. However, there are some Centres where the value added is negative, and this just outweighs the positive ones so that the value-added is negative for the cohort as a whole.

The situation for AS Level Further Mathematics is rather different; the value-added performance is indicated by the red rectangles in Figure 3, and these are seen to extend beyond the shaded area in the negative direction. The shaded area represents a 99% confidence interval, so being outside this area indicates a highly significant result; that is there is evidence here of significant underachievement in AS Level Further Mathematics by those candidates who were taught through the Network.

Figure 4, below, shows a comparison for A Level Further Mathematics for 2008 by gender. Here is it seen that in 2008 both male and female students slightly underperformed relative to the cohort as a whole and apparently a little more so for females, although the sample size is smaller, which may account for the difference with males. However, the graph for both these cohorts is well within the shaded region and thus of no significance in terms of general performance.

Figure 4: Gender Report; A Level Summary, 2008

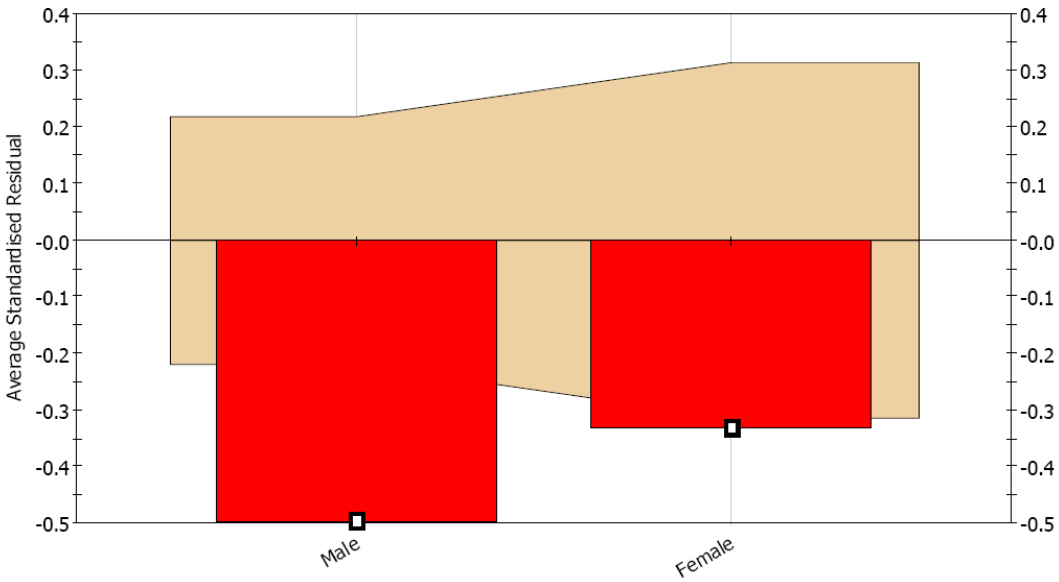


Gender	Number of Students	Average GCSE Score	Value-Added (Average Std Residual)	Error (99% Confidence)
Unknown	1	5.9	0.72	2.58
Male	88	6.9	-0.05	0.28
Female	28	7.1	-0.06	0.49

Figure 5, below, shows the corresponding gender graph for AS Level Further Mathematics.

Figure 5 shows both gender cohorts from the FMN Centres to be underperforming compared with all students in the cohort, and again the underperformance is significant as seen in the AS value-added results above for both males and females. The females appear to be performing better than the males but the sample size is again smaller, being about half that of the males so the result is less reliable.

Figure 5 : Gender Report AS Level Summary



Gender	Number of Students	Average GCSE Score	Value-Added (Average Std Residual)	Error (99% Confidence)
Unknown	1	5.9	0.86	2.58
Male	140	6.6	-0.50	0.22
Female	68	7.0	-0.33	0.31

The value-added results in AS Level Further Mathematics should be of concern to the Network. Further investigation is warranted at Centre and individual candidate level, but initial investigation has found there are students who achieved grade A* or A at GCSE who achieved a Grade E or U (ie failed) in AS Level Further Mathematics. Whether this is due to lack of commitment, inability to respond to the way the course is delivered, or perhaps over achievement at GCSE warrants further investigation. It would also be interesting to investigate the AS Level performance of those candidates who went on to successfully complete at A Level. It would be of interest too to investigate the effect of the examination board of subject entry, with initial investigations suggesting those who took the MEI examinations do better than those who sat the examinations through other boards.

6 Points to consider

1. Re-registration
The process of re-registration needs to be as simple as possible to encourage Heads of Department or the teacher responsible to re-register. If the amount of updated information they require can be kept to a minimum that would help. At the same time it would benefit the FMN to remind teachers of the range of benefits for both students and staff of re-registering their institution with the Network.

2. Encouraging participation
Some teachers would clearly like more involvement of their institution with the FMN than is currently the case, but need encourage to do so. This is particularly so with institutions from the independent and Further Education sectors. There could be opportunities for "networking" events and the Centre Managers could be proactive in bringing registered institutions together.

3. Timing and scale of events
Revision and enrichment events are clearly valued by both teachers and students. However, the timing of such events often also caused problems for both teachers and students. Centre Managers should consider negotiating with the local Network institutions on the organisation of relatively small scale local events over issues such as, holiday time v term time, avoiding exanimations but wanting timely revision sessions; facilitating the attendance of both staff and students. Centre Managers could also seek feedback on the staging of large scale events on a regional basis.

4. CPD in Further Mathematics
Many teachers would clearly like opportunity to broaden and deepen their knowledge and understanding of mathematics and its pedagogy. Many though would not wish to commit themselves to a lengthy course such as TFM, but would prefer more one off CPD events on particular topics or perhaps a particular Further Mathematics module. Many teachers have limitations on their availability so consideration should be given to delivering such CPD sessions online using *Elluminate*, both as live sessions in which participants can take an active part, or as a recording which can be watched at a later date.

5. Student Feedback
Although it is appreciated that students are sometimes asked to complete feedback evaluation forms after an organised event, consideration should be given as to obtaining feedback from students taught through the FMN on the whole experience. This would seem particularly pertinent as regards those students who took the AS qualification in 2008, where the ALIS analysis indicated considerable underperformance. Reasons for this should also be investigated at a local level.

6. Feedback to Centre Managers
Some Centre Managers do feel rather isolated in the job, and some show concern as to how their performance as a Centre Manager is perceived. The Central team might consider some sort of annual review in which reassurance and praise can be given as appropriate and / or issues and problems can be discussed and ways forward identified if necessary.

Appendix 1

Interviews with Heads of Departments on the management if Further Mathematics in their Institution : in house teaching of Further Mathematics to small cohorts of students

The interviews were conducted with 33 institutions.

Interview responses for individual institutions
All interviews were of a semi-structured nature following a pro-forma covering the four areas as delineated below.

1 The current situation re number of students taking Mathematics and Further Mathematics at both A Level and AS Level.
2 The nature of any involvement with the FMN.
3 Mathematics in the institution as a whole, including student attitudes; enrichment activities; advice and department staff and the perspective from the senior management.
4 Development of the FMN.

For each institution the current (2008/09) number of students following Further Mathematics and mainstream Mathematics AS Level and A Level courses are indicated. The abbreviations FM (Further Mathematics) AS A2 (for the full A Level) are used for convenience.

Selected quotations from the interviews are included where appropriate.

1. Comprehensive School; Yorkshire. FM AS 4 A2 4 , Maths AS 40 A2 25
1.1 Works in collaboration with two other schools; 21 in total doing AS is considered too many. Will argue 6 students is viable for in house. Will use the Network if a student's timetable will not fit.
1.2 Student use the online revision using *Elluminate.*
They found that really good; I think it was helpful. They are reluctant to miss lessons to go out and do revision on something they think they can do for themselves
Students have also used the STEP paper sessions.
1.3 Mathematics students have been to some university lectures; HoD wasn't sure if the university or the FMN was the provider. Students are attracted to mathematics from year 11; gets about 40 doing AS which she thinks is quite sufficient. She provides extra support for those with a weak background.
Enrichment activities take place in all year groups; all take part in UKMT competitions and challenges. All teachers are qualified mathematicians and most can teach to at least A Level; HoD is confident they can teach the Further Mathematics. A member of the SMT teaches Mathematics and support is generally positive.
HoD is pushing the need for Further Mathematics with students; particularly support for science and engineering at HE.
I think its on the increase; I am pushing it; I only took over September before last and it is one of my priorities.

1.4 HoD would like FMN to provide some “maths at work” type video clips, such as uses in engineering. Would also like some resources for lesson starter activities; they don’t have time to create them themselves.

2. Academy North West; FM AS 6 A2 5 , Maths 30 A2 18
2.1 HoD is in her third year at the school; she introduced Further Mathematics on arrival in response to student demand when it was taught in spare time. She has now persuaded senior management to allow reduced timetable time.
2.2 Students attend FMN revision sessions and she delivers some of them for the Network. Staff use the online resources; can’t afford them for students. She finds the local Centre Manager helpful in resource provision. Would like to visit an enrichment road show but finding the time is difficult.
2.3 Claims she has the best department in the school; certainly gets the best results. Careers advice and lots of supporting activities in mathematics is available through out the school and there is enrichment time three times a week. HoD believes in enthusing them when they are young. All the staff can teach A Level and are self supporting in their teaching of Further Mathematics. She is pressing SMT for a full timetable allocation for Further Mathematics, but believes the future development of Further Mathematics is very much down to her, and it won’t happen if she leaves!
2.4 Would like the C1 to C4 resources to be available to students free of charge. She would like to be informed of all events and revision sessions but would like to negotiate on dates; is holiday time preferable to term time?

3. Comprehensive school; South West FM AS 4 A2 2 Maths AS 34 A2 11
3.1 Currently 4 students taking AS and 2 taking A Level. Further Mathematics is now back on the timetable in the option blocks; formally done on an ad hoc basis. HoD is also the school timetabler and has organised mathematics so that years 12 and 13 can run concurrently for flexibility.
3.2 The HoD finds that the FMN is very useful; they use the on-line resources and students attend revision and enrichment activity days. Staff have taken part in CPD and issues have been discussed in the department with the Centre Manager. There is a lot of contact with the local university; some uncertainty over whether it is FMN related or not, but they put on taster days for year11 and emphasise the importance of mathematics.
I’m very impressed; I am normally very sceptical of anything that’s being funded from the centre because so many things don’t work. I’m not that impressed with the NCETM for the amount of funding they get but the Further Maths Network is very good value for money. Everyone we’ve met that has been connected with it, believes in it.
3.3 HoD believes children through out the school recognise that maths is important. There is nothing formal in the schemes of work re enrichment but visitor do come to the school; distance is a problem for them to go anywhere. All the staff are well qualified, some are late comers to the profession but all involved in Further Mathematics teaching in some way.
As timetabler he has been able to influence the senior management in the management of mathematics. He believes that in schools with small sixth forms that although AS Further Mathematics running parallel with AS Mathematics can work well in year 12 it doesn’t work well in year 13 as the C3 and C4 work is needed for the Further Mathematics pure modules. He’s got it organised so that able students can do A Level Mathematics in one year; indeed they can

start in year 11, then focus on Further Mathematics in year 13. However, he is concerned that there is no extra funding for "extra modules" that a student might pursue out of interest, nor for the relatively less able who get a U in AS Mathematics, but none the less pass at the second attempt. He reports "pressure" for such students to drop Mathematics whereas in his experience, relatively weak but committed students can pass A Level Mathematics in three years.
3.4 He would like to see FMN as a route to influence the examination boards. FMN could collect views from focus groups and feedback and avoid mistakes made in the past like Curriculum 2000.
Experienced maths teachers knew as soon as it came out that this isn't going to work. Now the FMN is a very good vehicle to find out what schools would like to do or get their opinions.

4 Comprehensive School, Eastern FM AS 12 A2 4 Maths AS 45 A2 26
4.1 The school has always offered AS Further Mathematics but the A Level provision evolved from one student who wanted to take a mathematics degree and was supported in extracurricular time to do the A2 work. The A2 course is now timetabled on reduced time.
The big increase in AS numbers is down to year 9 setting where all students with level 8 at KS3 were together in one set, and this pulled the performance of the whole set up. They were stretched beyond GCSE requirements during years 9 10 and 11.
4.2 The students participate in the Senior Maths Team Challenge. Although the HoD prefers the former format to the current relay, students still enjoy it. The HoD is in regular contact with the Centre Manager. Although she and her staff both can and want to teach FM, they find the FMN very helpful, particularly the revision sessions for students.
4.3 The staff are well qualified and they are researching and experimenting with effective ways of teaching A Level mathematics. There is considerable maths problem solving activity in their enterprise weeks in years 9 10 and 11, with emphasis on how maths is used in the "real world". An engineering project in the sixth form, including some year 11 students, is proving motivating for students and opens up ideas in mathematics. Students also make visits to external enrichment presentations.
4.4 The HoD had a discussion with a colleague who had attended events with students organised through a neighbouring FMN Centre. These events were said to be absolutely inspirational; they were related to *Murderous Maths*.
The idea behind it is if you can inspire students lower down the school to really enjoy maths and want to know more about maths and can see how it can be used and how they can get enjoyment out of it, that's how I think we are going to get more A-level mathematicians coming through.

5 Comprehensive School, North West FM AS 4 A2 2 Maths AS 20 A2 12
5.1 Further mathematics is in the option blocks and gets normal timetable time although this is supplemented with some after school time.
5.2 The department does all their own teaching of Further Mathematics but have made use of the revision events put on by FMN; they are registered with two FMN Centres. However, school policy on out of school visits, particularly close to examinations, does restrict this.
HoD is pleased that the FMN Centre supplies a lot of information, such as CPD opportunities, that he shares with the rest of the staff.
5.3 Pupils in the school as a whole are generally positive about mathematics. They take part in the UK Maths Trust Challenges and send teams to the Team Challenges. They have also visited a "Maths Inspiration" event and are involved with the Royal Institution's Master classes.

Most of the staff are graduates, several with mathematics degrees and the A Level work is shared between those who want to teach it. The Head of Sixth Form sees Further Mathematicss as a "flagship" course and the senior management is generally supportive, but want at least 4 students following it in year 12. The HoD would use the FMN for teaching if the numbers dropped
5.4 HoD says they do travel a long way to events; he would like something organised more locally but is prepared to travel as students do benefit from the revision and enrichment events, but notes the school requirement to avoid examination time.
HoD would particularly like information and advice re Further Mathematics and university entrance.
What sort of entry requirements are universities coming out with and how useful is further maths for pupils who are applying for other subjects. There is the odd quote on the website but I would appreciate knowing more about it.
He did report on former students who had read, for example, physics, who had found having done Further Maths to have been every useful.

6 Comprehensive School, North East FM AS 2 A2 1 Maths AS 20 A2 28
6.1 Further mathematicss has been running for three years. It is on a reduced timetable which is a bit of a struggle.
6.2 HoD got a lot of advice from the FMN Centre Manager when setting up the teaching of Further Mathematics, but he has not used the network for teaching. HoD has appreciated the Centre Manager keeping him informed of events, but not taken up much, due to lack of time. Similarly he has access to the online resources but not really investigated them yet. Further Mathematics is still very much under development in their new school premises. Some students have been to core revision days and found them valuable.
6.3 Pupils at the school are generally positive about Mathematics. All year groups take part in the UK Maths Challenge and they participate in the Team Challenges. He is aware of FMN organised enrichment events and would like to get involved, but no time at present. There is some school based enrichment activities, such as code breaking.
Some year 11 students take FSMQ (Additional Mathematics) and GCSE statistics is offered to year 10 students. HoD hopes that now SATs have gone, he can work towards early entry for GCSE and then go beyond and thus encourage greater take up of A Level Mathematics.
Most of the staff are qualified mathematicians and two of them are comfortable teaching the Further Mathematics. There is support from the senior management and the school is a specialist maths college. Hw wants to get AS numbers up to at least 6 students so as Further Mathematics can be taught as a proper A Level.
6.4 HoD is grateful for the advice he has received from the FMN.
I'm just thankful it is there, because I get a lot of reminders about what is available to me (from the Centre Manager). When I have the time I would like to get to grips with it (the network) and see what is actually there and start to take the offers up.

7 Independent school, South East FM AS 10 Maths AS 18
7.1 Further mathematics is not on the timetable. The school has a flexible approach to Mathematics. They have a fast track group who move in to AS Further Mathematics when they have completed the main A Level. No students have wanted to progress to A2 as yet.

7.2 HoD wanted students to participate in revision events, but there was some confusion over venues. She wants to use them and enrichment events in future. They make use of the online resources and she is very impressed with the MEI material.
7.3 Quite a lot of the pupils like Mathematics. They "talent spot" from year 7 and they give lots of encouragement and support. A relatively high proportion progress into AS Mathematics. She noted that standards have very much improved in recent years. Most staff can teach to A Level, and she is considering using FMN CPD to support the Further Mathematics.
7.4 HoD would like more notice of events because of time pressures. She would like to see a greater involvement of the independent sector in the FMN and would like to see it promoted to the sector. She notes her students work very hard at their Mathematics and they like to make rapid progress and she wants to support them in any way she can.

8 post 16 Academy, London FM AS 7 A2 0 Maths AS 37 A2 12
8.1 Further Mathematics was introduced as an option for year 13 students who had done well in AS Mathematics. In this inner city establishment, applications for double mathematics are very rare.
8.2 He now teaches the Further Mathematics himself, as former students who were taught through the FMN were not happy with the teacher. The SMG supported bringing it into the school, wanting to raise the achievement in Mathematics in general. However, he hopes there will be an A2 candidate next year and will use the FMN if it is decided it is not viable to teach it in the school. If he did have viable numbers who want to do double mathematics he would run AS Mathematics and Further mathematics in Year 12 and the A2 courses in year 13. He is looking for flexibility in offering the modules between years 12 and 13. However, he does have concerns re AS Mathematics and Further Mathematics running simultaneously because of the need for prior knowledge.
For those sorts of reason I am only willing to offer year 12 students Further Maths if initially I can see potential A grades; I won't consider it otherwise; I'll offer AS further maths to A2 students (of mathematics) if they obtain a C or above in AS; that is my model.
8.3 He has taken "weaker" students on the AS Further Mathematics course because they are keen to do it. He has not been involved in any enrichment activities but would like to do so. He has three staff able to teach to A Level.
8.4 He would like opportunity to discuss the provision and management of Mathematics and Further Mathematics with other HoDs; share ideas, concerns and possibly collaborate over teaching arrangements; could FMN facilitate such meetings and cooperation?

9 Comprehensive school, South West FM AS 6 A2 0 Maths AS 30 A2 13
9.1 Numbers in A Level Mathematics have generally been increasing reflecting improving standards across the school and retaining the bright ones to go on with A Level. There has been some pre-experience with the AS material in accelerated year 11 classes. Further Mathematics was only previously offered to particular individuals and is on the timetable for the first time this year but on reduced time; some after school time is used so as years 12 and 13 can combine. HoD is hoping numbers will justify full timetabling of Further Mathematics next year.
9.2 There was use of FMN for teaching in the early days but no longer; they teach it themselves. They do make use of enrichment events and lectures, and are registered with two FMN Centres and attend events organised by both with both sixth form and year 11.
They also make use of the online resources.

9.3 The department has a generally good image across the school; it is well resourced and has a lot of interactive material. Results at KS3 are good and top set year 11s now take FSMQ (additional mathematics) and GCSE statistics is offered to year 10 students to broaden experience. They take part in the UK Maths Challenge and team Events with all year groups, and also make use of the Royal Institutions Master classes. There is a maths club in the school for younger pupils.
They are fully staffed with well qualified teachers four of whom teach at A Level. They do make use of line CPD support for the Further Mathematics teaching. The senior management is supportive; the Head Teacher is a former mathematics teacher; and happy with the current and proposed timetabling arrangements.
9.4 The enrichment events are good and he wants to see them continue; they capture student interest particularly that of the younger pupils in years 10 and 11. He would like to see the teaching resources develop further; he finds them a big help.

10 FE College, North East FM AS 2 A2 0 Maths AS 18 A2 3
10.1 Further Mathematics started this year in the college with two students. It was part of a big push by the College in the provision of A Level courses.
10.2 The local FMN Centre Manager came in for a discussion about how the network operated and what it could offer by way of support. The FMN is currently tutoring the two students, but the College will do it themselves if numbers next year make it viable. The Centre Manager keeps the students and the College informed of events, but there has been no take up so far.
10.3 The College has some out reach work with the local schools and encouraging Year 11 students into Mathematics. At present there are only two teachers in the College teaching A Level but they have previous career experience of teaching Further Mathematics.
10.4 In registering with the FMN, the online resources have been found to be very good.
I think that it's great; its really good with all those extra materials, all the papers that are in there all the hints and tips. I think that's excellent.

11. FE College, London FM AS 2 A2 0 Maths AS 50 A2 40
11.1 There was no A2 students in the College last year; it is unusual to have any A2 students. AS is usually offered to Mathematics students when they know their AS results. Further Mathematics is timetabled, but the students pretty much self select; they take those who show an interest in doing it based on AS results.
11.2 The College is registered with the FMN but has little involvement with it. There has been no teaching support; the HoD is able to do it all herself. She is interested in FMN events but has not found their timing convenient.
11.3 Mathematics in the College is split between numeracy support for vocational course, and GCSE resits, FSMQ courses and A Level. Most of the students do not come direct from school; they tend to be older or from overseas and the College attracts them through community networks. The College does have open days, but all the local area post-16 provision is marketed separately so they don't have much direct contact with year 11 students. In the College, she does run a maths club as an enrichment activity. She has plans for a maths week with competitions and speakers but lack of time prevents its organisation. However, students have been to "Maths Inspiration" events. She is the only teacher of Further Mathematics but plans to look at FMN CPD provision for her colleagues.

11.4 She would like to see the FMN put on more local events, so that the students don't have to travel; they might then attend. She would generally like more contact with the local Centre Manager; she has little time at present though to pursue opportunities.
She made an interesting observation on why provide Further Mathematics :
I think it's good because the A-level content is so limited and calculus dominated that it doesn't necessarily give people an insight into what is interesting in about mathematics. So I prefer a lot of things that are in further mathematics as ways of getting people more interested in the subject as a whole.

12. Comprehensive school, London FM AS 4 A2 0 Maths AS 23 A2 13
12.1 They have just started to offer Further Mathematics this year and have four students. It is timetabled on reduced time, but they hope numbers will grow to become a fully viable A Level.
12.2 The HoD has had contact with the local FMN Centre Manager re the support on offer but he does not need teaching support; the department can do it. They do use the online resources and take part in the Mathematics Challenge organised by the FMN. Some of the students also attended a revision event.
12.3 The senior management is positive about offering Further Mathematics; the school is seen as improving and the school management want courses that will attract and retain high calibre students. So the department is developing the mathematics provision across the school and trying to make the lessons more inspirational. They do A Level taster sessions with Year 11 students and work particularly hard with them to attract them into A Level Mathematics. They also run a maths club, although it focuses on examination work. There have been some visitors to the department speaking about the maths they do professionally but they do not take students out to external events; they would like to.
All the department staff are graduates with mathematics related degrees and the HoD is confident they can teach the Further Mathematics.
12.4 He would like CPD opportunities for his staff. In particular he would like to be able to relate the work in years 7 and 8 to later developments in mathematics and possibly mathematics related careers.
I think what we are missing across the whole department is the ability to think in terms of further maths when we are teaching years 7 and 8 bright kids. Be able to pick things out quickly and do stuff with them and relate them to where it links into future careers and path progress which would help raise the profile of further maths.

13 Comprehensive school, Yorkshire FM AS 2 A2 0 Maths AS 18 A2 6
13.1 Further Mathematics was started a year ago with seven students taking the AS in year 13. This was run as an after school session with tuition provided by the FMN. HoD hopes to develop Further Mathematics but his first priority is greater success in mainstream AS Mathematics. The local Centre Manager provides a tutor some of the FM modules and the HoD is taking one himself..
13.2 The local Centre Manager also advised on setting up Further Mathematics and was said to be a great help. One student attended a revision day, and the HoD attended a CPD training day.
13.3 UK Maths Challenge is done by all the year group top sets else there is little else by way of enrichment, but maths is generally viewed positively in the school and the majority of pupils work hard at it.. The Centre Manager met with year 11 students to try and encourage them to think about Further Mathematics. The senior management are supportive; the Head Teacher is a

for HoD for Mathematics, and they would permit Further Mathematics onto the timetable with reduced time for small numbers. The staff are mostly qualified mathematicians and capable of teaching Further Mathematics.
13.4 HoD is very grateful for all the help and support he has received from the Network.
We wouldn't have got started without the help of the FMN, they have been a real help to us. Although it was on my mind to start it, it would have been very hard to have done that without the external support.

14 Comprehensive school, West Midlands FM AS 10 A2 1 Maths AS 30 A2 10
14.1 Further Mathematics is on the timetable for the first time this year. Previously it had been run with two or three students in extra lessons. HoD wanted to get Further Mathematics established.
14.2 The department teaches the Further Mathematics but students take part in events, particularly the enrichment events, including the UKMT Team Challenge. They find the online resources to be very good and make the students aware of them.
14.3 Year 11 students are encouraged to think about continuing mathematics; they take them to the Network organised Further Mathematics conference and do other activities to stimulate interest. In the school as a whole attitude to mathematics was described as fairly average but top sets tend to show interest and enjoy investigative activities; they do the UKMT Challenges. Younger pupils are involved with STEMNET enrichment activities. The full time staff are qualified mathematicians and they can teach Further Mathematics. The senior management is supportive and has allowed reduced timetable time for the course; a member of the senior management is a former HoD. .
14.3 The HoD wants more of the same from FMN in terms of online resources and enrichment activities. He finds it helpful for students to be provided with something a little different. HoD is generally pleased that there has been pressure to re-establish Further Mathematics.
I think it good that there has been a big push to get it reintroduced and it does seem to have been effective. The big thing I think is that you can now have your Further Mathematics group as a separate group alongside your existing A-level group and it doesn't create any problems; that has a lot to do with it.

15 Comprehensive school, West Midlands FM AS 8 A2 2 maths AS 40 A2 15
15.1 The department started Further Mathematics by sending a few students to the local FMN Centre for tuition, but the students weren't happy with the teaching. Has tried to run it with a local partner school but that wasn't successful, so the HoD decided to teach it himself in school. He has reduced timetable time in which to run the course.
15.2 The HoD is generally dissatisfied with the FMN and considers that he has had very little support. He does make use of the online resources which he is impressed with and there has been a constructive visit from a member of the FMN Central Team. He can teach the Further Mathematics and has been successful with committed students although some students do drop out due to high work load. The students did attend a revision event but he brings in his own enrichment activities.
15.3 Students in Years 10 and 11 are encouraged to think about taking mathematics at A Level and are offered GCSE statistics and FSMQ additional maths, the latter running as an after school activity. He believes the success of this is seen in the increase in numbers taking AS Mathematics. The senior management response is supportive in allowing Further Mathematics

now to have timetabled time. They want the course to be successful so that some students do not leave after year 11 to go to a local selective school.
15.4 The HoD values the online resources and is involved with the local university. He wants colleagues to train in Further Mathematics tuition and might consider the FMN for that, but clearly he is generally dissatisfied with the local support.

16 Independent school, Eastern FM AS 1 A2 2 Maths AS 18 A2 15
16.1 The HoD is disappointed in the AS take up; she expected more and hopefully will get more next year. However, the course is run for one student. Further Mathematics was introduced three years ago with two students taking AS Level in year 13.
16.2 They do all their own teaching but there is regular contact with the local FMN Centre. The students attend the revision events at the university. Students have also been to enrichment events, but she wasn't sure if they were FMN events. They make some use of the online resources but haven't had time for an in depth look at them and so integrate them into the scheme of work. They use textbooks rather more.
16.3 The attitude towards mathematics in the school is generally positive; there are small classes and the students get a lot of personal attention. Staff can talk to students about career possibilities involving mathematics and encourage suitable students into A Level. There are enrichment activities in the main school involving puzzles and competitions and they participate in the UKMT Challenge across the school.
16.4 The revision events are found to be very good and they would like those to continue and more resources to support revision to be made available.
The revision sessions we went to last summer, the students found that very good, very interesting, the different workshops, the talks and the different people that were involved. We will certainly be looking to be involved in that again next year… it does benefit to mix with students from the other schools.

17 Independent school, South East FM AS 3 A2 0 Maths AS 16 A2 7
17.1 As a small school they only do Further Mathematics with very bright students or one who stays for a third year in the sixth form. They do their own teaching, but some students can more or less teach themselves form the textbooks. Students have done the full A Level in the past.
17.2 The HoD found the FMN through web browsing and responded to a flyer, but has only had e mail contact with the local Centre Manager. She would like to become involved but lack of time prevents this. Currently she makes no use of FMN but doesn't know what is available nor how to obtain it.
17.3 Mathematics in the school as a whole is good and relatively large numbers continue into AS Mathematics. They encourage the students with their own enthusiasm for the subject and discuss career opportunities that mathematics can open up. They are involved in the UKMT Challenge and team events. They are a well experienced staff who can teach A Level Mathematics and support Further Mathematics. Senior management supports the teaching of Further Mathematics but they have noted that Mathematics puts heavy demands on student's time compared to other courses.
17.4 The HoD would just like more information and a face to face meeting to discuss opportunities that FMN has to offer and not be directed to a website.

18 Academy. North East FM AS 13 A2 5 Maths AS 40 A2 32
18.1 The school has been offering Further Mathematics for many years but only with one or two students taking it up and being taught in after school. The HoD pressurised to have it put on the timetable which was agreed in 2004. The AS course is now offered over two years or students can move onto the full A Level in year 13 or possibly over 3 years. HoD notes there was a big increase in he take up of mathematics post 2004 and that students now see Further Mathematics as valuable for career progression through university.
18.2 The HoD is himself an FMN tutor.
18.3 Mathematics is successful in the school as a whole; 70% A-C at GCSE and year 11 students are encouraged into A Level Mathematics and numbers continue to grow. The school has a timetabled enrichment slot and they run a maths activity club. The staff is stable and enthusiastic about teaching mathematics, and mutually support each other in the teaching of Further Mathematics.
18.4 HoD would like to see the development of more revision support material in both A Level Mathematics and Further Mathematics. He notes the general ethos of Further Mathematics has gained momentum and he puts the driving force behind it down to the FMN and its enthusiasm. Being able to offer Further Mathematics at the school has been a selling point in attracting post-16 students.

19 Comprehensive school, South East FM AS 1 A2 1 Maths AS 30 A2 30
19.1 Further Mathematics is taught in collaboration with two other schools and is timetabled.
19.2 There is considerable support available form the local FMN Centre Manager, who is available to support students, more or less on demand. Students attend revision events and also use the online resources but mainly for revision rather than learning.
19.3 The school has a new purpose built suite for mathematics and attitudes towards the subject are very positive. The Centre Manager talks to students in years 10 and 11 about the opportunities taking A Level Mathematics has to offer. The department participates in the UK Maths Challenge and students have attended talks, such as “Maths Inspiration”. The staff are very capable with five of them able to teach Further Mathematics. The senior management is supportive, one of whom is a former HoD. Further Mathematics is seen as prestigious and giving access to a range of higher education courses.
19.4 The HoD would like to see some resources for FP4. Other than that she is pleased with the way the Centre Manager works with the collaboration and she and the HoDs meet regularly re the development of Further Mathematics.

20 FE College, Eastern FM AS 5 A2 6 Maths AS 40 A2 10
20.1 This is the second year of teaching AS Further Mathematics in the College, and the first year for A2. Some students come to College from neighbouring schools sixth forms through the local authority’s consortium arrangements.
20.2 In the first year, the teaching was shared with a FMN tutor who came to the College; it wasn’t very successful so he decided to do all the teaching himself. He gets allocated timetable time but on reduced hours which he supplements with voluntary drop in sessions. Students go to revision events but these are organised by Key Note Educational rather than FMN, and students are addressed by a chief examiner. He thinks it a valuable broadening experience for the students but notes the weaker ones do not get a lot pout of it.

20.3 Within the local authority policy they as a college have no access to year 11 students and rely on schools to advise on what is on offer post-16. However, they do get some good students and good results.
I hope we get more than the five who started AS this year; there is precious little we can do about it; we are not in the driving seat to influence what students do; we advertise the best we can.
He is the only teacher of Further Mathematics and close to retirement! It is a big college and the senior management are remote form curriculum management but his line manager supports Further Mathematics and appreciates its marketing value in attracting students to the College. Students are told if numbers don't warrant a class then they will be taught through the FMN.
20.4 He has found the examination board AQA best fits the type of student they have for A Level Mathematics and Further Mathematics. He wants AQA orientated resources to be provided through the FMN with tuition available to go with it if needed.
If we have fewer next year in AS than we have this year we might need to get at least some of the provision from the network, and it would be extremely helpful to us if the network could supply that help based on the AQA syllabus. ….. With our lone student two years ago we were advised that the only realistic option for tuition from the network was for the MEI syllabus.
The HoD ended with two interesting anecdotes. One on HE entry and one from a HE electronic engineer who presented at a CPD event he went to.
She has got an offer from XXX University. An A in single maths, a B in further and a B in her other subject. She was told by XXX that without the further maths the offer would be three As. People coming into electronic engineering, we don't care if they haven't done physics, but we do care whether they have done further maths.

21 FE College, Eastern FM A2 6 AS 9 Maths AS 50 A2 11
21.1 The college is in a consortium with partnership schools and three Further Mathematics students come from one of them.
21.2 There has been no involvement with the FMN apart from e mails from the local Centre Manager. They do their own tuition and have not been to any events. They are considering a revision event but he has no time to organise it at present. He also has a perception of the FMN being for schools with sixth forms. The college does buy into the MEI resources and find them to be very useful.
21.3 He has not visited any schools to talk with year 11 students, but they do have taster days for those thinking of coming to the college. They also run a bridging course in mathematics for those Year 11s who have applied to do A Level Mathematics at the college. He has taken some of his students to "Maths Inspiration" events which he thought very beneficial for them and would like more such enrichment opportunities for them. He would like to pursue greater involvement with the FMN but he is new in post and has a first priority of improving the result at AS Mathematics. The staff are well qualified and can teach the Further Mathematics, although he would be interested to know more about what is available through *Elluminate,* such as support for the STEP papers. Senior management supports Further Mathematics in that he is allowed some timetable time but he has to mix and match modules between the year groups. He notes in his previous college, A Level Mathematics was done intensely in one year to permit Further Mathematics in year 2, whereas he is parallel running Mathematics and Further Mathematics.
21.4 he would really like more information on what FMN can offer him and may follow this up via the FMN website.

22 Comprehensive school, South East FM AS 3 A2 2 Maths AS 6 A2 24
Interview was not with the HoD but a highly committed teacher who initiated Further Mathematics and is determined to keep it going. She is also part of the local FMN Centre.
22.1 Due to the small numbers the HoD does not see Further Mathematics as a priority; raising the performance of Mathematics as whole in the school is the priority. However, the school permits Further Mathematics to run to try and keep students in the sixth form; many go elsewhere in a very competitive local authority for post-16 provision. But she only get limited timetable time and has to juggle modules to fit in the students who are at various stages in the course.
22.2 Due to timetable constraints, some of the teaching is done through the local FMN Centre. She notes Further Mathematics in the school wouldn't have started without the support of the FMN. She uses the online resources herself but it is deemed too expensive to make them available to the students. The students have been to some revision events and they took part in the UKMT senior challenge.
22.3 Generally the attitude towards Mathematics in the school is poor and many pupils have low self esteem. They have tried some enrichment activities but these have been of an ad hoc nature. She would like opportunity to discuss what mathematics has to offer with Year 11 students but other demands on time have prevented this from happening. There are two experienced members of staff who can teach Further Mathematics but younger members need CPD for A Level Mathematics before they think about Further Mathematics.
22.4 Basically she keeps Further Mathematics going in the school and thinks it would fold if she wasn't there. She is part of the local FMN and goes into other schools to support them. She sees the FMN as important in helping schools get Further Mathematics started and to develop their provision, making it available to a broad spectrum of students and not just the most able.
The current AS group I think are going to get Bs and Cs so they are not the most able students but they are really enjoying doing it.
The FMN made me realise they were trying to change things and get more students to do it with the only requirement being sufficiently enthusiastic to put the work in….and further maths has got so many fun things in that used to be in A-level and aren't any more like complex numbers and proof by induction; and they seem to really enjoy that.

23. Comprehensive school, South West FM AS 10 A2 4 Maths AS 80 A2 30
23.1 The A2 students are taught through the local FMN Centre; the AS students are taught by the department. There has been a big increase in mainstream AS mathematics; she is not sure why but they just want to do it! Further Mathematics AS Level has been on offer for four years with support from the local FMN Centre.
23.2 Relationships with the local Centre are very good and they have provided some tuition. The students have used online revision sessions and resources, which they supplemented in class giving support to individual students. Students also use this resource at home, but she considered it works better if they are with a teacher in school, who can help students focus on their needs.
23.3 Mathematics in the school as a whole is positive; the pupils really like it. The top sets take GCSE early and start AS topics in Year 11, so that AS Level can be seen as a natural progression for Year 11 students. They offer them a FSMQ, but the department choose the topics.
We don't like additional mathematics; it's a dreadful course.
There is however little enrichment activity but they are considering it and looking to do more. At present they take part in the UKMT Challenge. They are taking the A Level students to a "take maths to the limit " event and will see how they respond.

Most of the mathematics staff are well qualified teachers, and they can teach the Further Mathematics material. The senior management included two former mathematics teachers and they are very supportive of Further Mathematics; they permit additional support sessions for A Level students.
23.4 She is full of praise for the local Centre Manager.
It's the key thing; its really good, you are lucky. The Centre Manager is really good at running the network and letting us know what is going on.
She would also like more opportunity for CPD.
The thing that I desperately want is an awful lot of CPD and later on at night; I can't do one of those online sessions until after 8:00 pm but I would love to do some of that.

24 Independent school, South East, FM AS 4 A2 0 Maths AS 12 A2 5
24.1 There were very few students taking Further Mathematics prior to 2007, when it was put on the timetable separately to A Level Mathematics. The school hopes to attract students from elsewhere post-16, and with their own Year 11 students hope numbers will grow.
24.2 There has been little contact with the FMN. Initially contact was made through the UKMT Challenge and he registered with FMN, but he is not aware of what the FMN can offer. He would like to investigate the MEI resources when time permits. They are considering revision events but in partnership with other schools rather then through FMN, but might contact the local Centre Manager to discuss it.
24.3 The staff are well qualified and three of them can teach Further Mathematics. Little is done with Year 11 to encourage A Level take up, but they do have a day when they introduce some A Level topics to try and stimulate interest. There is no particular enrichment beyond the UKMT Challenge. The sixth form are taken to hear speakers, or they come to the school, but in partnership with other schools rather than FMN. The senior management supports the provision of Further Mathematics, seeing that good results in the subject is good marketing for the school.
They realise that maths is one of the harder subjects and they recognise we have good results and that is a good advertisement for the school.
24.4 He would like more involvement with the FMN. There is potential and it could start with the Centre Manager coming in and doing some enrichment work with the students.

25 Comprehensive school, North East FM AS 13 A2 0 Maths AS 50 A2 18
This is the first year Further Mathematics has been offered; it is running concurrently with AS Mathematics for the students taking it. It resulted from very able Year 11 students who wanted to take Further Mathematics and would have gone elsewhere if the school hadn't put it on. HoD expects about 10 students to continue top A2. He notes they have generally had a big increase in the numbers taking AS Mathematics; it doubled this year.
25.2 They are doing their own teaching of the Further Mathematics, but the local Centre Manager did advise on setting up the course and course management. They are interested in the revision events but students haven't actually been to one yet. They have paid for student access to the MEI resources and they are developing their use, seeing a lot of potential in them.
25.3 Pupils in the school in general like Mathematics and its importance is recognised as the pupils get older. They get positive feedback from the pupils. They are working on providing enrichment opportunities; some mathematics related visits are planned for various year groups, and they take part in local competitions. However, they don't do a great deal with Year 11 to encourage them into A Level Mathematics; they just make them aware of the possibilities at

A Level. They will run a taster day this year for both their own Year 11 students and those coming to the school from elsewhere. For the latter this will get them used to the ethos of the school and make them aware of the workload to be expected. A few Year 11 students are voluntarily following an Additional Mathematics course after school. Most of the staff are well qualified mathematicians with six involved in teaching A Level. The staff includes two members of the senior management who are very supportive. Mathematics is held in high esteem and the good results recognised, but there could be a funding issue in wanting to run more A Level Mathematics sets and Further Mathematics next year.
25.4 He is looking towards greater involvement with the network, particularly making use of revision days.
I think we would certainly use those revision days, its nice for the pupils to get someone else's point of view for half a day at least.
He also wants to develop the use of the MEI resources.
I find those an excellent resource, particularly having gone through the text book and done all the questions, the fact that there are model solutions on there as well has been really helpful. I will try to develop the use of multiple choice tests with all the students having an account.
He would also find it useful if an external speaker came to talk about university courses and career opportunities involving Mathematics and wondered if the network could provide a speaker.

26 Comprehensive school, South East FM AS 6 A2 5 Maths AS 30 A2 12
26.1 The full A Level in Further Mathematics was started last year with four students. Further Mathematics provision evolved from three years ago when the HoD started it with after school lessons, and first getting the AS Level on the timetable and then the full A Level. It runs with reduced hours but is manageable. Some of the students on the A2 Mathematics course are also taking the AS Further Mathematics course.
26.2 The school is registered with the FMN and there has been some contact with the local Centre Manager. He has had some involvement as a tutor at a revision event, but the students have found it difficult to attend such events. He uses the MEI online resources to supplement the textbooks, but they do all their own teaching.
26.3 There is a generally positive attitude towards to Mathematics across the school and they get good results at GCSE (82% A-C). They have good enthusiastic teachers, and do some enrichment activities with the pupils, such as a maths day of puzzles and challenges with Year 8, so as the pupils see another side to Mathematics rather than just answering questions. He wants to develop enrichment opportunities further by for example getting external speakers in to give different perspectives about Mathematics. An accelerated program is run with some Year 11 students and they take FSMQ Additional Mathematics. The HoD also introduces them to some A Level topics or something a little bit different in Mathematics to stimulate their interest in pursuing the subject into A Level. All the staff are graduate mathematicians and the senior management includes former Mathematics teachers, and they are a Mathematics and Computing School, so support for Further Mathematics is very strong. He would however like some CPD training for the staff so that Further Mathematics remains sustainable in the school.
26.4 The HoD generally wants to make greater use of the FMN and the activities it has to offer, such as students attending enrichment days. He enthused again about the resources.

The resources are fantastic and they have helped out with the teaching of it (FM) and having some extra questions as much as anything else is very helpful. I don't think I am using it (the FMN) to the full potential yet, but over time I will be.
He is pleased at the interest in Further Mathematics at the school and that students stay there to study it rather than go elsewhere. He notes parental backing has been important in recognising both that Mathematics is a demanding subject and also that the qualification and the opportunities it brings are very worthwhile.

27 Comprehensive school, South East FM AS 0 A2 2 Maths AS 23 A2 15
27.1 Further Mathematics has been running for three years. The department does the teaching itself with support from the local Network on topics they feel insecure about. Further Mathematics is given reduced timetable time and students find it stressful to complete the course in the time available. The HoD is hopeful a new Head Teacher will allow this time to increase if more students take it up.
27.2 The department makes extensive use of the MEI resources and they have paid for student access to them. They are registered with two local FMN Centres who have been helpful on advising on the management of Further Mathematics and they make extensive use of the revision events. She noted that one of the Centres often has a speaker, or similar enrichment activity, running in conjunction with a revision event, which she and the students value.
27.3 The pupils in the school are fairly happy with Mathematics but the department has been going through a period of large turnover in personnel. The HoD hopes that with the New Head Teacher supporting them and the staff becoming settled that the results will improve. There are able pupils in Year 11, so she is hopeful some will take up Further Mathematics and keep it running in the school. However, there is a lot of competition for post-16 students in the area so they provide incentives to Year 11 to try and retain them. Undergraduates from a university come in and talk to Year10 students about their experiences of doing Mathematics related degree courses and give them positive encouragement with some new perspectives on Mathematics. In particular the HoD focuses on encouraging more girls to continue with their study of Mathematics. The school takes part in the UKMT Maths Challenge and they are developing enrichment activities for gifted and talented pupils in Mathematics. All the staff are well qualified Mathematics specialists and two members of the senior management team teach Mathematics. They hope to retain the younger members of staff.
27.4 The HoD wants to see the revision sessions continue and be able to call on help in the teaching of some topics if she needs to.
If they (the FMN) didn't continue we would find it very hard to continue with Further Mathematics, because we do rely on them quite heavily, so I think Further Mathematics would take a downturn.
She would like to see "one-off" events that teachers could go to possibly with students, to hear speakers talk about their professional use of Mathematics, input from examination board examiners and advice on teaching topics in Mathematics. She noted any long term commitment to CPD is difficult to make. She was unaware of ,opportunities available through *Elluminate*. She would like more opportunities at a local level to share and discuss problems.
We are quite a big school, but we can't afford to separate our Further Mathematics students into separate classes to do their Mathematics…. If they want to do the full Further Mathematics we have to make sure that the syllabus is such that we can start the Further Mathematics in Year 12.

We needed a little more guidance on that…..that sort of advice is valuable when you are working in isolation, which you are with Further Mathematics….Perhaps a little area meeting from time to time might be helpful with pointing these things out.

28 Comprehensive school, South East FM AS 2 A2 4 Maths AS 35 A2 16
28.1 Further Mathematics has been running for two years on a reduced timetable, which the HoD is not happy about. She is arguing the students need more time. Further Mathematics and Mathematics run concurrently in years 12 and 13 and there have been problems. They are still developing the course management and campaigning for more flexibility with the senior management team.
28.2 The staff make considerable use of the MEI resources and they buy into it for student access. They find it helpful to have all the course material in one place especially as suitable textbooks are not available. Some students have attended revision days and they are interested in using the online revision materials, and are investigating the use of *Elluminate*. They find the support of the local Centre Manager to be very helpful; they have entered UKMT Challenge organised by her, which the students really enjoyed.
28.3 They get good results in Mathematics across the school and have good teaching staff; the pupils are generally positive about Mathematics. A variety of activities are put on for them. The Year 11 top sets are offered FSMQ Additional Mathematics; from last year many of these continued to A Level even if they had been unsuccessful in passing the examination. The local Centre Manager helped out with the Additional Mathematics and students reported it as a great help in their A Level studies. She is looking to integrate enrichment activities into normal lessons and ideas are under development; after school clubs and alike are not feasible. The staff are well qualified and they know the subject material of the Further Mathematics course, but the HoD notes they do need support in how to teach it effectively. She had been to a CPD event and was not impressed as it was just subject knowledge. The Head Teacher is a mathematician but HoD believe he doesn't appreciate that some students need time to master some Mathematics concepts and thus her argument with him, for more time.
28.4 The local Centre Manager is very helpful and supportive.
The problem is we are a relatively small school so we can't have someone doing the same sort of thing every year. We are always having to learn new stuff. The centre manager has always been very helpful in sending me text books and bits and pieces; she's very supportive of additional maths and yes, I need to ask for her help again.
She does want more CPD both to build subject knowledge and to develop effective teaching strategies. She notes the scarcity of useful textbooks in some of the topic areas and would like FMN advice on resources and their use. She recognises the need for her department to have greater involvement in the FMN.
So its useful to have the MEI and website and stuff and the maths network is very useful. I think I need to know more about getting involved, getting people in to teach bits and I haven't really investigated that so far.

29 FE College, London FM AS 8 A2 ?? Maths AS 48 A2 ??
29.1 The HoD followed the trend of lets get Further Mathematics going again and first offered the AS course four years ago. It was taught to one or two students on an ad hoc basis, in their own time and last year management allowed them a timetabled hour now increased to a full time 5 hours as they have 8 students. They are a mix of first and second year Mathematics students

and there are problems with student's prior knowledge and course management but he and a colleague manage, as the students are able and willing. They have got good results in the past and he is pleased to offer Further Mathematics as there is competition for post-16 students from elsewhere, although the College students are mostly mature. Some of his students have gone onto Mathematics related degrees.
29.2 The college is registered with the FMN and he gets e mail contact from the local Centre Manager but does little with the information other than pass it onto students, who in turn don't act on it. He knows they should and wants to get involved more. He and a colleague can teach the Further Mathematics topics, but he is aware of other opportunities in the network, like meeting other teachers and his students getting to mix with other students. He needs time and money to take a group of students out of College but there have been some Mathematics related visits. He is aware that FMN type events are likely to be more effective if a teacher accompanies the students.
29.3 The College students mostly travel in and do not live locally and there is a big ethnic majority. Some local schools actually advise Year 11 students against going there. Yet he is pleased with the cohort of students he gets but he has no way of influencing local Year 11 students. He and his colleagues are well qualified and experienced and work with committed students and get good results. It's a big college and the department is remote from the senior management; the department just gets on with managing itself "they (senior management) know nothing and do nothing" and the only thing the management has done for them is allow timetable time for Further Mathematics.
29.4 He does want to know more about what the network could offer; the College is positioned where he could actually make use of two Centres, but needs both information and a welcoming invitation to get involved. He would particularly like local revision events, noting it is more efficient for a lot of students to do such an event together when time is tight towards the end of a course and examinations are imminent.

30 Comprehensive school, South West FM A2 1 AS 1 Maths A2 6 AS 13
30.1 The first cohort of Further Mathematics students started two years ago with three students of whom two completed to A Level. The course was followed in enrichment time; it was not timetabled. It's a small rural school with a small sixth form.
30.2 The local FMN Centre Manager taught the first cohort and use was also made of *Elluminate*. Currently there is a mix as there is a member of staff who can teach Further Mathematics. The HoD is on the local Centre Management Committee and likes to be involved. The students have been to enrichment events and revision sessions put on by the local Centre, which were enjoyed by most of them. The local Centre Manager is also helping to provide after school taster sessions for Year 11 pupils, which are voluntary but well attended.
30.3 The pupils in the schools as whole are generally positive about Mathematics. There are enrichment opportunities through quizzes, local competitions and the UKMT Challenge across the year groups. The school has a Mathematics and Computing specialism, but while the senior management appreciate the hard work that goes into Further Mathematics, they will not allow it timetable time. The department staff are well qualified mathematicians, one of whom can teach Further Mathematics.
30.4 The HoD is pleased with the interest shown by Year 11 students in A Level Mathematics and hopes the Further Mathematics will grow and that she can staff it; she will use FMN if she

can't. What she wants is more of the same in terms of enrichment opportunities and revision sessions.
I think they have hit the nail on the head; they have found what people want and that is what they have tried to provide…with the FMN all my experience has been great. We would not have been able to run further mathematics without the help of the network.

31 Comprehensive school, South East FM AS 11 A2 2 Maths AS 52 AS 36
31.1 Further Mathematics started three years ago with the HoD giving lessons in voluntary time and she registered with the Network anticipating the need for support. However, the next year it was given reduced timetable time and she now does all the teaching herself. The AS class is a mix of Year 12 and 13 students.
31.2 She has met with the local Centre Manager, who has given more general support to the department rather than Further Mathematics. She uses the MEI resources and finds them good, and would like them to be available to the students at no charge. The students aren't keen to go to FMN revision sessions; the school puts on its own support sessions. Students haven't made use of the online *Elluminate* sessions available due to time constraints, although they are made aware of them. However, when she did request revision sessions on certain modules, the Network didn't respond.
There was nothing on D2 which our A2 students are doing this January…I did e mail the Network and I didn't get a response which was disappointing because they are normally very good.
31.3 Pupils' attitude towards Mathematics in the school as a whole is generally positive; she felt more so than in most schools. The department does encourage suitable Year 11 students to continue their study of Mathematics; they do power point presentations in class and have taster days meeting and using some of the topics that will be met in AS Mathematics. However, she emphasised no student is forced into taking Mathematics, however able they might be. Enrichment activities are being developed for the school as a whole. In the past they have done GCSE statistics with able Year 10 students and are considering the FSMQ Additional Mathematics but she noted its standard is much lower than the previous O Level. They have able students who will take GCSE early, but are undecided on what to do with them subsequently, and whether to start introducing AS Mathematics topics. However, they will do something different! The department staff all have some sort of Mathematics background but most aren't specialists, although the A Level teachers are. The senior management team was recently appointed at the school, so she wasn't sure where they stood as regards Further Mathematics, but she did note when the school results are reported in the local paper the students who have five A Levels all had Mathematics and Further Mathematics, so considered that Mathematics would receive favourable support from the senior management team.
31.4 She didn't want the number of students taking Further Mathematics to get large; she wanted to avoid attracting students who might struggle and so undermine their performance in mainstream Mathematics. She noted the big conceptual jump in the pure mathematics following PF1.
I feel there is a massive jump from AS Further Mathematics to A2 Further Mathematics particularly from FMP1 to FMP2; it gets a bit heavy. Apart from that I think the students enjoy most of it especially the Year 12 who are enjoying the AS. I am pleased about that but year 13 are finding it a bit of a slog if I am honest!

She will continue to use the online resources and wished her students could use them as well. She would like students to attend the FMN revision sessions but noted personal notification of these, via e mail, would bring them to her attention and so to the students, noting there is too much reliance on web site based information that they don't have time to access.

32 Comprehensive school, South East FM AS 5 A2 4 Maths AS 55 A2 28
32.1 Further Mathematics was introduced four years ago on the timetable with six students who completed to A Level. They had a big drop out from the current A Level students but they only want about 5 or 6 students and so now insist on a grade A at GCSE for Further Mathematics.
32.2 The school teachers the course itself, and has two teachers involved, one of whom is a senior manager. The students have made some use of revision sessions put on by the local FMN but found they are not orientated towards their AQA Specification. The students are told about enrichment events, but time and commitment to attend is lacking. The staff do make some use of the MEI resources, but need to investigate further. They are not aware of the *Elluminate* sessions and will also investigate those. They also do some STEP support, and though the local Centre Manager hope to offer this to students from other schools.
32.3 The school is generally successful with Mathematics and achieves 70%+ A-C at GCSE. Year 11 students show a lot of interest in A Level Mathematics, and booster classes are put on for the weaker ones to provide a bridging course, so that can take on the AS Level course. For enrichment, the pupils across the year groups do UKMT Challenge and take part in the Team Challenge. Various activities are put on for the pupils by way of enrichment. The staff are mathematics' specialists and most can teach A Kevel. The senior management is generally impressed with the department whose numbers at AS Level are considerably higher than in other neighbouring schools. There is good support from senior management.
32.4 He would like to know more about what the FMN has to offer and be more involved. He is in regular contact with the Centre Manager so will follow this up.

33 Comprehensive School, Eastern FM AS 6 A2 2 Maths AS 32 A2 35
33.1 Further Mathematics was restarted in 2007 after a 5 year lapse when the HoD wanted to get it going again. This happened with two students who he taught in his own time with some tuition coming from the local Centre. It is currently timetabled although some modules are taught alongside the mainstream Mathematics. Interest from Year 11 students suggests numbers will grow next year.
33.2 The Centre Manager has visited the school and done some enrichment work, particularly with Year 11 students to encourage them into A-level. The HoD finds the online resources very helpful. He has made some use of revision and enrichment sessions put on by the FMN but finds the paperwork required by the school for external visits detracts from organising such trips. His own Further Mathematics students actually put on revision sessions for their peers on the mainstream Mathematics course.
33.3 His own survey shows a very positive attitude towards Mathematics in the school. The Year 11 staff encourage those who show interest towards A Level and they put on an induction course, which any student who wishes to take AS Level has to attend and complete the associated work. There is a lot of enrichment activities with Years 7 and 8 where the HoD has altered the way Mathematics is taught. He has well experienced staff, who are strict with discipline and ensure homework gets done. The senior management now support Further Mathematics after a

bit of a battle to get it re-established; they will permit the course to run with as few as two students. The HoD is concerned about staff limitations when it comes to teaching Further Mathematics and when the time comes, if he will be able to appoint teachers who can teach it.
33.4 He would like continued access to the resources, and was annoyed at the threat of being "switched off" when he hadn't responded to the re-registration form.

Appendix 2 Report Tables

Table 3(a)
Schools and colleges with A Level Further Mathematics entries of 5 or less in 2005 and 10 or more in 2007
Table 3(b)
Schools and colleges with AS Level Further Mathematics entries of 5 or less in 2005 and 10 or more in 2007
Table 4(a)
Schools and colleges teaching Further Mathematics “in house”; graded entries in Further Mathematics
Table 5.1(a)
Graded entries in A Level Mathematics and A Level Further Mathematics 2004-2008
Table 5.1(b)
Graded entries in AS Level Mathematics and AS Level Further Mathematics 2004-2008
Table 5.2
Graded entries in Further Mathematics by gender 2004-2008
Table 5.3(a)
Mathematics and Further Mathematics entry combinations in 2008
Table 5.3(b)
Mathematics and Further Mathematics entry combinations in 2007
Table 5.4(a)
Graded entries in A Level Mathematics and A Level Further Mathematics 2004-2008
Table 5.4 (b)
Graded entries in A Level Mathematics and A Level Further Mathematics 2004-2008
Table 5.5
Number of institutions offering Further Mathematics
Table 5.6(a)
Graded entry cohort sizes; all institutions entering candidates for A Level Further Mathematics
Table 5.6(b)
Graded entry cohort sizes; all institutions entering candidates for AS Level Further Mathematics
Table 5.7(a)
Further Mathematics Network regions defined by local authorities: graded entries in A Level Further Mathematics; regional summary
Table 5.7(b)
Further Mathematics Network regions defined by local authorities: graded entries in AS Level Further Mathematics; regional summary
Table 5.8(a)
Further Mathematics Network regions defined by local authorities: graded entries in A Level Further Mathematics
Table 5.8(b)
Further Mathematics Network regions defined by local authorities: graded entries in AS Level Further Mathematics