



Qualifications and
Curriculum Authority

Evaluation of participation in GCE mathematics

Appendix K: Case study centre student interview report

QCA Research Faculty and Clare Snowden, Consultant to QCA

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Introduction

In March/April 2006 a total of 251 students were interviewed, in groups, at 18 of the 20 centres. Group sizes ranged from 1 to 11. Students were grouped by the following categories: AS; A2; further mathematics (FM); and non-completers. This last category comprised both students who had dropped out of AS mathematics before completing the course and students who had not continued on to A2 after getting their AS grade.

The tables 1 to 3 give an analysis of the interviews by gender; year group and by grade attained in GCSE mathematics before starting A level mathematics. Please note that this statistical data is provided for the purpose of giving a context for this report only and is not intended to be indicative of any trends in the wider population.

Table 1: Interviewees by category, number of centres and gender

Category	No of centres	Female	Male	Total students
AS	18	51	42	93
A2	18	32	45	77
FM	13	19	32	51
NC	13	11	19	30
Total	-	121	130	251
% of total	-	45%	55%	100%

Table 2: Interviewees by year group

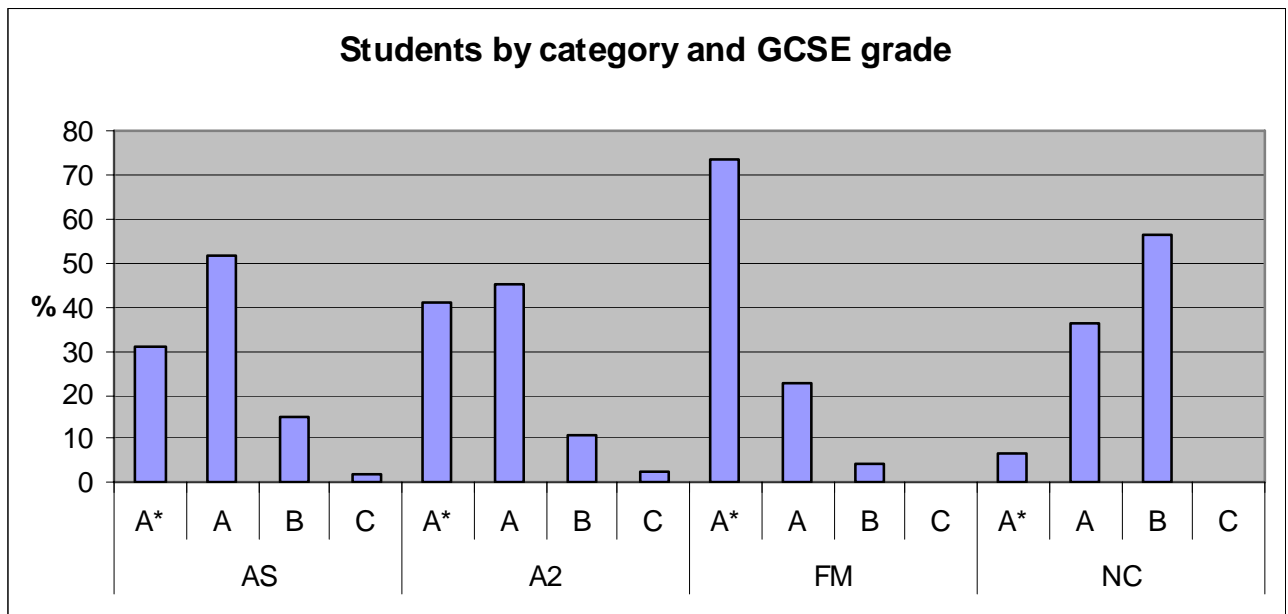
	Year 12	Year 13	Total
AS	93	-	93
A2		77	77
FM	21	30	51
Total	114	107	221

(Year group not given for non-completers.)

Table 3: Interviewees by GCSE grade and by GCSE tier

	A*	A	B	C
Higher tier	98	104	30	3
Intermediate tier	-	-	11	1
Total	98	104	41	4
% of total	39%	41%	16%	2%

Chart 1: Interviewees by GCSE grade (%)



The interviewees used a detailed interview schedule, which gave prompts for the areas of interest for the research team. These questions and prompts have formed the nature of the responses. The headings below reflect the areas of questioning. It should be noted that the comments are generally prompted rather than spontaneous. Also, in some cases, students might not have responded to all prompts or not been prompted on all aspects of the question.

The questions in the interview schedules for each category, while covering very similar ground, differed in some ways. These differences caused some areas to be covered in more or less detail across the categories. In a few cases, interviewees were asked questions specific to their situation. Data from these questions is reported on separately, after the common areas.

The data were analysed using NUD.IST software. As the majority of the data were qualitative, it was not possible to quantify comments made in most cases.

Summary

Attitude and enjoyment

The vast majority of AS and A2 students said that they enjoyed the subject and considered that they were good at it.

AS and A2 students often said mathematics was a difficult subject, but mostly they were enjoying the challenge and finding they could meet it if they worked hard.

AS and A2 students often described their study of mathematics as satisfying, rewarding and interesting, although sometimes frustrating.

Girls were more likely than boys to say that they enjoyed the challenge of mathematics. Boys were much more likely than girls to say that they enjoyed the subject because it was logical or straightforward.

Girls were much more likely than boys to stress, in a negative way, how frustrating they sometimes found the subject.

A2 students said morale within the classroom was good.

Further mathematics students were enjoying their course and finding the work interesting.

Nearly 80% of the AS students said they were planning to continue to A2, depending on their AS grade. Almost all A2 students said they had always intended to continue.

While a third of non-completing students said that they enjoyed AS mathematics initially, this enjoyment waned when they encountered difficulties.

Recruitment

Students generally reported a combination of factors influencing their choice, but many also stressed that it was their own choice and that they were not swayed by the opinion of others.

Some AS, A2 and further mathematics students had been very strongly encouraged to choose the subject by their teachers.

In general, students reported that teachers had encouraged students they thought had the ability to do A level mathematics to take it.

Students reported teachers and others warning them that it was a difficult subject.

Non-completing students had been encouraged to choose mathematics by messages that it was a good subject to do in terms of future prospects and earning potential, although they had heard it was difficult.

A third of non-completing students said that they had been encouraged to take A level mathematics by their teachers.

Reasons for studying mathematics

AS and A2 students' main reason for studying mathematics was because it would be useful to them for university entrance or for their career. Enjoyment and ability were also frequently occurring reasons.

University and career plans were by far the most frequently occurring reason given by boys for choosing mathematics.

For girls, the top three reasons occurred with similar frequencies. They were, in order of frequency: previous success; university and career plans; and enjoyment of the subject.

The main reason further mathematics students said they were doing the course was because they enjoyed mathematics, closely followed by future plans, and then ability.

The most common reason non-completing students gave for choosing AS mathematics was that they had enjoyed GCSE or done well at it.

Some AS, A2 and non-completing students described mathematics as having as high a status as an A level subject.

Usefulness

Many students said that mathematics would be useful to them for university entrance or for their careers.

The most frequently occurring response from AS students was that they had not decided on a course but believed that mathematics would be a good subject to have on their UCAS form.

Students named a wide variety of university courses and careers for which they thought mathematics would be necessary or relevant; most commonly mentioned were mathematics courses or teaching, medicine, engineering and finance-based courses or careers in finance.

Students were finding that their mathematics work helped them with some of their other A level subjects, especially science and business-based courses.

Challenge

The vast majority of AS and A2 students said that A level mathematics was challenging and did not need to be made any more challenging.

While A2 students said that A2 was more difficult and challenging than AS, they felt that the progression was smooth and generally indicated that they found AS an effective preparation for A2.

Most AS students said the level of demand was what they expected. Teachers and others had warned them that it would be difficult.

A2 students said that, on reflection, the AS course was 'OK'.

Students said A level mathematics was difficult mostly because of a high workload, fast pace and a lot of work to do outside lessons.

Non-completers echoed the above, and also said that it was easy to get behind and there was no time to consolidate learning.

Some non-completers said that the amount of time they had had to give to mathematics had been affecting their other courses.

FM students said FM was harder than A level but they were enjoying the challenge and finding the work interesting.

There was no evidence in the qualitative data that students with grades below A in GCSE mathematics were more likely to say that they were finding the course difficult than those with grades A or A*.

Comparing mathematics to other subjects

AS and A2 students had mixed opinions about whether mathematics was harder or easier than their other subjects.

Nearly a half of AS students commenting said that mathematics was their hardest subject. Just over a quarter of A2 students commenting made the same judgement.

Just over a third of AS students commenting said that mathematics was their easiest subject; only a tenth of A2 students commenting made this judgement.

A fifth of A2 students commenting said that all their subjects were of equal difficulty; no AS students made this judgement.

Comparisons to individual subjects involved small numbers of students and opinions were often contradictory.

Non-completing students mostly said that mathematics was harder than their other subjects.

Students enjoying mathematics demonstrated a liking for its 'straightforward' nature, compared with what they considered to be the less clear-cut nature of other subjects.

Some of those finding the subject difficult said part of the difficulty lay in the 'right or wrong' nature of mathematics.

Preferences

Students had a wide range of most and least favourite topics and units. The data were often contradictory, with little significant correlation of opinion.

C1 was the most frequently stated preferred unit for both AS and A2 students because, they said, they found it the easiest unit.

A number of students expressed a wish that they could have done different units, or had more choice in which units they could do.

Examinations

A2 students' opinions were mostly split between finding the examinations harder than expected or as expected.

AS students who had taken examinations were mostly positive about the experience.

Further mathematics students expressed mixed views of the examinations they had taken, with some groups feeling they had gone well and others feeling they had not been fully prepared when they sat them.

Non-completing students described very negative experiences of examinations, although one third said that they were 'OK' or 'easy'.

A number of AS and A2 students said that they had found the wording difficult to interpret on some questions.

GCSE and transition to A level

Calculus, graph work and trigonometry were most frequently mentioned suggestions for inclusion in GCSE to help with the transition to A level, although each was raised by a small proportion of students.

The majority of comments non-completing students made about their experience of GCSE mathematics were positive.

More than half of non-completing students said there was a big jump from GCSE to AS mathematics.

Many AS students said there was a big jump from GCSE to AS mathematics, although some said it was not as high as they had expected.

Teaching and support

Students were mostly positive about their teachers.

AS students appreciated teachers who gave good explanations and helped everyone to keep up.

Preferred characteristics of teachers given by A2 students were being well-prepared, knowledgeable and experienced.

Further mathematics students preferred teachers using a mixture of approaches, taking time with explanations and making lessons interesting.

Around half the centres provided drop-in sessions or workshops for mathematics students, but there were few comments about how useful students found them.

Most students felt that they could approach teachers for help outside lessons.

Non-completers from most centres were positive about the support available to them while they had been on the AS course.

More than half of non-completing students said that different teaching methods could have helped them to continue. Suggestions included better explanations from teachers, smaller groups and a slower pace of work for less able students.

Findings of the report

Attitudes to mathematics

A2

Most A2 students were positive about mathematics. They expressed enjoyment of the subject and some described it as 'interesting'. While some students acknowledged that it was 'hard', many spoke about enjoying the challenge and about the satisfaction of working out a problem. They thought it required a lot of work but said that this was worth it in the end.

When asked, the majority of students said they thought they were mathematical. They frequently said that they thought they would always do mathematics, even if they were not planning to study it at university, and whether they were considering careers in a directly related field such as teaching or finance, or other fields such as medicine or architecture. Only eight students clearly stated that they would not use mathematics in future.

A minority of students said they did not think they were mathematical, although this did not necessarily mean that they were negative about their ability. A few in this group said that they needed mathematics for university. A few others had become disillusioned about their ability after enjoying GCSE.

AS

The most frequently occurring comments about mathematics from AS students were that it is enjoyable, challenging and rewarding. The next most common opinion was that it is 'hard', and it was also described as 'tough' and 'confusing'. A similar number of students said it was 'easy', 'straightforward' or 'logical'.

A small number of students said the workload was high and it was easy to get behind. A similar number said it was a useful subject to have, which supported other subjects and could be used in future.

A slightly smaller number of students compared AS to GCSE and said AS was a big step up. Three others were finding mechanics difficult. One (with a B at intermediate level) was questioning her decision to take mathematics; another said he did not think he was a mathematician.

Enjoyment of mathematics

A2

The vast majority of A2 students said that they enjoyed mathematics. The most common reason was that they found it satisfying when they could work out the solution to a problem. They referred to enjoying the challenge of mathematics. A number of students highlighted the difference between other subjects and mathematics, which they said had less 'waffle'. Good teaching and relaxed lessons were also said to contribute to students' enjoyment of the subject.

A significant minority of students said that their enjoyment levels varied depending on the topic or how well they were doing. Some said it was very frustrating when they 'get stuck'.

Seven students said that they were not enjoying mathematics any more. Generally, this was because they were finding it difficult.

AS

Most AS students said that they enjoyed mathematics. They spoke positively of it being challenging, logical and interesting. In particular, students said that they found mathematics satisfying and rewarding when they were able to resolve a problem. Some stressed that they did not enjoy it all the time, particularly when they got stuck on a particular problem. They varied in their response to this situation, some saying it was satisfying when they solved it; others found it frustrating and demoralising. Three students from one group said good teaching added to their enjoyment.

Eight students said they were not enjoying mathematics. (Six of these had achieved grade A at GCSE. The other two had a B at higher and a C intermediate tier respectively). Where reasons were given, they included, 'I can't do it', the teacher 'does my head in' and 'it's hard and boring'. One, who was doing it because he said it was a useful subject, said 'I don't enjoy it; I just want to do well'.

FM

Further mathematics students gave a variety of reasons why they enjoyed mathematics. The following were mentioned by small numbers of students, as far as possible in order of the frequency with which they were mentioned. The reason given most frequently was that students found mathematics challenging and enjoyed the challenge. Slightly fewer said that they perceived mathematics as straightforward and logical, sometimes making comparisons with other subjects that either did not have right and wrong answers or required essay writing. A smaller group of students said they enjoyed the problem-solving aspect of mathematics, which they said they found satisfying and rewarding. A few students said they found mathematics interesting and varied. Others liked the way topics linked together. Some said they enjoyed it because they could do it, or found it easy. For one interview group, some of their enjoyment came from working as a small, close-knit group.

A small number of students said they particularly enjoyed being given proofs of things they had had to take for granted in the past. One or two specifically enjoyed pure or applied mathematics and one or two others said they enjoyed the link to other subjects.

A few students were either not enjoying aspects of mathematics, did not enjoy it at all or were losing their enjoyment of it.

Non-completers

Around a third of non-completing students said that they enjoyed the A level course initially, or enjoyed parts of it. They said that their enjoyment dropped as they began to struggle and fall behind. A few of the students said that they enjoyed mechanics.

Recruitment and prior awareness

A2

Most A2 students said taking mathematics was their own choice and they did not need to have it sold to them. Some of these said they had not heard anything about mathematics before making their choice but for most, teachers or, to a lesser extent, family members had encouraged them.

The students reported a mixture of encouragement and warning about doing A level mathematics. They said they had heard that it would be hard but were not put off. They had also heard that it was a useful subject.

Some said that teachers had encouraged them as individuals, or encouraged those who were expected to do well at GCSE, but students also often said that teachers had warned them that it was a difficult subject. Three interview groups of students who had been on taster days said that they were off-putting.

Having family members who were mathematicians had encouraged some students. Two were discouraged by their parents, who said it would be difficult to get a good grade. Friends and students already on the course also said it was hard.

A few students mentioned messages in the media and how these influenced their choice. These included that it was difficult and therefore would be a challenge; that there was a shortage of people with mathematics skills therefore there would be jobs, and that people with mathematics get paid more. Another boy said he had read that mathematics was easy, whereas his teacher and sister said it would be hard – he said his teacher and sister were right.

AS

About a third of AS students said that they did not feel anyone had influenced their choice to do mathematics. Some of these said they had been told they had the ability to do AS. Almost the same number of students said that their teachers had actively encouraged them.

Encouragement varied in strength from teachers telling some students they 'had to' do mathematics –one saying he would be angry if she didn't – to letting students know they were capable of it. The latter was the most common approach. Students from a few centres said it was expected that students with good grades would do the AS. Other encouragement included physics teachers encouraging students to do mathematics, and teachers telling students mathematics was good for university entry, or for a good wage packet.

Some students also reported that teachers had warned them that mathematics was a difficult subject at A level. This was the main message that students reported hearing from friends, family and other students, although some had had encouragement from the same sources. Very few said they had been actively discouraged.

FM

For further mathematics students, similar numbers said they were encouraged to do further mathematics as said they chose to do it without specific encouragement. For those who had been encouraged, this came mainly from teachers and sometimes took the form of a teacher telling them they would be doing the course. Others had strong encouragement, described in terms such as 'persuaded' or 'advised' to do it.

Several students had heard nothing or very little about further mathematics beforehand. Some just read about it in a prospectus or heard about it at open day. On the other hand, three students in one group said that they had specifically sought out a college that did offer further mathematics.

Reports of positive prior experiences of family members and other students doing further mathematics had encouraged some of the students. Very few students reported being warned that it was difficult.

Non-completers

Non-completing students said that teachers, families and friends had made comments about mathematics. While students had generally heard that mathematics was difficult, an equal number said that they had been encouraged by messages that mathematics was a good subject to do in terms of their future prospects and earning potential.

About a third of students said that they had been encouraged to do mathematics by their teachers. A few other students said that positive comments made by teachers about mathematics at open evenings had encouraged them to choose it. A few said that teachers had warned them about the difficulty of mathematics. One said she had been discouraged because she had done intermediate tier GCSE.

Reasons for choosing mathematics

A2

The most frequently occurring reason A2 students gave for studying mathematics was that it would be useful to them in the future, chiefly for study or career purposes but sometimes in a less specific way. Some students thought that it was a high status subject which 'looks good on a CV'. Enjoyment and ability were also key reasons and were often linked to comments about their choice of future career.

AS

AS students often had a variety of reasons for studying mathematics. The vast majority of students said they were studying mathematics because it was a useful subject. This was related to either their choice of career or university degree, or more general. Students demonstrated a perception that mathematics was applicable to a range of degree courses and careers. A few also noted that it was generally well thought of and 'looks good on a CV'.

Planned courses and careers included mathematics teaching, sciences, medicine and related courses, and business or finance-based courses. A few students had not decided what course they wanted to do, or were planning to take a course for which mathematics was not essential,

but said that doing mathematics did not restrict their choices and looked good on a UCAS form.

The next most common reason given for doing mathematics was that they were good at it, or that they had got a good grade at GCSE. A smaller number of students said it was because they enjoyed the subject. A similar number said they were doing it because it was a good fit with their other subjects. This was usually because they thought it would complement and support their other subjects but sometimes students chose it as a contrast to other, essay-based subjects.

Many students expressed a combination of the reasons given above.

Only two said they were doing mathematics because they were advised to, one of these because he would need it for university. One student said he was doing it only because his parents had said he had to. One was unable to do the subject he wanted to because of the timetabling. Another said he was doing it because he would be able to get help from his brother.

FM

For further mathematics students, the most frequently stated reason for studying mathematics was enjoyment. This was closely followed by future plans and then being good at mathematics. A small number of students said they were taking it because they wanted to have an extra AS. A few students said that they preferred mathematics to other subjects and so decided to do more of it rather than choose something else.

Non-completers

The most common reasons the non-completing students gave for taking up AS mathematics were that they enjoyed GCSE mathematics or that they got a good GCSE grade. Three students said they did it because teachers persuaded them and three because of parental pressure. A few said they had thought it would be a good qualification to have on their CV. Several others said that they did it to help with their applications to university.

Students often said they thought mathematics was generally useful, or said that some aspects had been useful to them in their other courses. A few were more sceptical about its usefulness generally.

Usefulness: future plans and 'fit' with other subjects

A2

Most A2 students said that mathematics would be useful to them in their career or university course. They mentioned a range of courses they were considering and for which they thought mathematics would be useful, including: mathematics; engineering; medicine; pharmacy; sports; science; and animal science. Some did not mention university but predicted a use for mathematics in careers such as finance, marketing and engineering. One girl needed to take a mathematics paper for a nursing course. A small number of students said that mathematics was generally useful, with some emphasising the development of their problem-solving skills.

Another small number of students was not sure whether or not it would be useful, generally because they had not decided what to do after A level.

The vast majority of A2 students said that mathematics was relevant to other subjects they were taking. Physics, chemistry and biology were the most frequently mentioned; other subjects mentioned were psychology, business studies, economics and design and technology. Students often identified very specific parts of the mathematics course which they thought were relevant to a particular subject.

A small number of students said that mathematics was not relevant to their other subjects. Some of these were doing sciences or economics. Another small group said that the other subjects, including sciences, only required GCSE level mathematics.

AS

AS students thought that mathematics would be useful to them when applying to university and for their future career. They gave a wide variety of subjects they were planning to study, including oceanography, physiotherapy and motor sport engineering. However, the most frequently occurring response was that they had not decided on a course but believed that mathematics would be a good subject to have on their UCAS form. Where students had decided on a course, medicine and economics were most frequently occurring. Only three students said they were planning to study mathematics. Another two were aiming to do biomedical science. Other subjects mentioned, besides those above, were business, finance and engineering.

Students also gave a wide range of possible careers for which they thought their mathematics qualification would be useful. A few said accountancy or finance. Others said: architecture; law; becoming a pilot; dentistry; becoming a vet; engineering; working with computers; and teaching mathematics. One said A level mathematics was required for entry to the RAF. Few made more general comments about mathematics being useful for their future career.

The students mostly were finding that mathematics related to other subjects they were doing and was often useful. The most frequently mentioned link was to physics, with some students saying that their work on mechanics was particularly useful here. The next most frequently mentioned was chemistry, then biology. Students said that their work on equations helped with the other sciences. Business studies was mentioned by as many students as said biology. A few students said mathematics helped their study of psychology, geography, music, IT and economics. Statistics was said to help with psychology, geography, biology and economics. A few students said mathematics helped only 'a bit' with their science-based subjects and a few said that mathematics was not useful to their other subjects.

FM

The most frequently occurring comment from further mathematics students was that mathematics would be useful for gaining entrance to university. Students cited this whether or not they said that they were intending to study mathematics at university. Ten of those responding to this question said they were planning to study mathematics at university. Other subjects that students were applying for and for which they thought that studying mathematics would be useful were, in order of frequency, engineering, physics, economics, medicine and

chemistry. Some students said that they had already found it advantageous to be able to say that they were studying further mathematics. They said that universities had responded well to this subject. Only one further mathematics student said that mathematics would not be useful to him in the future.

Where a small number of students gave their choice of career, most were planning to work in finance, two as mathematics teachers, one as an engineer, one as a helicopter pilot, and one as a speech and language therapist.

A few students said that mathematics was useful generally. Two had used it to perform complex calculations for fun. One of these thought mathematics would be useful for helping him to build climbing frames.

When students were asked whether mathematics helped with their other subjects, just under half of all further mathematics students interviewed said that it was helpful in physics, with some saying mechanics was particularly useful. About a quarter said it helped with calculations in chemistry. Other subjects students had found mathematics useful for were psychology, accounts, business and geography.

Non-completers

Around half of the non-completing students said that they had found mathematics helped their other subjects. Some said that, even though they had only done a little of the AS course, it had helped in science and business courses.

Level of challenge

A2

Almost all the A2 students said that they thought the mathematics course was challenging. Fewer than 10 said that the course was not challenging or could be more challenging. Some of these conceded that they found some topics challenging.

Students did not think that the course was too challenging. Where they made comments, often they described the challenge in a positive way.

The items most frequently mentioned as being challenging were, in order of frequency: trigonometry (including integrating trig functions); statistics; cores 3 and 4; integration; and mechanics. Other items mentioned were logs, hypothesis testing and core 1. Applying the methods they had learned to a problem was mentioned several times, and two students found having to learn and remember so many things difficult.

AS

Only one AS student said that AS mathematics was insufficiently challenging. All others making comment said it was challenging, and they did not think it needed to be any more challenging.

While some gave specific topics as the most challenging aspect, others spoke about the difficulty of fully understanding the concepts they were introduced to and learning how to use them. The workload and pace were also seen as presenting a challenge for a few students. The topics they said they found challenging varied, along the lines of those given in response to the questions about preferences, described below.

Comparison with other subjects

A2

Around half of A2 students commented on the relative difficulty of other A level subjects compared with mathematics. More than a quarter of those commenting said that mathematics was their hardest subject; a fifth said the subjects were all about the same difficulty and a tenth said mathematics was the easiest subject. All other comments compared mathematics to individual subjects.

Where students made specific comparisons between mathematics and other individual subjects, the data were inconclusive. To give some examples, six students said biology was

harder than mathematics but three said it was easier, two said chemistry was harder than mathematics and five said it was easier. Other subjects said by one or two students to be easier than mathematics were business studies, geography, economics and music. Other subjects said by one or two students to be harder than mathematics were IT, physics, English and French.

Students articulated their reasons for their mixed opinions. Their comments made it clear that they found mathematics a demanding subject. Mathematics was described as challenging and fast paced, with a high workload. A number of students said that there was more work to do outside the lessons than for other subjects. A similar number of students said that the pace was fast; some thought it was a rush, although others said this was not a problem.

Mathematics was often seen as different from other subjects; students referred to it as being more predictable or 'straightforward'. Some said they preferred this to essay writing. Students were finding that they had a lot of information to memorise in other subjects; biology and chemistry were mentioned particularly. As one student put it: 'In mathematics you need the first letter to work out the word, but in biology and chemistry you need all the letters to get the word'.

In contradiction to the above, other students said its difficulty lay in the fact that there was a 'right or wrong' answer. Some students said they found that the relatively less clear-cut nature of other subjects made them easier.

AS

When AS students were asked to consider the same question, there was a different pattern to their responses. Just over half of all students made a response. Nearly half of all those making a response said it was their most difficult subject, while just over a third said it was their easiest. Around a fifth made comparisons to individual subjects.

Where students compared mathematics to other individual subjects, a range of other subjects was given, with little correspondence. The only exception to this was chemistry, with a number

of students considering this to be a more difficult subject. The next most frequently occurring comment was that A level law was of equal difficulty to mathematics. Other subjects were mentioned by one or two students.

Students were asked to give their reasons for their opinions. Where those who were finding it harder than other subjects gave reasons, these were mainly that mathematics was fast-paced and it could be difficult to keep up. They thought the workload was higher than in other subjects and that there was a lot to remember.

Students who were finding mathematics relatively easy said it was 'more straightforward' than other subjects in that it had right and wrong answers. Students' comments suggested that they were finding the transition from GCSE to AS in other subjects difficult.

Non-completers

Non-completing students in the majority of centres specifically said that they found mathematics harder than their other subjects. The main reason they gave was the workload. Students chiefly said that mathematics required a lot of homework and revision in order to learn the content. They also said that they felt it went at a faster pace than other subjects and that it was easy to get left behind, particularly if they missed a lesson. They felt that there was no time to learn things properly and said that they forgot one thing when they moved on to something else.

A few students highlighted a difference between the nature of mathematics and other subjects, saying there was more of a right or wrong answer than in other subjects. A few said the lessons were less relaxed than for other subjects.

Preferences

A2

When A2 students were asked to state their favourite aspect of the course, the most frequently mentioned was mechanics, given by 17 students. Twelve expressed a preference

for algebra and six each for integration and pure generally. Others, mentioned by fewer students, were statistics, binomial expansions, partial fractions, trigonometry, decision mathematics, logs and combined forces. Eight students had no preference.

There was a wider range of topics mentioned as least favourites. By far the most frequently cited aspect was trigonometry, mentioned by 19 students. Next was statistics for 11 students. Eight students said mechanics and five said integration. Smaller numbers of students mentioned the following: graphs, logs, binomial expansion, pure mathematics, decision mathematics, equations, curves, radians, centres of mass, permutations and combinations and projectiles. Three had no least favourite.

Students were asked to name the units they liked most and least. For A2 students, the most frequently cited 'best' unit was C1, given by 21 students. Where students made comments, they said they liked it because it was easy. Next was M1, given by 18 students. Eleven said S1. Three or fewer gave C2, S2, C4, D1 and M2.

The least popular units were S1, C4 and M1, mentioned by 14, 13 and 12 students respectively. Seven gave C3 and six D1. A further five said pure, three S2 and one C1. The main reason for students not liking a unit was that they found it difficult.

Eleven students did not express any preference.

Students were also asked whether there were any aspects of the course they would like to do more of instead of another aspect. A wide variety of comments was given in response to this question. The students were taking a range of combinations of units and some felt they would have preferred a different combination. The students' preferences were also dictated by their perceived aptitudes.

Most of the comments related to applied mathematics. Comments included wanting more mechanics or statistics. A few students wanted more applied mathematics because they

thought that it was more useful in the real world than the pure mathematics. One student wanted more statistics to 'understand it better'. A few students would have liked to do M1 and S1 for variety. Ten students would have liked to do mechanics instead of statistics. Four stated the opposite preference. Three doing M1 said they would have liked less mechanics.

Four students said they would like more pure mathematics.

Where a small minority of students made comments about specific topics, again these were very varied; a few said they would like more algebra and a few less trigonometry. A wide range of other topics was mentioned by individuals.

There were some more general suggestions, including two students wanting more 'practical mathematics', or seeing mathematics being used. Two students said elements of applied courses could have been put in the core (statistics, mechanics).

AS

When asked to name their favourite aspects of the AS course, AS students gave a wide range of topics. There was no significant correlation of responses. There were small clusters of students giving each of mechanics, algebra and calculus. Thirteen students expressed a preference for pure mathematics generally (this includes one group of 11 who appeared to have the same opinion).

Students were also asked which parts of the course they liked least. The most frequently mentioned aspect of the course was graphs. About half as many said logs, and then smaller numbers said statistics, permutations and combinations and trigonometry. A wide range of items was given by one or two students.

AS

Where AS students gave their reasons for their preferences, it was generally because they found one unit easier or harder than the others. To a lesser extent, preferences were based

on whether or not students found a unit interesting. Some students preferred applied units because they thought they seemed more useful.

A strong preference for unit C1 emerged amongst AS students. Reasons given were that it was the easiest unit and most like GCSE. About a quarter as many again said they preferred core units generally; a similar number liked C2 best.

S1 was the favourite of about half as many students as C1. Where students gave reasons for their choice, some said that they found S1 easier than the core units, others said that it was more useful. A handful of students expressed a preference for D1 because it was easy and 'different'. A few said M1 because it was useful.

C2 and S1 were the least liked units, closely followed by M1. Comments indicated that students found C2 difficult. S1 was disliked for containing topics such as graphs and probability and was also said to be complicated. Students who disliked M1 said it was hard, boring and not clear. One group appeared to dislike it mainly because of the teacher.

A few students said they found D1 'boring'.

When students were asked whether they would like to do more of some things and less of others, their responses generally drew on the comments analysed above: they would like to do more of the things they like and fewer of the things they do not like. However, some said they would have preferred to do a different applied unit. A few would have like the balance between pure and applied to be more equal.

FM

When asked to state their preferences in further mathematics, students gave a wide range of items. With regard to favourite aspects, the only items mentioned more than once were differential equations (seven), mechanics (three), pure (three) and hyperbolic functions (two). The list of least favourite aspects was longer and the items mentioned by more than one

students were statistics (six), matrices, mechanics and differential equations (three each) and pure (two).

Further mathematics students were also asked to name the 'best and worst' units. Favourite here was M2 (seven) followed by FP1 (five), S2 (five), FP2 (four), pure (three), C4 (three), C2 (three), D1 (three), FP3 (two) and Discrete (two). Worst units were: M3 (five), M2 (three), D1 (three), statistics (three), S1 (two) and FP3 (two). Worst units were often applied mathematics units. Typical reasons given by students for these being the 'worst' units were that they were 'boring', 'pointless' or 'not real mathematics'. This kind of thinking was also evident when students identified aspects they would like more and less of there was a general trend of wanting more pure mathematics rather than applied. However, the list of favourite units, above – where two of the three most frequently mentioned units were applied – demonstrates that not all students were negative about applied mathematics.

Experience of A level examinations

A2

A2 students' opinions were mostly split between finding the examinations harder than expected and finding them as expected. Only a few found them easier than expected. Most found at least one paper difficult.

Those who were comfortable with the level of difficulty of the examinations they had sat used phrases such as 'fine', 'nice' and 'OK'. Often, even those who found the examinations generally fair had found one or two more to be challenging. Where they found them harder, reasons given included that they were not fully prepared and that the papers were different from specimen papers or from coursework. A few students said they found the wording of the questions difficult or confusing, which they said made it difficult to identify which methods they were supposed to be using.

Four students said they found C3 particularly hard. M1 and C2 were mentioned three times, C1 and S1 twice. A few students spoke about failing and resitting units, using phrases like 'the

first time...' and 'the second time...', suggesting that failing or getting a low grade on a unit did not necessarily mean that a student gave up the subject.

AS

About a quarter of the AS students said that they had not taken any AS examinations at the time of interview (one group had done mocks). The most common one to have been taken was C1. Two students had taken D1.

The majority of students who made comments about the examinations they had taken were positive about the experience. Several said it was easier than they had expected, and easier than the practice papers they had done. Some said they appreciated the preparation they had done by working through practice papers. In general, they felt they had enough time to complete the exam.

Where a small number of students made negative comments about the examinations, about half said that they had found the wording difficult to interpret, meaning that it was not always easy to see what they had to do. One other said that he had difficulty applying his knowledge to the question. The others said they had found the paper hard. One said she did not finish. The group of students who had done mocks said they had found them hard.

FM

Year 13 students in 10 centres said that they had already sat some further mathematics examinations. Year 12 students in five centres said that they had not sat any. The most common unit to have been sat was FP1. Some had taken S2 and M2. One had taken FP1, FP4 and D1.

Students in three groups, and one or two other individuals, said FP1 was 'OK' or went well. Students in two groups said M2 had not been too bad.

Students in four groups said that FP1 had not gone well, generally feeling that they had not been ready to take it. It was described as challenging and students spoke of running out of time. One group of students and one other individual said they found M2 difficult.

Students in one group said that the S2 paper was 'unusual' and had questions more suited to S1. Another individual complained that the S1 questions were too wordy.

Non-completers

Most of the non-completing students had taken some examinations. They had taken a range of papers, both pure and applied. More than half of the students said that they found the examinations difficult. The papers most frequently mentioned, by small groups of students, were C2 then C1 and S1. One or two students mentioned each of C3, C4 and M1. Students used terms such as 'impossible' and 'nightmare' to describe the examinations. A few said that they did not understand the paper. Two students said that they walked out of an examination without completing the paper.

On the other hand, around a third of the students said that some or all of their examinations were 'OK', or 'easy'. Two or three students in this category mentioned each of C1, C2, S1 and D1.

Experience and expectations of the AS course

A2

Generally, A2 students said that the AS course was 'OK'. Often, they said that it was easier than they had expected, or as expected. There were suggestions in the data that some of these opinions were purely formed by hindsight; some made comments such as it seemed hard when they were doing it but it did not at the time of the interview, for example: 'I failed but now on reflection it seems OK'. Only four students specifically said it was hard, and another four said it was a big jump from GCSE. Three said the examinations were harder than the course. A few students thought that the AS was rushed; others said it was well-paced. There

was no evidence in the data that students with lower grades at GCSE were more likely to say that they found it difficult.

AS

Around four-fifths of all AS students interviewed made direct comparisons between their experience of AS mathematics and their prior expectations. Just under half of these said it was much as they had expected. Slightly fewer said it was harder than expected and the rest said it was easier than expected.

Those in the largest group, who said it was much as they expected, frequently said that they thought AS mathematics was hard or challenging, typically saying that they had been expecting it to be difficult and it was. Fewer of those saying it was harder than expected made additional comment. A few said that they had thought teachers were exaggerating the difficulty beforehand. A few others said they felt they had been thrown in at the deep end and had expected a more gradual increase in difficulty.

Continuing to A2

A2

The vast majority of the A2 students said that they had always planned to continue to A2. Only five said they had changed their minds or not decided until the last minute. Where a reason for continuing was given, it was generally for university entrance. Two said that they continued it because their other subjects 'were not very academic', two more because it helped their other subjects.

AS

AS students were asked about their intentions to continue to A2. Out of 93 AS students interviewed, 70 said they were intending to continue to A2, although often they said that this would depend on their AS grade. Twelve were undecided and eight said they would not be continuing. There were no data for the other three AS students.

The data regarding whether the AS students had changed their minds about continuing with mathematics were incomplete. Thirty-four students said they had always intended to continue. A further three said they had not intended to but had changed their minds. Four others had intended to continue but had changed their minds and would not be continuing. Another was unsure whether to continue or not although she had intended to originally. Three said they never planned to continue.

Two of the students who had changed their minds and intended to continue said they were enjoying it more than expected. Both had A* at GCSE. The other (A at GCSE) said it was going better than she had expected.

Of the four who had decided not to continue, three (two GCSE A*, one GCSE A) said it was the subject they enjoyed least. The other (GCSE A) said he found it harder than expected.

Few AS students gave reasons here about why they were continuing. A few students said that they needed mathematics for their future plans. However, one group noted that their course would not finish until January 2007 so they would not be able to pick up another AS afterwards and another group was doing a one-year A level course and moving on to further mathematics in year 13.

Experience of GCSE

AS

The vast majority of AS students said that GCSE mathematics was easy and easier than AS. Some said it was fun. They had mixed views about their GCSE teachers, but most said that they were good, taught thoroughly, were supportive and some made lessons fun. A few explanations were given where teaching was described as bad; two students said this was because the teacher seemed disinterested; another two said there were class discipline problems; and one said there had been problems with their coursework.

Non-completers

Non-completing students were very positive about their experience of GCSE. They often said that it was easy and that they were good at it. Students said that they enjoyed GCSE mathematics. They said that the course was well paced and that there was time to learn everything. A few said that GCSE was a more supportive environment than AS, with less independent working.

Half of the comments about teaching were positive and several more said teaching was adequate. A few students were very negative about their teaching at GCSE.

Two students said that they did not enjoy the course; one saying it was 'boring'. Two students said that they found the examinations harder than they had expected.

GCSE as preparation for A level

A2

When A2 students were asked whether there were any topics that were not covered sufficiently well at GCSE, the most common response was negative. Where topics were mentioned, the most commonly cited was calculus (eight students). Seven said more graph work and five said more trigonometry. Other items mentioned by one or two students were: probability, statistics, logs, radians, vectors, matrices and linear involvement.

One student who had taken intermediate tier GCSE said not everything was covered in his course.

AS

Like A2 students, AS students were asked whether they thought any topics should have been covered in more detail in GCSE. However, they were also asked more detailed questions about their transition from GCSE to AS and the jump from C1 to C2.

AS students named a wide range of topics that they thought were not covered sufficiently at GCSE. The most frequently occurring, from a handful of students, was working with graphs. A few students suggested trigonometry. Other suggestions included: completing the square; Venn diagrams; fractions; probability; factorising; surds; rationalising the denominator; indices; mechanics; standard deviation and percentages.

Many of the students said there had been a big jump from GCSE to AS. Reasons they gave were the workload and also that the nature of the work was different and they had to work more independently. A few students who had taken the intermediate tier GCSE said that the jump was difficult. One had had a tutor to help her cope with the transition; another said she would not advise AS mathematics for intermediate tier students as she had found the jump 'too much'.

Around half as many students said it was not as big a jump as they had expected. Some mentioned a similarity between C1 and what they had done at GCSE. They varied in their assessment of how much overlap there was between GCSE and AS. Some recognised there was some overlap and said it was helpful at the beginning. A few said the overlap was very little.

Where students commented on the shift from C1 to C2, most said it was a good, gradual progression. A few preferred C2, finding it more interesting; one said it was easier because a calculator is allowed. A very small number of students said C2 was much harder than C1.

Non-completers

Non-completing students were also asked about the transition from GCSE to AS. Over half of the students said that there was a big jump from GCSE to AS. Some of these said that the jump came only after a few weeks, which they said had lulled them into a sense of false security. A few more students commented on an increase in workload and pace when they started AS. Students generally saw some overlap between GCSE and AS but varied in how much they thought this overlap was and in which areas. Some said there was a lot; some said there was very little.

A number of students said that there was a big jump from C1 to C2 and a few others said that the transition was smooth.

Teachers and teaching

A2

The mode for number of teachers amongst the A2 students interviewed was two (12 groups). Six groups had one teacher and two had three. (Note: some interview groups contained students from more than one teaching group.)

In most cases the students were happy with their teachers and in some cases they were very enthusiastic about them. They were critical about them in terms of both their mathematical ability and their skills as teachers. The qualities they appreciated in their teachers were being well-prepared, experienced, knowledgeable and approachable. Injecting humour and promoting a relaxed atmosphere were also appreciated. It was seen as important to be able to have a dialogue with the teacher, being given explanations and being able to ask questions.

Where students made negative comments about their teachers, these included that they did not know their subject sufficiently well or were unapproachable. Some teachers were said not to make the lessons interesting enough. Some were 'intimidating'. Other negative characteristics mentioned included assuming too much knowledge and not being prepared to go over things. One teacher gave rushed classes and 'seems like she doesn't want to be there'.

AS

The mode for number of teachers amongst the AS students was two (13 groups). Four groups had one teacher and three groups had three teachers. (Note: some interview groups contained students from more than one mathematics group.)

While comments about teachers were predominantly good, students from 11 centres made negative comments about their teachers. Good characteristics were: explaining things well

and ensuring everyone was keeping up; giving out good notes, and making the classes interesting.

Negative characteristics varied more, and included: not acknowledging the range of abilities or understanding in a class; not taking the time to give a thorough explanation; not varying teaching and learning methods; too much talking; too much writing; not sticking to the point; and giving too much explanation.

FM

For the further mathematics students the mode for number of teachers was three (seven groups). Five groups had two teachers, two had one and one had four. (Some interview groups contained students from more than one mathematics group.) The data suggest that some or most students included their single A level teachers. As some students were doing A level alongside further mathematics and some were doing it discretely, this information is inconclusive.

The vast majority of comments about teaching were positive. Students commented on how teachers had different teaching styles. Good points were: using a mixture of approaches, taking time with explanations and making lessons interesting and enjoyable. A few students commented that further mathematics attracted the best teachers because it was a difficult subject. Others commented positively on how experienced or able their teachers were.

The few negative comments related to teachers going too fast or too slowly, not being approachable, not being interesting and giving too much homework.

Support strategies

A2

In the vast majority of cases, A2 students said that they had open access to teachers. They said they could approach them anytime or arrange a time to meet them. This was the main source of support and students appreciated one-to-one help.

Eight groups said that their centres provided support sessions or workshops, although two of these were at revision time only. One student said the session was for AS students only. Students did not comment on the effectiveness of these sessions.

A couple of students said that, because their classes were small, difficulties could be resolved within the classroom. Some students also spoke of getting help from other students. In one case, at a school, students said this was the only source of support.

AS

AS students from most of the centres said they were able to approach teachers informally to ask for additional help. However, in one centre students said that teachers they had approached were too busy to help; in another students said no one ever did ask for help.

Students in eight centres said that support sessions were available for those who wanted them. Revision sessions were provided in a further centre. Not all had used the support sessions available but those who had said they were useful.

Students in one centre said there was no support. A few students at another centre said that the students supported each other and two said that they got help at home.

FM

Further mathematics students in all but one of the interview groups said that they had open access to approach teachers for support outside lessons. In the other case, one-to-one help was available at extra lessons and lunchtime sessions. Students in four centres also said that there were workshops or extra sessions available on a drop-in basis. Some students commented that their small class sizes meant it was possible to have queries answered within the class.

Non-completers

Non-completing students from six centres said that support classes were available to them. Students in seven centres said that teachers were happy for students to approach them with problems at any time. The majority of students were positive about the support available to them, saying teachers were approachable and prepared to go over a topic until they understood. A group of students at one centre said that support was good but they felt that they could not keep asking for support again and again.

Students from two centres said that they had not had any support. A few further students said that the support was not helpful. Reasons given included: that the teacher was too rushed; that a support class did not offer individual support; and that students were told to get on with homework in a support class.

Two students (both with grade A at GCSE) said that they had had private tuition.

Category-specific questions

A2-specific questions

Morale in the group

The vast majority of comments about morale were positive. Classes were often described as 'fun' or 'a laugh'. Students also appreciated working in small groups where problems could be discussed. Other positive features were that students were hard working, enthusiastic and mutually supportive.

A very small number of students reported poor morale, characterised by unmotivated students.

Comparison of AS to A2

Students said that they were finding A2 more challenging than AS and they were working harder. On balance, however, the general tenor of comments was that the progression was manageable. They said it was a step up from AS and that there was greater depth in A2. Some found this a big jump. A couple of students said the jump from C2 to C3 was considerable. On the other hand, many students said they saw a progression from AS to A2 and felt that the AS had given them a basis for the work they were now doing. This was seen as good and bad, with some enjoying building on their prior work while a few others felt that their AS knowledge was assumed.

AS-specific questions

Opportunities for studying further mathematics

AS students at six centres said it was possible to study AS further mathematics and AS at the same time. Students at 11 centres said it was not possible. At three of these further mathematics was not offered, either in their centre or in year 12. Students in one group said further mathematics was available only if you studied in your own time, after school. Students in a few centres said they offered an accelerated one-year mathematics course followed by further mathematics in year 13. It was not clear from the data how widespread this was.

FM-specific questions

Starting further mathematics

Students in six centres said that they had started further mathematics in year 13. For three of these there was no choice, but the data do not state the case for the other three. Four said that they had completed the A level in year 12. Students in seven groups started at the beginning of year 12; one group stated there was no choice about this, but there was no data for the other groups. One group started at the end of the first term of year 12. One student at another centre had started later in year 12.

Further mathematics compared with A level

When students were asked to compare further mathematics with A level, the most common response was that further mathematics was harder. Students said that they were being introduced to new and complex concepts, and they had to apply themselves more to meet the challenge. They were generally enjoying the challenge and finding the work interesting. A few commented that doing further mathematics helped with their work on the A level course. A few students mentioned smaller groups and more intensive teaching in further mathematics. Three students said they thought further mathematics was easier than A level. A group of students from one centre said that FP1 was easier than C4.

Questions specific to non-completer

When and why did you decide to stop?

Around half the students interviewed said that they dropped AS mathematics without completing the AS course. Some stopped very early on. Others carried on until the second term. A few dropped it after taking an examination.

Students in one centre described teachers not letting them drop the course when they first asked.

About a third of the students said that they dropped AS mathematics after receiving their AS grade. Mostly, they made the decision because of their grade. One student said he had a good grade but still decided to drop it (because he preferred other subjects).

The most common reason for giving up was that students were finding the work too difficult. Some also said the pace of work was too fast or the workload too heavy. Eight out of the 30 students said that they were worried that they were giving too much time to mathematics and this was affecting their other subjects. A few students said that they dropped it because it had little relation to what they wanted to do in future. One student said she thought having done intermediate tier GCSE had disadvantaged her.

What would have helped you continue A level mathematics?

About a third of students said that nothing could have helped them to continue with A level mathematics. These students said either that they were not enjoying it or that they felt out of their depth.

More than half of the students said that different teaching methods could have helped them to continue. Suggestions included better explanations from teachers, smaller groups and a slower pace of work for less able students.

A few students suggested that the content was too heavy. Two of these said that more could be put into GCSE to make the transition smoother. Similarly, one student suggested that the transition between C1 and C2 could be improved. Other suggestions, each from two students, included: that A level mathematics could be made more relevant to the outside world; and that they should be able to choose which modules they did.

Two students said they would have carried on if they had got a good grade. Another would have if she had needed mathematics for university. One student felt that if she had done higher tier GCSE she would have been able to continue.

Analysis across categories

Gender-based analysis

Gender-based analysis was carried out in five key areas:

1. Enjoyment of mathematics
2. Reasons for choosing mathematics
3. Recruitment
4. Teaching and support
5. Level of challenge

Enjoyment of mathematics

Similar numbers of males and females gave the following reasons for enjoying mathematics:

- good experience of teaching or classroom environment
- mathematics giving a sense of achievement and satisfaction
- enjoying it when they can do it or finding it easy.

The genders' views differed in three areas. Girls were more likely than boys to say that they enjoyed the challenge of mathematics. Boys were much more likely than girls to say that they enjoyed the subject because it was logical or straightforward. More girls than boys said that they enjoyed the subject because it was interesting or different from their other subjects.

While girls said that they enjoyed the challenge of mathematics and found it satisfying, they were also much more likely than boys to stress, in a negative way, how frustrating they sometimes found the subject.

The frequency of students saying they were not enjoying mathematics or not enjoying aspects of it was about the same for both genders. In both cases, students said their enjoyment of the subject dropped when they were struggling with a topic.

Reasons for choosing mathematics

A range of reasons for studying mathematics emerged from the data. The majority of students gave more than one reason. The most commonly occurring reasons, in order of frequency of occurrence, were:

Boys

1. University/career plans
2. Previous success
3. General benefits
4. Enjoyment

Girls

1. Previous success
2. University/career plans
3. Enjoyment
4. Complementing other subjects

- | | |
|---------------------------------|---------------------|
| 5. Complementing other subjects | 5. General benefits |
| 6. Advice | 6. Advice |

University and career plans were by far the strongest motivator given by boys for choosing mathematics, with the second most popular reason being given far less frequently. In the case of girls, there was much less variation in the frequency of occurrence of the first three reasons.

Boys were significantly more likely than girls to say that they chose mathematics because of their university or career plans. Boys were very slightly more likely to give a reason that mathematics was more generally beneficial to have. However, girls and boys generally expressed this differently. Boys talked about mathematics being a 'good' subject to have and mentioned its being impressive on a CV. Girls were more likely to say the subject was 'useful'.

Girls were significantly more likely than boys to say they had based their choice on previous success. They were twice as likely as boys to say that they chose mathematics because of their enjoyment of the subject. Girls were also more likely than boys to give the reason that mathematics complemented their other subjects.

Only a small number of students said that they chose mathematics because they were advised to do it, and these were mainly boys.

Recruitment

There were no notable differences between the sexes in terms of being encouraged or discouraged by teachers, families and others. They were about equal in saying they had heard that mathematics was a difficult option and in stating that it was their own decision to study mathematics.

They did differ in terms of being influenced by positive messages about mathematics. Boys were more likely to say that they had heard that mathematics was a good subject to do in terms of future career opportunities and earning potential.

Teaching and support

No real differences emerged from the data in terms of students' attitudes to their experience of teaching and support. Positive and negative attributes of teachers given were similar for both sexes, as were comments on the availability and usefulness of support.

Level of challenge

When students were specifically asked about the level of challenge of A level mathematics and whether it should be made more challenging, responses from the two sexes were comparable. Few students said there should be more challenge, although these were more likely to be boys.

Students were asked which aspect of the course they found most challenging and again there were no notable gender difference in their responses.

Analysis by GCSE grade and/or tier**Students with grades below A**

As table 4 shows, 45 of the students interviewed had achieved grades B or C at GCSE. Mostly, these were achieved at the higher tier but 11 B grades and one C grade were from intermediate tier GCSE.

The tables 4 and 5 show which category of interviewee these students fell into and what percentage they constituted of interviewees in that category.

Table 4: Interviewees by category and GCSE grade/tier

	AS	A2	FM	NC
B intermediate	4	2	0	5
B higher	10	6	2	12
C intermediate	0	1	0	0

C higher	2	1	0	0
Total	16	10	2	17

Table 5: Percentage of students with GCSE grades B and C by category

	AS	A2	FM	DO
Total no of students in each category	93	75	49	30
% of students with B/C grades	17%	13%	4%	57%

As the numbers we are dealing with here are low, and the interviewees randomly selected, it is impossible to draw any firm conclusions from these data. However, it is notable that more than half of non-completing students had a grade below A at GCSE. This is a significantly higher representation than for the other categories.

There was no indication in qualitative data that students on AS and A2 courses with grades below A at GCSE were any more likely to say that they were finding the course difficult than students with A* or A grade at GCSE. It is possible that students experiencing difficulty might not have wanted to speak up in a group situation; comments were mostly assigned to individuals in the original data and students did not necessarily answer all the questions.

A few students referred to having done intermediate tier at GCSE. Four students said the transition to AS mathematics was difficult for intermediate tier GCSE students. One said she would not advise it, as she was struggling. Another had engaged a private tutor to help her cover the extra ground. She said her centre ran workshops to help people in her position. A non-completing student with a GCSE at intermediate tier had been advised by her teacher not to do A level.

It is possible that useful information could be gleaned from further discussions with students with lower GCSE grades. Any future work could make more specific attempts to elicit their opinions.

Comparison with last year's report

An attempt was made to draw comparisons between this report and last year's report from the same project. Differences in how the students were interviewed and the focus of the questions make it difficult to produce a detailed analysis.

Where the report did cover similar ground, no substantial differences were identified. Common areas were: reasons for choosing mathematics; level of demand; comparison with other subjects; transition from GCSE to A level; recruitment and prior awareness; topics covered at GCSE; continuing to A2; and preventing drop out.