The qualifications of English and mathematics teachers

Report prepared for the Education and Training Foundation (ETF)

September 2014

frontier economics

The
Education
& Training
Foundation

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Executive summary

Frontier Economics was commissioned by the Education and Training Foundation (ETF) to carry out an analysis of existing survey evidence on the subject qualifications of teachers in further education (FE) colleges in England. The purpose of this research is to add to and expand the evidence base around teachers' subject qualifications, focusing on English and mathematics teachers in particular. This can help identify training needs in the sector and inform workforce planning.

For this analysis data from two surveys was used:

- Strategic Consultation: Mathematics and English Survey ("Strategic Consultation Survey") conducted by CUREE (Centre for the Use of Research & Evidence in Education) and emCETT (The East Midlands Centre for Excellence in Teacher Training); and

- GCSE Maths Training Needs Analysis ("GCSE Maths Analysis") conducted by HOST Policy Research for the Education and Training Foundation to inform programmes focused on improving the teaching of GCSE mathematics to learners aged 16-18.

The survey datasets cover only a very small fraction of the teacher workforce (approximately 1.6%[1]) with sample sizes ranging from 231 to 246 respondents, so the findings and conclusions presented in this paper should be interpreted in this context. Further, small sample sizes considerably limit our ability to conduct in depth analyses of subject qualifications among different sub-groups of the FE teacher population. As a result, the findings we present are relatively high-level.

The key findings from the analysis are:

- The youngest teachers (34 and younger) are, on average, the least qualified. This may be at odds with the increasing market need for high-quality teachers able to deliver effective learning at a high level.

- The subject qualifications of teachers at FE colleges are generally higher than those of teachers in other institutions.

- Teachers typically have subject qualifications at least one level above the level they teach. However, based on the data from the Strategic Consultation Survey, 12% of those teaching GCSE mathematics and 6% of those teaching GCSE English only have highest qualifications to the same level taught. Moreover, based on the data from GCSE Maths Analysis, there is evidence that some teachers (9%) teaching at the GCSE mathematics level possess only functional or basic skills Level 2 qualifications. This indicates that in some instances teachers may lack adequate qualification with respect to the level they teach.

- A large proportion of teachers lack confidence to teach different aspects of mathematics which could affect students and their ability to learn effectively. Specifically, a considerable proportion of teachers (43%) lack confidence in teaching all elements of GCSE higher level mathematics. Moreover, some teachers (16%) reported difficulties in dealing with questions asked by students, among other things.

- There is a positive link in mathematics between teachers' subject qualifications and confidence. Teachers with higher subject qualifications have more confidence in their ability to deliver learning effectively.

A number of conclusions can be drawn from the analysis and findings presented in this report.

- There is evidence that in some cases teachers face difficulties in delivering learning in mathematics and English, so providing further support to teachers who experience difficulties in teaching is appropriate.

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1 Based on Frontier Economics estimates of the total number of English and mathematics teachers in England in "Further Education Workforce Data for England: Analysis of the 2012-2013 Staff Individualised Record Data", 2014

- The difficulties faced by teachers could be driven by a lack of appropriate subject qualification needed to teach at certain levels. Educational institutions need to ensure that they allocate teaching responsibilities within their organisations adequately. The evidence generally indicates that it is preferable for teachers to have subject qualifications which are at least one level above the level at which they teach. This is supported both by the fact that teachers with relatively lower subject qualifications are on average less confident in providing effective learning, and by the views of newly qualified teachers themselves.

- Support for teachers can be targeted to the groups that most need it. Our analysis shows that younger teachers are on average less qualified (and, by definition, also on average less experienced). It may also be worthwhile examining what the incentives are for teachers to acquire additional subject qualifications and how these incentives could be further enhanced.

The findings and conclusions presented in this paper should be interpreted with care, as they are based on survey data with small sample sizes. This limits the ability to explore subject qualifications in depth among different teacher sub-groups. Historically, information on teacher qualifications was collected as part of the Staff Individualised Record (SIR) data return which covers the whole FE sector. However this data requirement was removed recently in an attempt to streamline the data collection process. Going forward, it will be important to consider different options for gathering more comprehensive data on teacher qualifications. This could be done in different ways, such as expanding surveys looking at the subject qualifications of the teaching workforce, or finding new ways to re-integrate teacher qualifications information into the SIR data return in a way which is less burdensome for colleges (requiring aggregate rather than individual data for example). Ultimately, this would ensure a thorough understanding of the FE teacher landscape and allow policy makers to base decisions and actions on robust and comprehensive data.

1. Introduction

Frontier Economics was commissioned by the Education and Training Foundation (ETF) to carry out an analysis of existing survey evidence on the subject qualifications of teachers in further education (FE) colleges in England. The purpose of this research is to add to and expand the evidence base around teachers' subject qualifications, focusing on English and mathematics teachers in particular. This can help identify training needs in the sector and inform workforce planning.

This report provides a descriptive account of the qualifications of teaching staff, drawing on information from two surveys, each with slightly over 200 respondents.

The report is structured as follows:

- First, we provide an overview of the data and methodology used in the analysis.

- Second, we discuss the subject qualifications of English and mathematics teachers and how they correspond to characteristics such as age and educational institution.

- Third, we provide an analysis of the link between teachers' subject qualifications and the level of English and mathematics taught.

- Fourth, we explore the reported confidence of teachers of mathematics and the relationship between confidence and teachers' qualifications and experience.

- Finally, we provide a summary of our key findings and conclusions and what they imply for workforce support going forward.

2. Data and Methodology

The analysis in this report is based on data from two surveys focused on teachers in the post-16 education sector. Specifically:

• Strategic Consultation: Mathematics and English Survey ("Strategic Consultation Survey") conducted by CUREE (Centre for the Use of Research & Evidence in Education) and emCETT (The East Midlands Centre for Excellence in Teacher Training). The Strategic Consultation Survey covers teachers of both mathematics and English teaching either at Level 1, Level 2 (including GCSE), Level 3, or at pre entry and entry level. The survey provides data on teachers' highest subject qualification, the level of mathematics or English taught and their confidence in teaching mathematics or English.

• GCSE Maths Training Needs Analysis ("GCSE Maths Analysis") conducted by HOST Policy Research for the Education and Training Foundation to inform programmes focused on improving the teaching of GCSE mathematics to learners aged 16-18. The GCSE Maths Analysis covers only mathematics teachers, focusing particularly on those teaching GCSE mathematics in England. The survey holds information on teacher characteristics (e.g. place of work, age or region), subject qualifications and experience, as well as level of mathematics taught.

Both datasets are based on internet surveys of teachers. According to the GCSE Maths Analysis report, the GCSE Maths Analysis data are based on an e-survey of a "representative sample of providers from the education and training sector"[2]. The link to the questionnaire was circulated to teachers that participated in a six-day Mathematics Enhancement Programme[3]. A link to the survey was also placed in social media to encourage teachers in the post-16 education sector to take part in this survey.

The Strategic Consultation Survey is also based on an e-survey targeting those that teach or support learners in English and mathematics.

We analyse each of the surveys, taking into account respective differences in research focus and respondents. Where possible, we also provide a combined analysis of the two surveys. The combined analysis ("meta-analysis")[4] is useful as it increases the sample size, thus enhancing the robustness of conclusions drawn from the analysis. Table 1 provides a summary of the respective sample sizes of each survey.

Table 1. Summary statistics (sample sizes)

Survey	Total respondents	FE colleges	Other institutions	Teachers of maths	Teachers of English
GCSE Maths Analysis	246	157	89	246	N/A
Strategic Consultation Survey	231	61	107	149	129

Source: GCSE Maths Analysis, Strategic Consultation Survey

Note 1: Other institutions covered in the GCSE Maths Analysis include (respective number of respondents in brackets): Community learning and skills providers (30), Sixth form colleges (5), Offender learning centres (5), Independent training providers (38) and other institutions (7). Other institutions covered in the Strategic Consultation Survey include: Adult and community learning centres (52), Independent training providers delivering vocational qualifications (18), Specialist Colleges for learners with learning difficulties/disabilities (11), Offender learning centres (7) and other institutions (19).

Note 2: The total number of respondents as per the Strategic Consultation Survey does not correspond to the sum of teachers at FE colleges and other institutions because a considerable proportion of respondents did not provide an answer to the question about where they work. This data problem (that not all answers are reported by all respondents) arises throughout the surveys. In this respect, wherever figures are reported we rely only on the answered survey questions and provide the respective sample sizes in brackets.

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2 GCSE Maths Analysis (2014, p. 3)

3 This programme was developed and co-funded by the Education and Training Foundation and aimed at upskilling the teachers' workforce.

4 Please note that here the term "meta-analysis" means simply comparing the results from the two surveys.

Coverage is in general better for mathematics teachers with 149 respondents in the Strategic Consultation Survey and 246 respondents in the GCSE Maths Analysis. The total number of English teachers surveyed is 129. It is also worth noting that almost 40% of the teachers covered by the Strategic Consultation Survey teach both English and mathematics. Given the relatively small samples it is important to stress that this analysis is somewhat limited and the findings and conclusions should therefore be treated with caution.

The surveys contain only a limited amount of information on teacher demographics and location, so it is not possible to assess in detail how the characteristics of respondents compare to the sector as a whole. The GCSE Maths Analysis does provide information on the geographical regions coved in the survey. Based on this and comparing it to the Staff Individualised Record 2012/13 data ("SIR data"), in Table 2 we can see that all regions in England are represented in the survey, although the South East and South West regions are under-presented while London and the North East region are over-presented in the sample.

Table 2. Representativeness of data by region (proportion of teachers)

Region	SIR data	GCSE Maths Analysis (all respondents)	GCSE Maths Analysis (FE colleges only)
Total number of teachers across all regions	93,320	246	157
Greater London	11.3%	17.2%	16.1%
South West	9.4%	7.1%	7.1%
North West	17.8%	15.9%	14.2%
West Midlands	11.2%	10.5%	10.3%
East Midlands	9.5%	11.7%	11.6%
East of England	9.4%	7.5%	7.1%
South East	16.6%	7.1%	7.1%
Yorkshire and Humber	10.3%	8.4%	11.0%
North East	4.5%	14.6%	15.5%

Source: GCSE Maths Analysis, SIR data

Note: SIR data reports on the characteristics of the FE workforce including information on college location. The 2012/13 SIR dataset contains up to date information on one third of all FE colleges in England.

The GCSE Maths Analysis also provides information on teachers' gender and role which we summarise in the Annex. This shows that, relative to the population of teachers, survey respondents are slightly more likely to be female.

3. Findings

There is evidence that England does not perform particularly well internationally in terms of adult skills. A recent international survey of skills carried out by the OECD[5] found that numeracy amongst adults in England and Northern Ireland is below the OECD average (see Figure 1). The result is worse for young adults (aged 16-24) where England and Northern Ireland score considerably below the OECD average. Furthermore, the OECD work finds that increasing numeracy and literacy is associated with better employment prospects.

This section discusses the subject qualifications of teachers of English and mathematics and how these vary with respect to age, educational institution and subject taught. This is helpful to better understand the workforce and underlying market developments and to target policy in relation to upskilling teachers more effectively.

Understanding teachers' subject qualifications is important for two reasons:

• Teachers' subject qualifications may be correlated with the quality of teaching and the ability of teachers to deliver learning effectively. According to research published by DfE[6] both PGCE (Postgraduate Certificate in Education) students and newly qualified teachers are of the view that at least one level of subject knowledge above the level they would be expected to teach is needed in order to deliver teaching effectively. Moreover, they stated that this would enable them to have more confidence in teaching.

• Teacher quality may in turn affect learner outcomes[7] which can have long-lasting implications for graduate employability and the wider UK economy[8].
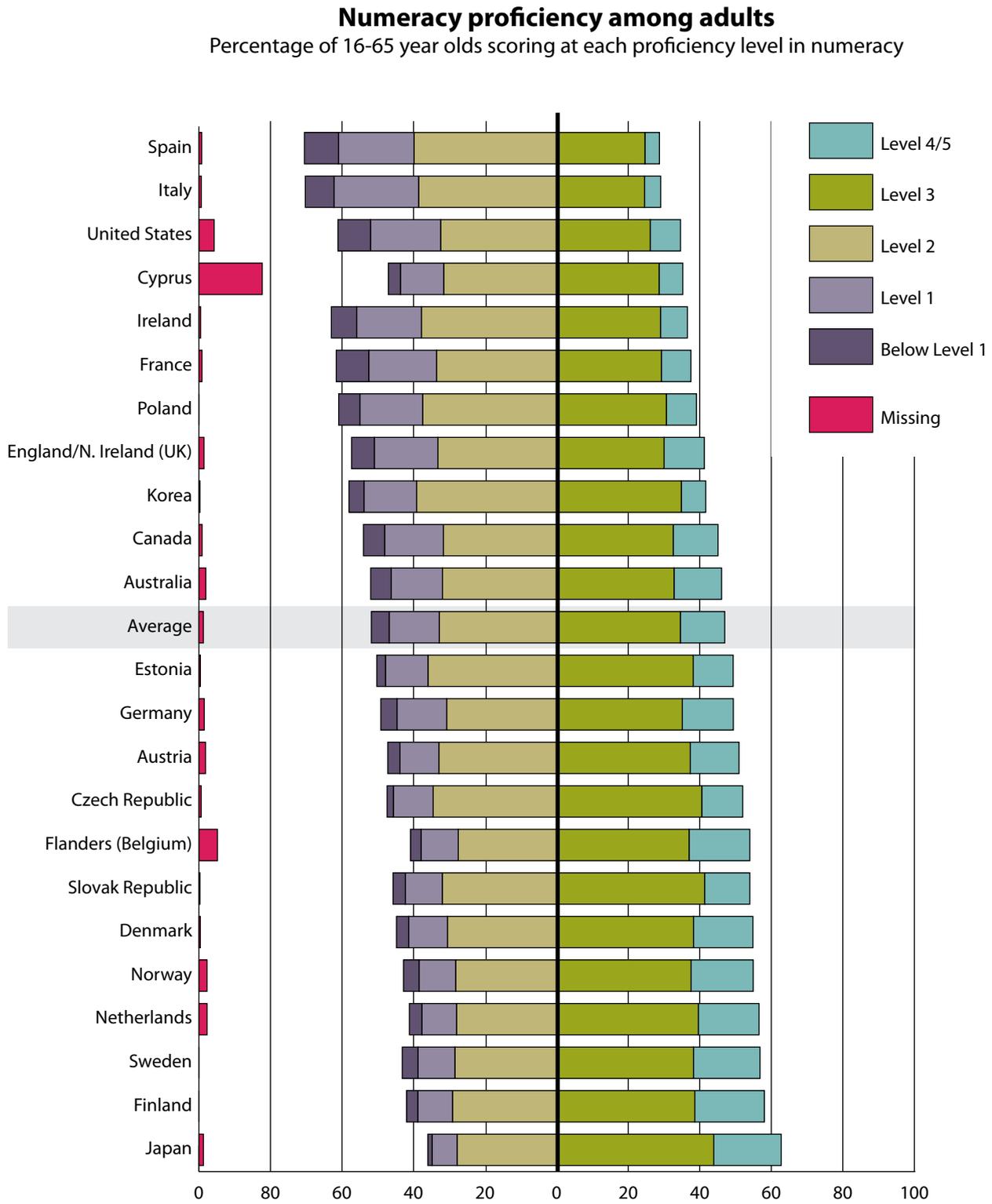
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5   "OECD Skills Outlook 2013: First Results from the Survey of Adult Skills", 2013

6   https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224705/DFE-RR301A.pdf

7   For example Unanma et al.(2013) find that teachers' professional qualifications influence student academic achievement in Chemistry. Clearly teacher quality is related not only to qualifications but also to experience.

8   Achieving a good level in mathematics is considered as a strong predictor of success for young adults (GCSE Maths Analysis, 2014). Moreover, employers consider that weaknesses in literacy and numeracy are obstacles to developing specific work-related skills in young people (Learning to grow: what employers need from education and skills, CBI Education and Skills Survey, 2012). In addition, for example, an evidence review of employers and the recruitment of young people (16-18 years olds) by Chris Hasluck and Josie Armitage (2011) reads: "Negative perceptions see 16-18 years olds as unable to make a productive contribution from the start of their employment (perhaps because of a lack of basic skills) […]".

Figure 1. International comparison of adult numeracy

Numeracy proficiency among adults
Percentage of 16-65 year olds scoring at each proficiency level in numeracy


Source: OECD [Skills Outlook, 2013]

3.1 Qualifications by age group (teachers of mathematics)

Figure 2 shows how teachers' subject qualifications vary with respect to age among mathematics teachers. The data show that younger teachers (34 and younger) are on average less qualified than older teachers. Almost three quarters (72%) of teachers aged 34 or younger have GCSE (or below) as their highest subject qualification. One in three teachers aged over 55 has a degree in mathematics (or another degree with significant mathematical content), compared with one in ten teachers aged 34 or younger. This could be an indication that the mathematics qualifications of teachers are decreasing over time. On the other hand it may simply be that older teachers with better qualifications opt into FE teaching later, but that those with longer tenure necessarily better qualified. The lack of data limits our ability to carry out more detailed sub group analysis which would shed more light on this issue.

Figure 2. Subject qualification by age group (teachers of mathematics)
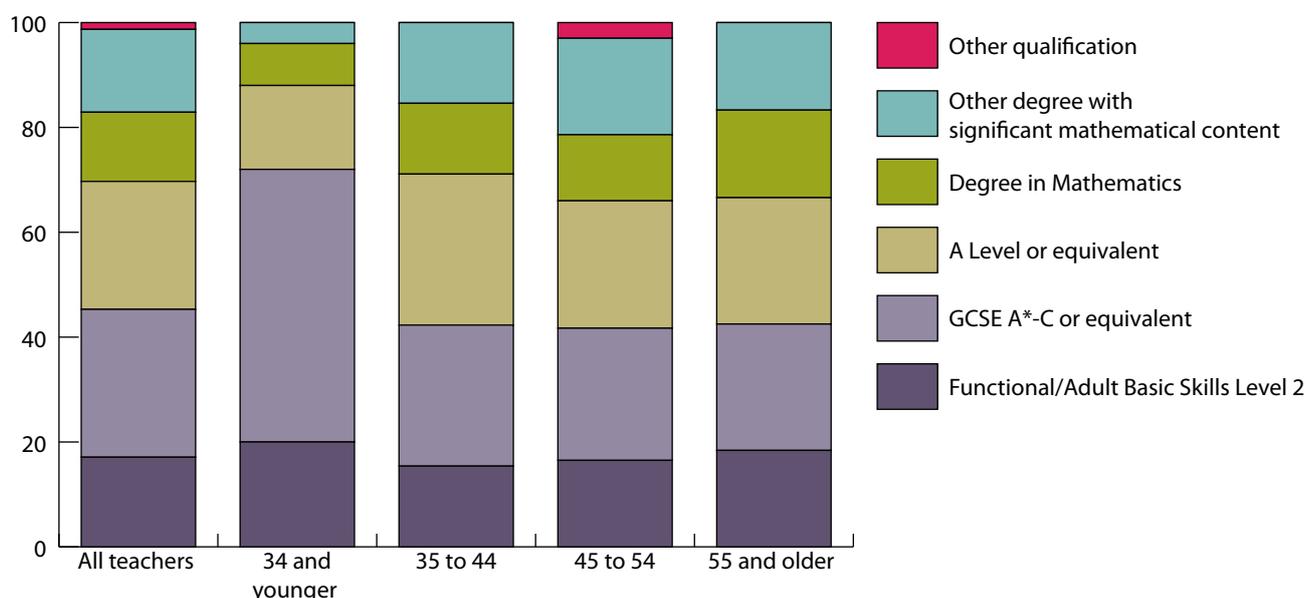
Source: GCSE Maths Analysis (n=234)

Note: Three teachers in the 45 to 54 group indicated that they possess 'other qualification' (namely, HNC mechanical engineering, Association of Taxation Technicians, Other degree with some mathematical content).

## 3.2 Qualifications by institution type

Figure 3 and Figure 4 provide a breakdown of the highest subject qualifications of teachers of mathematics and English respectively, broken down by institution type (FE College or other). The most common subject qualifications for mathematics teachers are GCSE (Level 2) or graduate degree (Level 5).

The figures also indicate that teachers at FE colleges have, on average, higher subject qualifications than teachers in other institutions. This result is, however, based on only a small sample size and therefore should be interpreted in this context.

Further, English teachers are in general more qualified than teachers of mathematics. This is particularly true for teachers at FE colleges.[9]

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9   The proportion of teachers of mathematics who have Certificate/Level 4 or above is 55.8% at FE colleges as compared to only 39.4% at other institutions. The proportion of English teachers with English teachers Certificate/Level 4 qualification or above is 63.2% at FE colleges and 53.2% at other institutions.

Figure 3. Subject qualification of teachers of mathematics
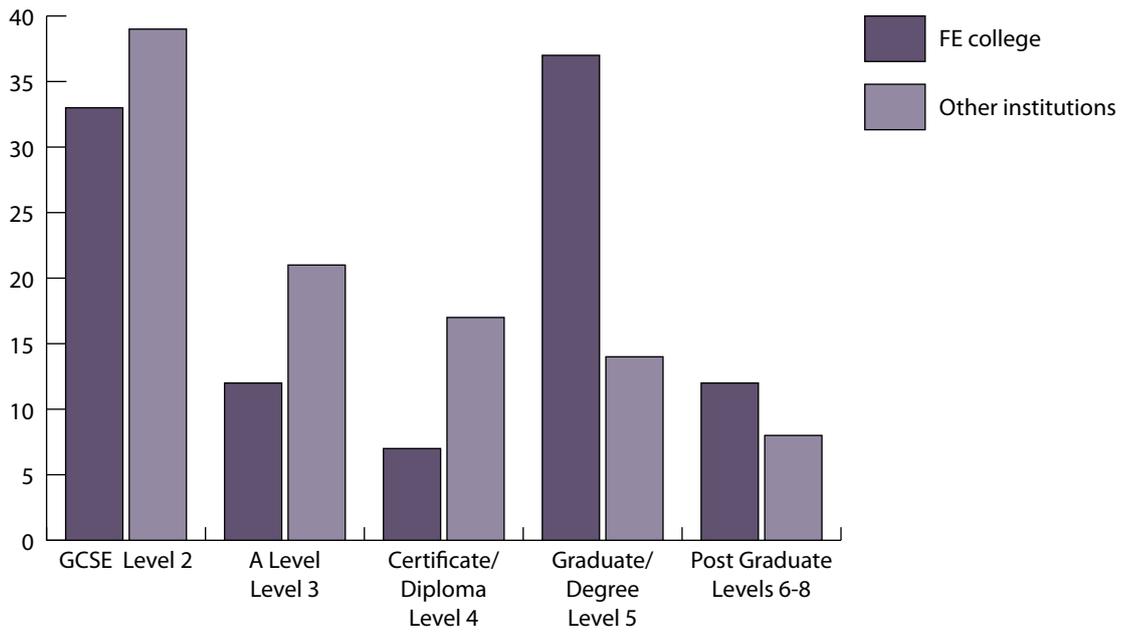
Source: Strategic Consultation Survey (n=119)[10]

## Figure 4. Subject qualification of teachers of English
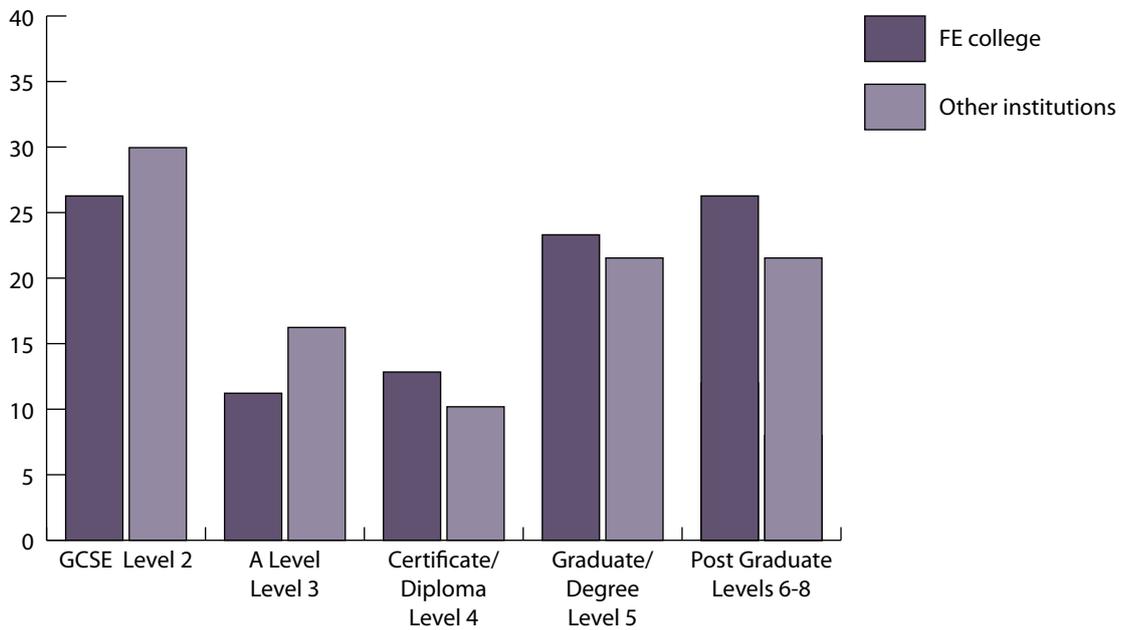
Source: Strategic Consultation Survey (n=101)

10 It is important to note that five teachers of mathematics (4% of the teachers covered) that fully completed the survey did not report any relevant
qualification that would be mathematics specific. Four out of the five teachers have, however, reported some other qualification (namely, a qualification
in English at level 4 and above, Post-Graduate Certificate in Education or Certificate in Post Compulsory education).

Figure 5 provides a "meta-analysis" of the combined evidence from the two surveys to increase the underlying sample size to inform on the qualification of teachers of mathematics at FE colleges and other institutions.

Figure 5. Combined evidence on teachers' qualification (mathematics)
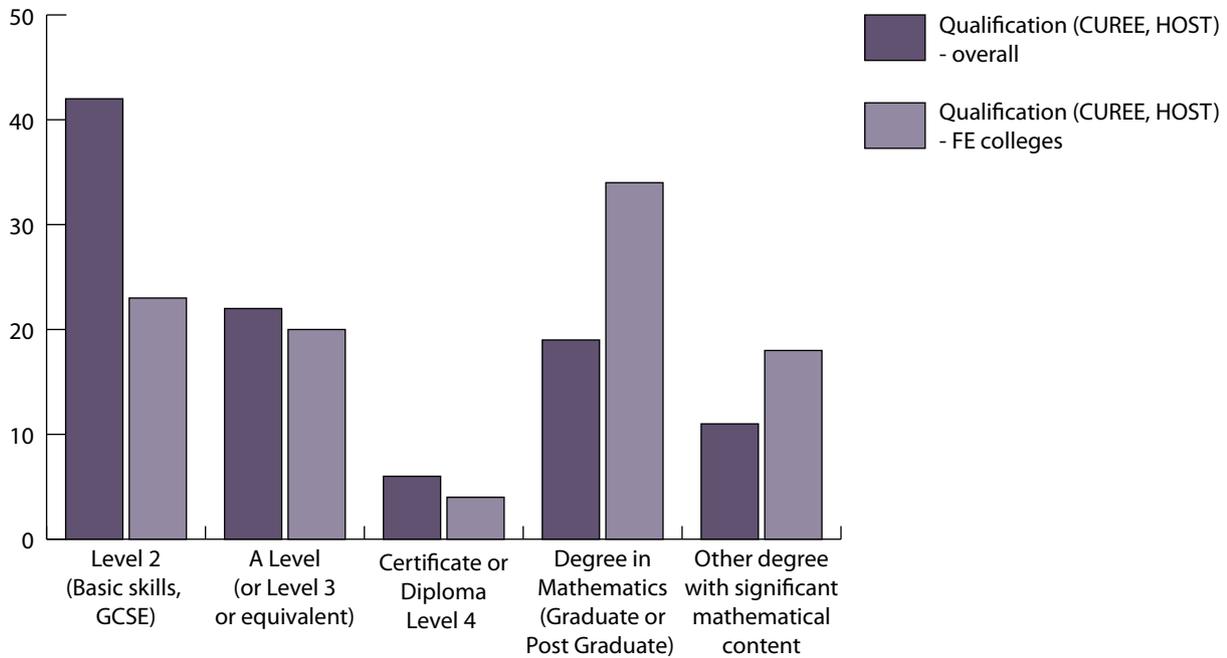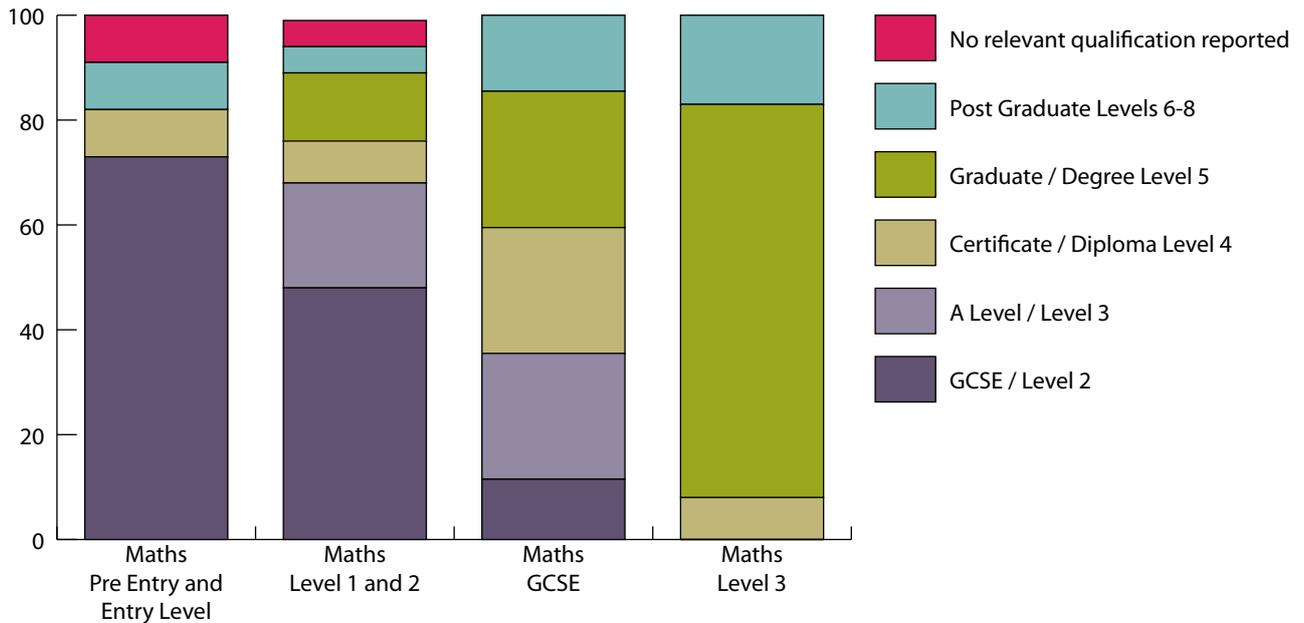

Source: Strategic Consultation Survey and GCSE Maths Analysis (n=354 for the qualification of all teachers across all the institutions, n=125 for the qualification of teachers at FE colleges).

3.3 The link between qualification and the level of mathematics and English taught

This section explores the available evidence on the subject qualifications of English and mathematics teachers, examining how teachers' subject qualifications in England relate to the level of English and mathematics taught.
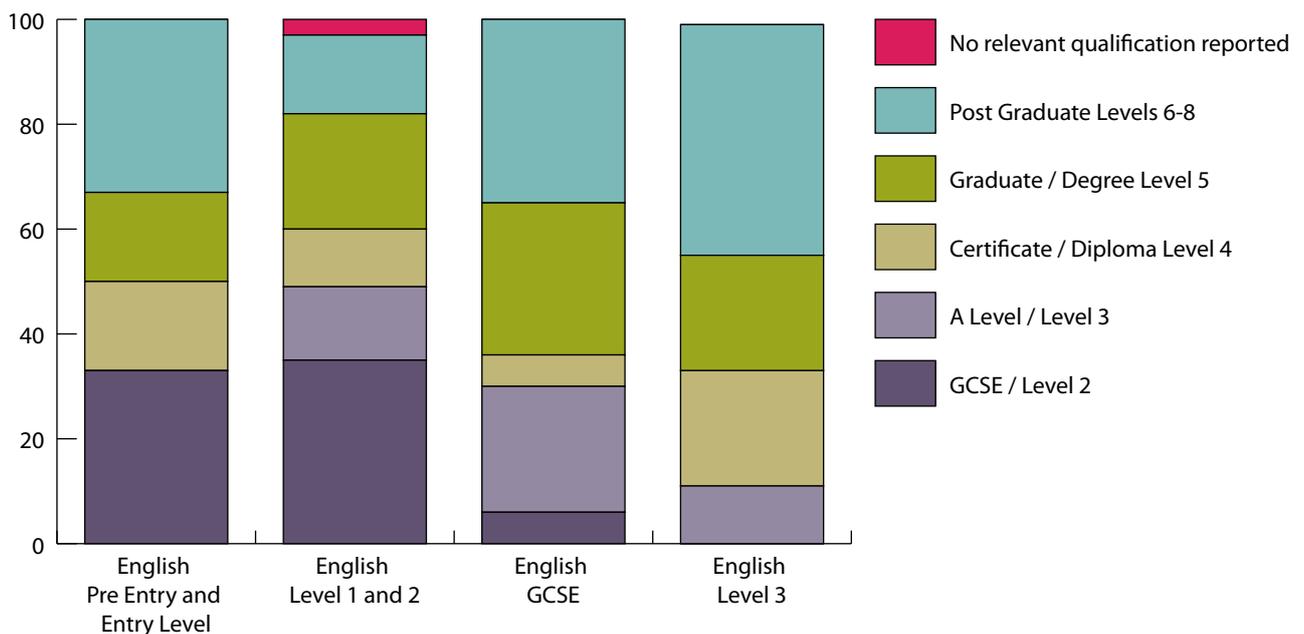
Figure 6 and Figure 7 explore the link between teachers' subject qualifications and the level of mathematics and English taught.

Figure 6. Subject qualification by level of mathematics taught

Source: Strategic Consultation Survey (n=113)

### Figure 7. Subject qualification by level of English taught

Source: Strategic Consultation Survey (n=95)

Analysis of the Strategic Consultation Survey data shows that the majority of English and mathematics teachers possess subject qualifications which are at least one level above the respective level they teach. Nevertheless, it is worth noting that almost 12% of teachers teaching GCSE mathematics and 6% of teachers teaching GCSE English possess only GCSE or Level 2 subject qualifications. In addition, 11% of teachers teaching English at Level 3 have only A-Level or Level 3 subject qualifications.

The GCSE Maths Analysis data (focusing on GCSE mathematics teachers) reveals a similar picture. As shown in Figure 8, there is evidence that a non-negligible proportion of teachers (9%) teaching GCSE mathematics have only a functional or basic skills Level 2 subject qualification. This result is slightly better for FE colleges where 8% of teachers teaching GCSE mathematics hold only a functional or basic skills Level 2 subject qualification. Nevertheless, it is important to note that the results and comparisons as per Figure 8 are based on very small sample size of teachers teaching GCSE mathematics. Another aspect of the data worth pointing out is that 4% of the mathematics teachers and 2% of the English teachers did not report any relevant subject qualification in relation to the specific subject taught (English or mathematics). These teachers have however reported that they possess a post-16 teaching qualification.[11]

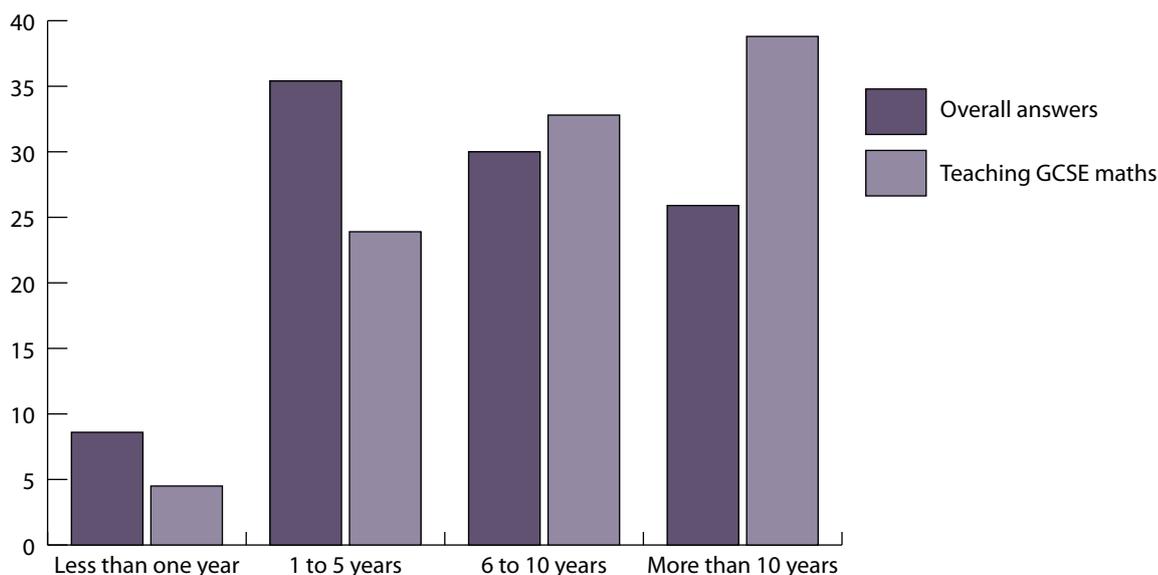**Figure 8. Subject qualification of teachers teaching GCSE mathematics**
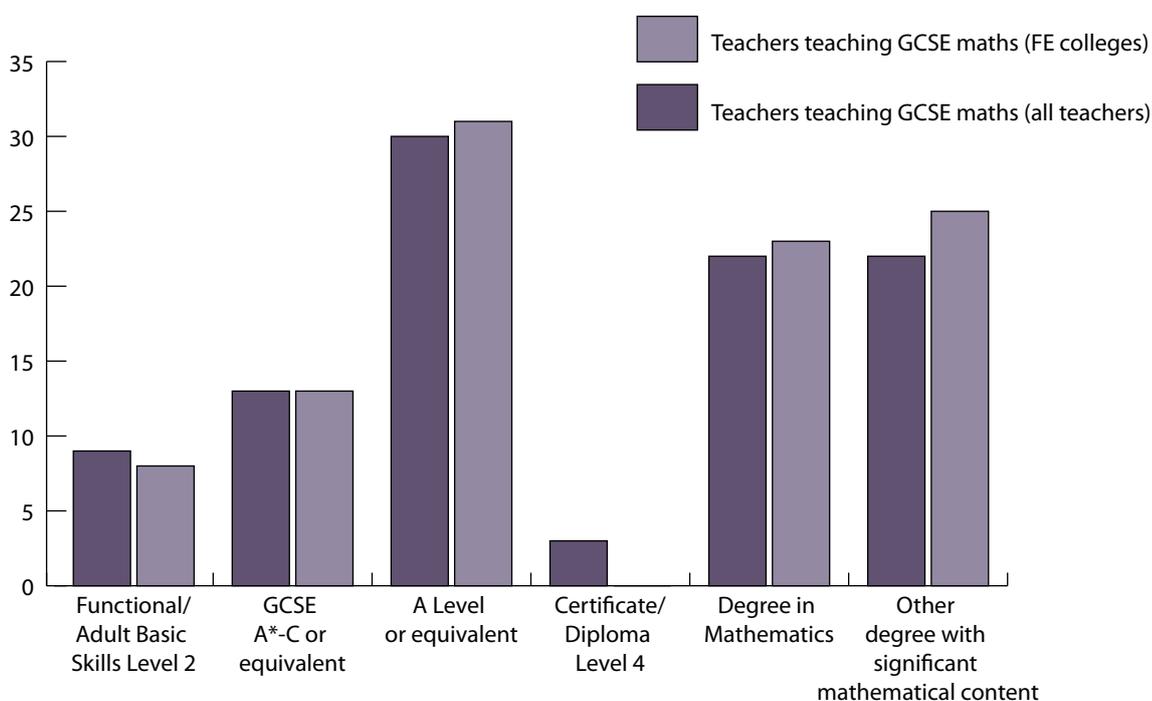
Source: GCSE Maths Analysis (n=67 for all teachers teaching GCSE mathematics; n=48 for teachers teaching GCSE mathematics at FE colleges)

Of course, formal subject qualifications are not all that matters for teachers' ability to deliver learning effectively. The relatively high incidence of low subject qualifications among GCSE teachers could be in some cases compensated for by adequate length of work experience. Indeed, as Figure 9 shows, the vast majority of teachers teaching GCSE mathematics have six or more years of experience in teaching. This analysis is nevertheless based on a sample of only 243 teachers. Therefore, in order to draw robust conclusions, the respective sample size of teachers would need to be increased.

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11   The total available sample of teachers that teach at least one of the following levels in mathematics and English: pre entry and entry level, Level 1 and 2, GCSE and Level 3 is 117 and 97, respectively.

Figure 9. Length of experience

Source: GCSE Maths Analysis (n=243)

On the whole, however, the evidence in this section indicates that some groups of teachers could benefit from support to improve their subject qualifications. Given the small sample sizes and the lack of other covariates it is hard to make clear statements about the characteristics of teachers that are most likely related to a lack of suitable qualification, though age appears to be one related factor.

## 3.4 Reported confidence of mathematics teachers

This section discusses the self-reported confidence of mathematics teachers. Particular attention is paid to how the reported confidence varies by characteristics such as teachers' subject qualifications and the level of mathematics taught.

The GCSE Maths Analysis asked teachers of mathematics to consider several statements related to their confidence, such as how confident they are in teaching all elements of GCSE higher level mathematics or how confident they are in dealing with questions asked by students.

Figure 10 summarises teachers' responses to the statements. The data show that almost half of teachers (43%) lack confidence in teaching all elements of GCSE mathematics[12]. Moreover, some teachers (16%) lack confidence that they can deal with most questions asked by students.

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12   Here we define the proportion of teachers that lack confidence as the proportion of teachers answering either "strongly disagree" or "disagree" to the questions asked (listed on the horizontal axis).

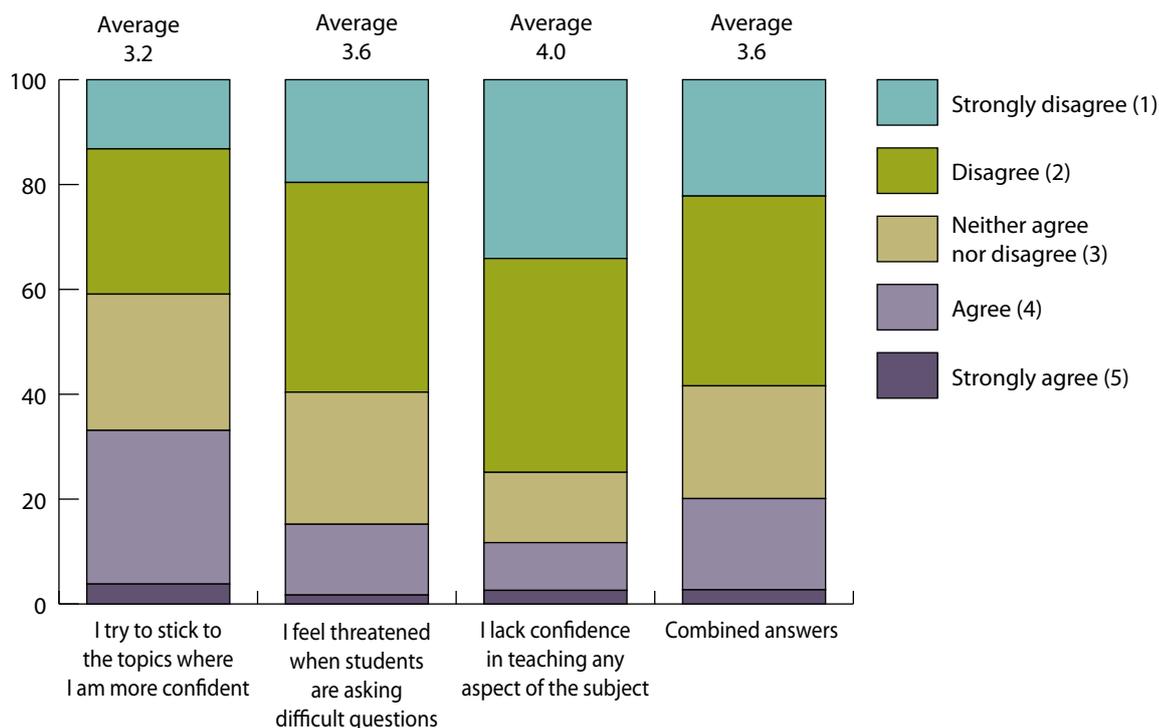## Figure 10. Responses to statements related to teachers' confidence
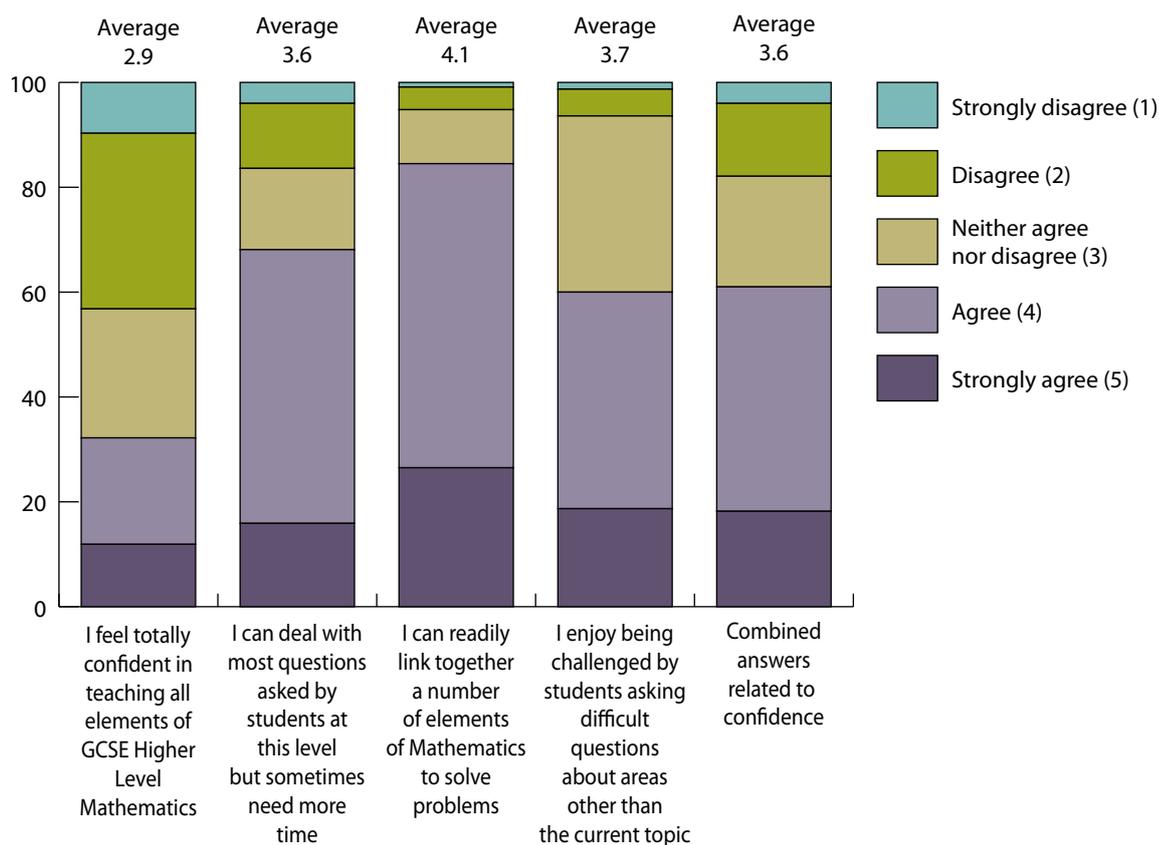
Source: GCSE Maths Analysis (n=226 to 236 depending on the question under consideration)

Note: Confidence is rising with the extent to which respondents agreed to the stipulated statements. The average level of confidence is increasing if the number approaches number 5 (strongly agree answer).

Figure 10 also provides, for each statement, the average level of teacher confidence[13] (shown at the top of each bar). For instance, the average level of confidence with respect to the ability to teach all elements of GCSE Higher level mathematics is 2.9 (close to the "neither agree nor disagree" answer) and the most common answer provided by teachers is "disagree". That is, most commonly teachers would disagree with the statement that they feel totally confident in teaching all elements of GCSE mathematics. On the other hand, Figure 11 provides an overview of answers to statements that could indicate lack of confidence with respect to teaching various aspects of mathematics (such as feeling threatened when asked difficult questions by students). The data show that 15% of teachers agree or strongly agree with the statement that they feel threatened when asked difficult questions by students. Moreover, 33% of teachers agree or strongly agree with the statement that they try to stick to the topics where they feel most confident.

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13 Here, the level of confidence is the degree to which teachers agreed with the statements describing their confidence. Confidence is highest if teachers strongly agreed with the stipulated statement and lowest if teachers strongly disagreed with it. The average level of confidence is calculated by assigning numerical values to answers (5 if the teacher strongly agreed, 4 if the teacher agreed, 3 if the teacher neither agreed nor disagreed, 2 if the teacher disagreed and 1 if the teacher strongly disagreed with the question asked, indicating the lowest level of confidence) and taking a simple average of the reported answers.

Figure 11. Responses to statements that could indicate lack of confidence

Source: GCSE Maths Analysis (n=230 to 235 depending on the question under consideration)

Note: Confidence is rising with the extent to which respondents disagreed to the stipulated statements. The average level of confidence is increasing if the number approaches number 5 (strongly disagree answer).

Figure 11 also provides, for each statement, the average level of teacher confidence[14] (shown at the top of each bar). For instance, the average level of confidence with respect to the statement "I try to stick to the topics where I am more confident" is 3.2. This indicates that a relatively high proportion of teachers agreed or strongly agreed (33%) to the statement, pushing the average level of confidence down.

Finally, we explore the link between teacher qualifications and confidence in teaching GCSE mathematics.[15] The data show a clear link between teacher confidence and teachers' subject qualifications such that reported confidence increases considerably with educational attainment. For example, as Figure 12 shows, 65% of teachers with a degree in mathematics, and 73% of teachers with 'other degree with significant mathematical content', agreed or strongly agreed with the statement that they feel totally confident in teaching all elements of GCSE Higher level mathematics, as opposed to only 16% of teachers with GCSE A-C or equivalent qualification, or as compared to only 5% of teachers with Functional or Adult Basic Skills Level 2 qualifications.

14　Here, the level of confidence is the degree to which teachers disagreed to the statements. Confidence is the highest if teachers strongly disagreed with the stipulated statement and the lowest if teachers strongly agreed with it. The average level of confidence is calculated by assigning numerical values to answers (5 if the teacher strongly disagreed, 4 if the teacher disagreed, 3 if the teacher neither agreed nor disagreed, 2 if the teacher agreed and 1 if the teacher strongly agreed with the statement in question, indicating the lowest level of confidence) and taking a simple average of the reported answers.

15　We excluded a small number (3) of teachers who reported possessing other qualifications to any of the groups shown in the charts.

Figure 12. Answers to statement: "I feel totally confident in teaching all elements of GCSE Higher Level Mathematics" by level of achieved subject qualification
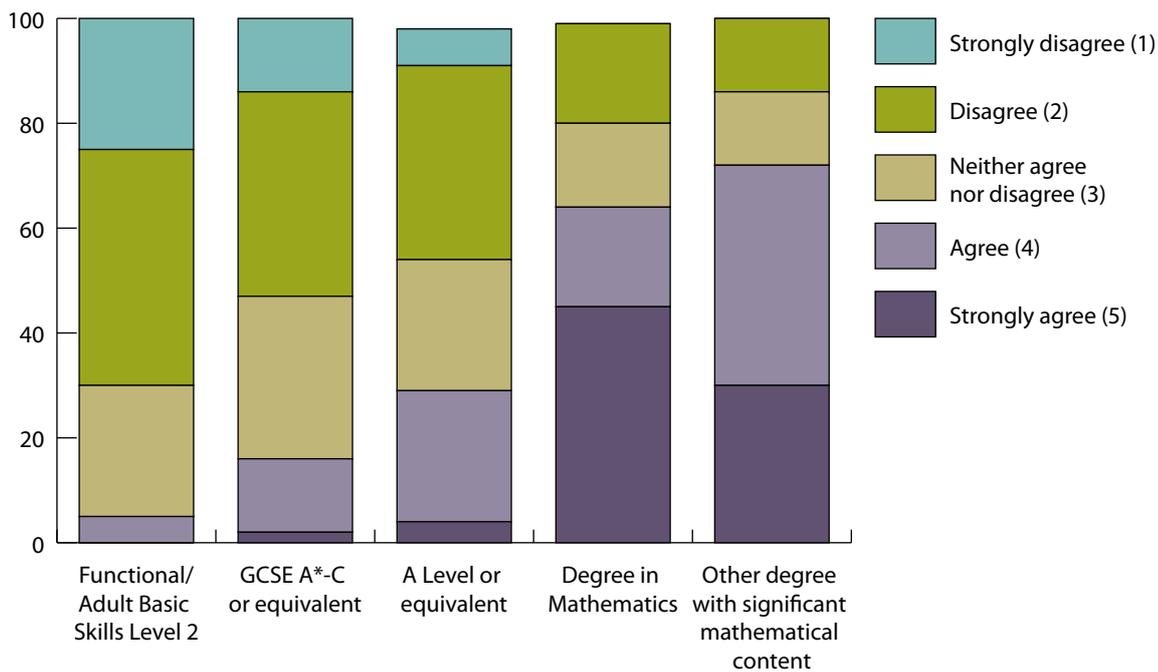
Source: GCSE Maths Analysis (n=230 to 235 depending on the question under consideration)

Figures 13 to 19 in the Annexe also show the relationship between other questions regarding teacher confidence and the level of subject qualifications. The message is consistent that more qualified teachers feel more confident about their ability to teach mathematics. For example, 90% of teachers with a degree in mathematics and 78% of teachers that possess another degree with significant mathematical content disagreed or strongly disagreed with the statement that they feel threatened when asked difficult questions by students, as opposed to only 55% of teachers with GCSE A-C or equivalent qualifications, or as compared to only 32% of teachers with Functional or Adult Basic Skills Level 2 qualifications.

Taken together, the findings in this section suggest that a large number of GCSE mathematics teachers lack the confidence required to teach various aspects of the subject. This could be a reflection of the subject qualifications held by the teachers - more qualified teachers have higher confidence in their ability to teach the subject relative to teachers with lower subject qualifications. It would be also interesting to analyse, for example, the relationship between reported self-confidence, qualifications and age. However, the lack of sample size inhibits more detailed analyses of this nature.

4. Conclusions

This report presents our analysis of the available survey evidence on the subject qualifications of English and mathematics teachers in England, drawing on data from two surveys. In addition to documenting the subject qualifications of English and mathematics teachers, we explore the links between teacher qualifications and the level of English or mathematics taught, and teacher confidence in delivering learning effectively.

The key findings from the analysis are:

• The youngest teachers (34 and younger) are, on average, the least qualified. This may be at odds with the increasing market need for high-quality teachers able to deliver effective learning at a high level.

• The subject qualifications of teachers at FE colleges are generally higher than those of teachers in other institutions.

• Teachers typically have subject qualifications at least one level above the level they teach. However, based on the data from the Strategic Consultation Survey, 12% of those teaching GCSE mathematics and 6% of those teaching GCSE English only have highest qualifications to the same level taught. Moreover, based on the data from GCSE Maths Analysis, there is evidence that some teachers (9%) teaching at the GCSE mathematics level, possess only functional or basic skills Level 2 qualifications. This indicates that in some instances teachers may lack adequate qualification with respect to the level they teach.

• A considerable proportion of teachers (43%) lack confidence in teaching all elements of GCSE higher level mathematics. Moreover, some teachers (16%) reported difficulties in dealing with questions asked by students, among other things.

• There is a positive link between teachers' subject qualifications and confidence. Teachers with higher subject qualifications have more confidence in their ability to deliver learning effectively.

A number of conclusions can be drawn from the analysis and findings presented in this report.

• There is evidence that in some cases teachers face difficulties in delivering learning in mathematics and English, so providing further support to teachers who experience difficulties in teaching is appropriate.

• The difficulties faced by teachers could be driven by a lack of appropriate subject qualifications needed to teach at certain levels. Educational institutions need to ensure that they adequately allocate teaching responsibilities within their organisations. The evidence generally indicates that it is preferable for teachers to have subject qualifications which are at least one level above the level at which they teach. This is supported by the fact that teachers with relatively lower subject qualification are on average less confident in providing effective learning and the views of newly qualified teachers themselves. The survey data indicate a potential mismatch between the subject qualifications held by teachers and the level at which they teach in some instances.

• Support for teachers can be targeted to the groups that most need it. Our analysis shows that younger teachers are on average less qualified (and by definition also on average less experienced). Related to this point, it may be worthwhile examining what the incentives are for teachers to acquire additional subject qualifications and how these incentives could be further enhanced.

Finally, we note that the findings and conclusions presented in this paper should be interpreted with care as they are based on survey data covering only a limited proportion of the teacher workforce (sample size is slightly higher than 200 in each survey). In the past teacher qualifications data was collected as part of the Staff Individualised Record (SIR) which covers all publicly funded further education colleges in England. However this data requirement was removed recently in an attempt to streamline the data collection process. Going forward, it will be important to consider different options for gathering more comprehensive data on teacher qualifications. This could be done in different ways, such as expanding surveys looking at the subject qualifications of the teaching workforce, or finding new ways to re-integrate teacher qualifications information into the SIR data return in a way which is less burdensome for colleges (requiring aggregate rather than individual data for example). Ultimately, this would ensure a thorough understanding of the FE teacher landscape and allow policy makers to base decisions and actions on robust and comprehensive data.

Annexe

Characteristics of survey respondents

Table 3. GCSE Maths Analysis data by role

Teacher's role	GCSE Maths Analysis (all respondents)	GCSE Maths Analysis (FE colleges only)
Mathematics teacher	68%	71%
Vocational teacher	14%	12%
Head of mathematics	4%	5%
Other	12%	11%

Source: GCSE Maths Analysis.

Note: The other category consists of 29 teachers and includes ESOL teachers, functional skills tutors, study assistants and others.

Table 4. Representativeness of the GCSE Maths Analysis data by gender

Gender	SIR data	GCSE Maths Analysis (all respondents)	GCSE Maths Analysis (FE colleges only)
Male	45%	34%	38%
Female	55%	66%	62%

Source: GCSE Maths Analysis, SIR data

Note: The proportion of males and females in the SIR data is based on contracts rather than individuals as these cannot be identified in the SIR data.

Reported confidence of teachers

The GCSE Maths Analysis asked teachers of mathematics to consider various statements related to their confidence and indicate how well these statements reflect their teaching level of confidence. Specifically, the following statements were tested:

• I feel totally confident in teaching all elements of GCSE Higher Level Mathematics.

• I can deal with most questions asked by students at this level but sometimes need more time.

• I can readily link together a number of elements of Mathematics to solve problems.

• I enjoy being challenged by students asking difficult questions about other areas than the current topic.

Teachers could either strongly agree with the statement (this answer would be indicative of high confidence), agree, neither agree nor disagree, disagree or strongly disagree (strongly disagreeing to the statement is indicative of a considerable lack of confidence).

The figures that follow summarise teachers' responses linking reported confidence and subject qualifications. The evidence shows that teachers that hold higher qualifications are on average considerably more confident than teachers with relatively lower subject qualifications.

Figure 13. Answers to statement: "I feel totally confident in teaching all elements of GCSE Higher Level Mathematics" by level of achieved subject qualification
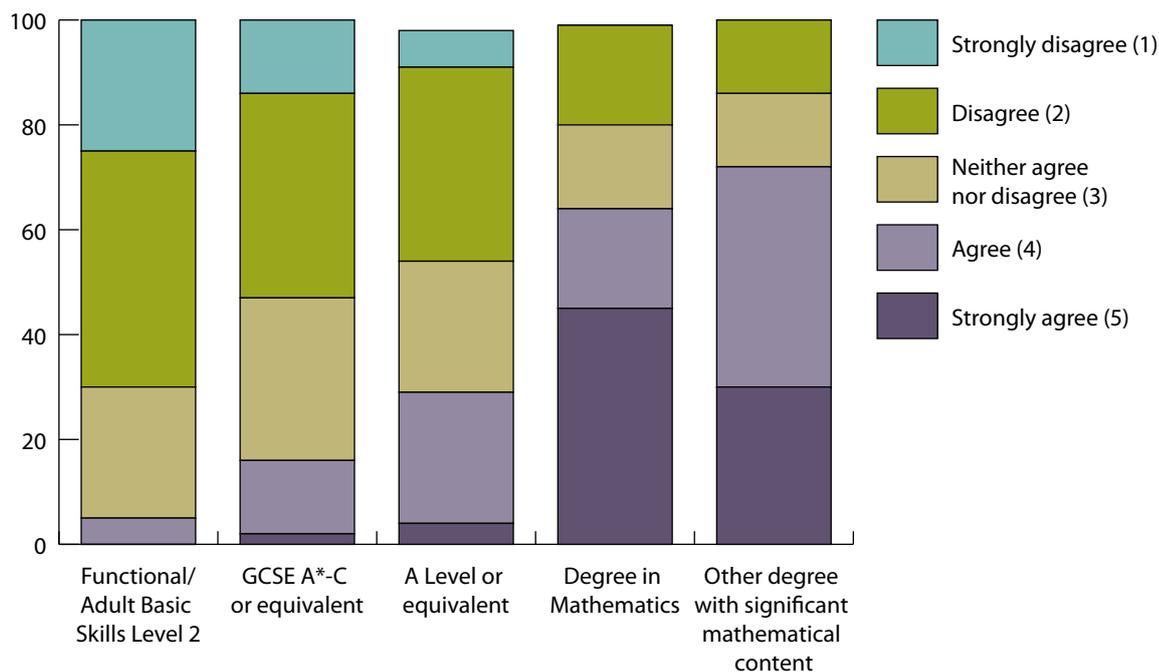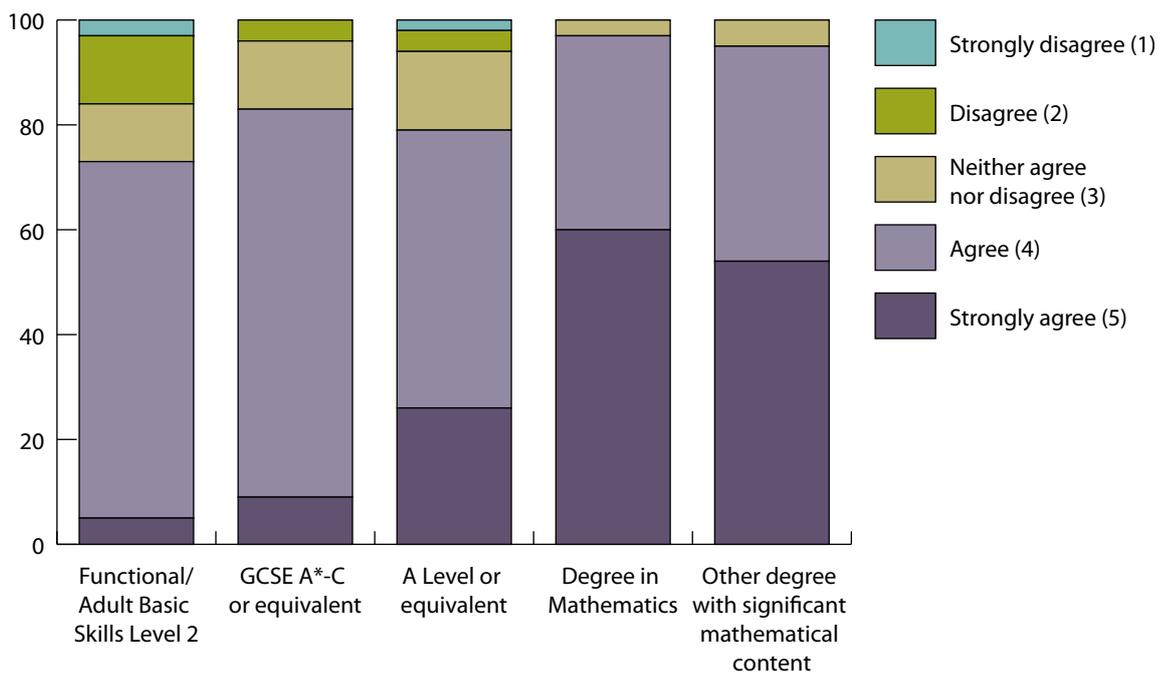

Source: GCSE Maths Analysis (n=228)

Figure 14. Answers to statement: "I can deal with most questions asked by students at this level but sometimes need more time" by level of achieved subject qualification
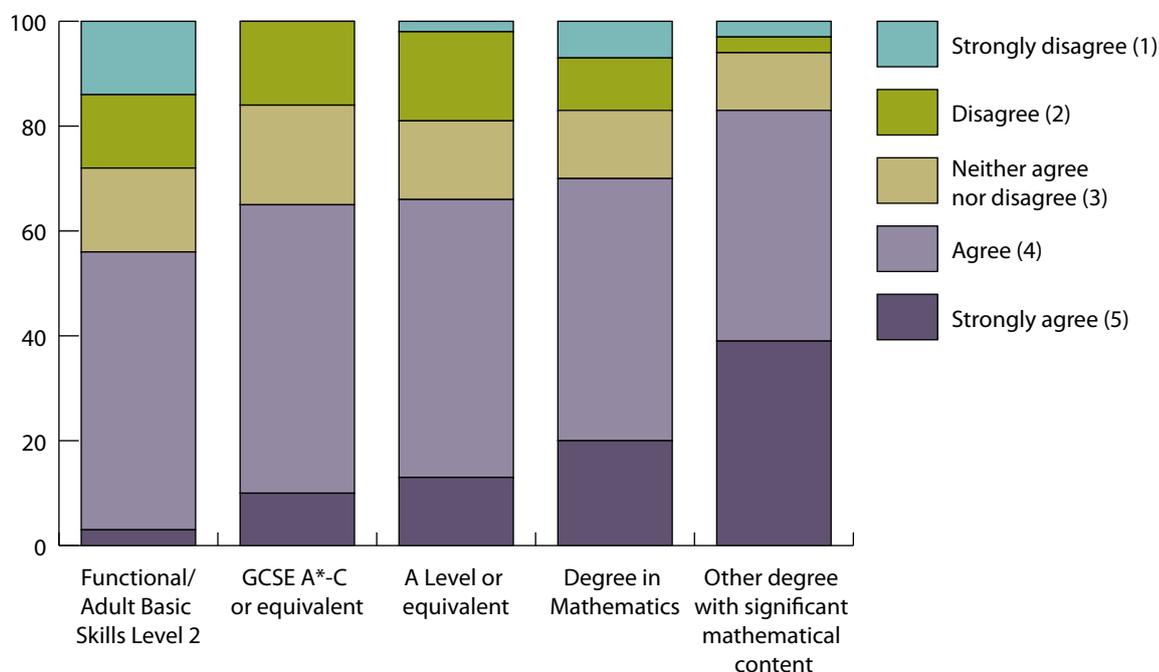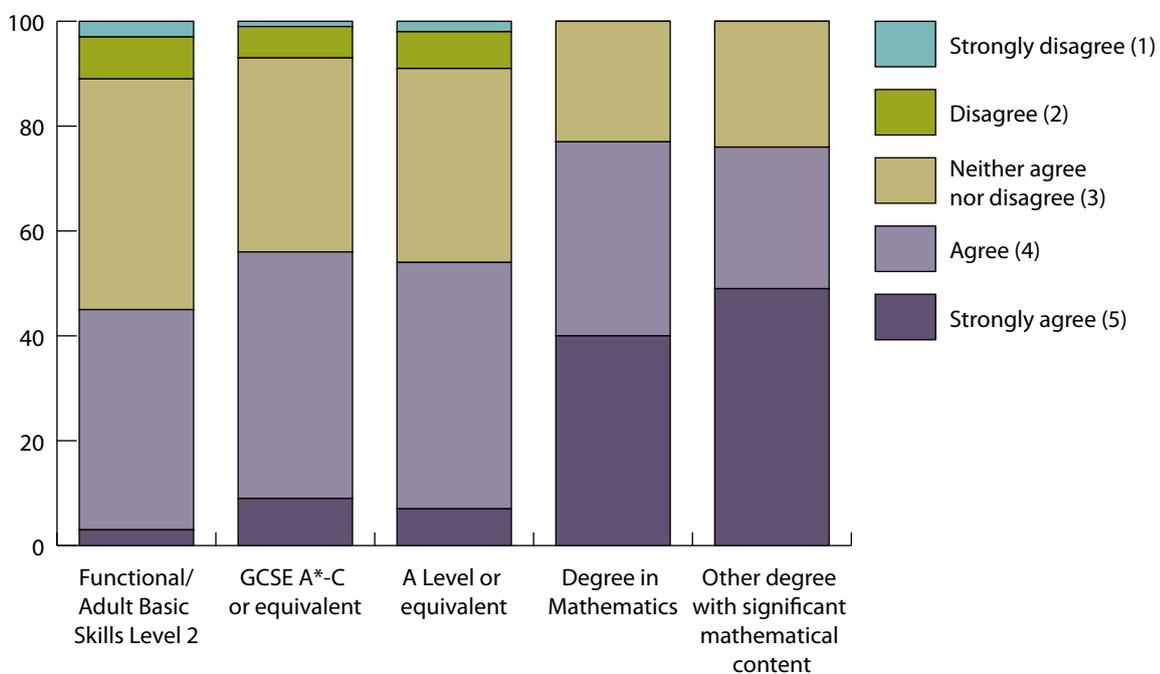

Source: GCSE Maths Analysis (n=226)

Figure 15. Answers to statement: "I can readily link together a number of elements of Mathematics to solve problems" by level of achieved subject qualification

Source: GCSE Maths Analysis (n=226)

Figure 16. Answers to statement: "I enjoy being challenged by students asking difficult questions about other areas than the current topic" by level of achieved subject qualification

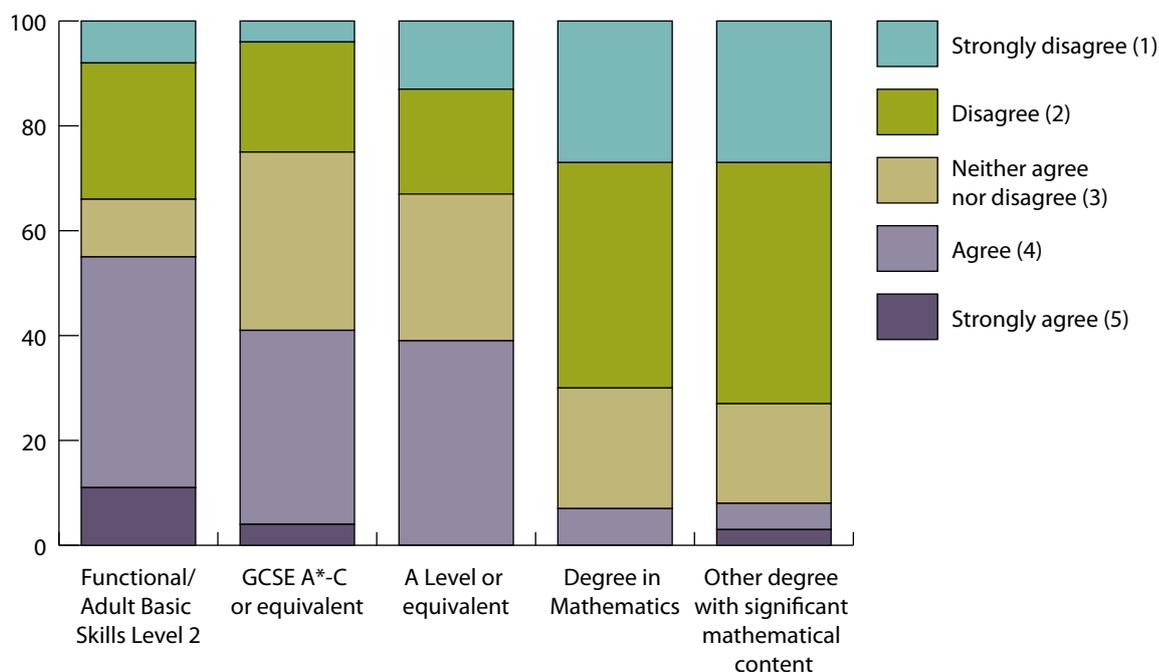Source: GCSE Maths Analysis (n=227)

Reported lack of confidence of teachers

The GCSE Maths Analysis asked teachers of mathematics to consider various statements which indicate confidence or lack thereof. Specifically, the following statements were tested:

• I try to stick to the topics where I am more confident.

• I feel threatened when students are asking difficult questions.

• I lack confidence in teaching any aspect of the subject.

Teachers could either strongly agree with the statement (this answer would be indicative of a considerable lack of confidence), agree, neither agree nor disagree, disagree or strongly disagree (indicative of high confidence).

The figures that follow summarise teachers' responses linking reported lack of confidence and subject qualifications. The evidence shows that teachers with lower subject qualifications are, on average, less confident than teachers with higher subject qualifications.

Figure 17. Answers to statement: "I try to stick to the topics where I am more confident" by level of achieved subject qualification
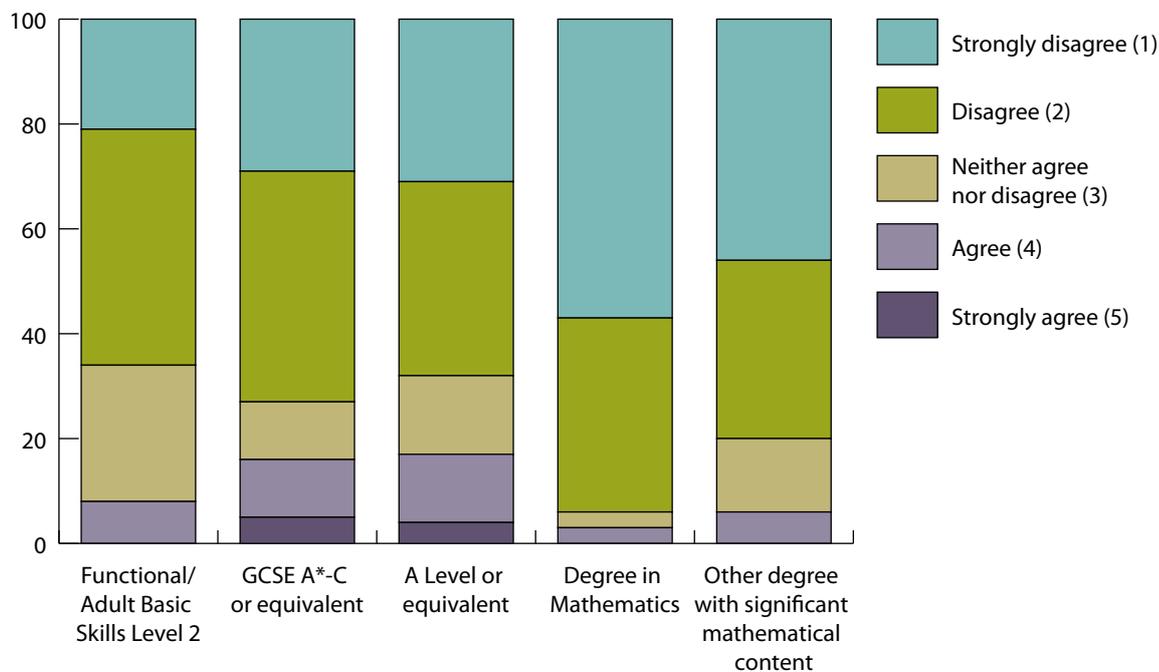

Source: GCSE Maths Analysis (n=227)

Figure 18. Answers to statement: "I feel threatened when students are asking difficult questions" by level of achieved subject qualification
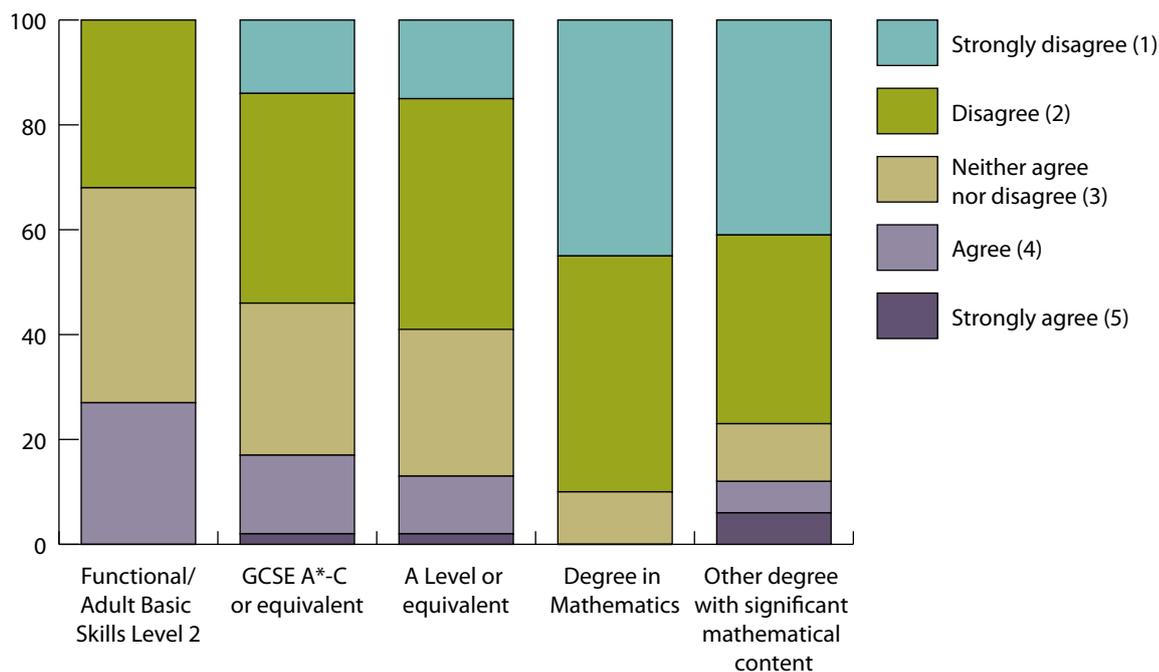
Source: GCSE Maths Analysis (n=227)

Figure 19. Answers to statement: "I lack confidence in teaching any aspect of the subject" by level of achieved subject qualification

Source: GCSE Maths Analysis (n=224)