International Centre for Guidance Studies

AP8: STEM Careers Awareness Timelines

STEM subjects and jobs: A longitudinal perspective of attitudes among Key Stage 3 students, 2008 – 2010

March 2011

Jo Hutchinson and Kieran Bentley

UNIVERSITY of DERBY
International Centre for Guidance Studies (iCeGS)

www.derby.ac.uk/icegs

STEM subjects and jobs: A longitudinal perspective of attitudes among Key Stage 3 students, 2008 - 2010

Jo Hutchinson
Kieran Bentley

International Centre for Guidance Studies (iCeGS)
University of Derby, Kedleston Road
Derby, DE22 1GB
Tel: 01332 591267
www.derby.ac.uk/icegs
j.hutchinson@derby.ac.uk
P553c

Contents

SUMMARY OF FINDINGS

Research Context

In response to the Roberts Review the DFE (formerly Department for Children, Schools and Families; DCSF) developed a suite of 11 Action Programmes within a strategic framework to prioritise science, technology, engineering and maths (STEM) issues. The STEM Careers Awareness Timelines initiative was part of Action Programme 8 which ran between 2008 to 2011. The project was undertaken by the Centre for Education and Industry at the University of Warwick, the International Centre for Guidance Studies at the University of Derby and Isinglass Consultancy.

The project enlisted 30 schools to pilot the initiatives across England. Nominated school contacts initially assessed their school in relation to delivery of STEM subjects and careers. Through mentoring arrangements and regional events, these schools were then supported through their design and delivery of careers awareness timelines – or programmes of activities within the curriculum - designed to increase the awareness of young people about STEM subjects and related careers options.

Surveys of young people were also undertaken that were designed to capture opinions on STEM subjects and thoughts about STEM careers. The first of these surveys (which we refer to as Wave One) took place from September 2008 until March 2009. The second (Wave Two) lasted from September 2010 until February 2011. The staggered approach, focusing two surveys with many of the same questions on the same schools two years apart, allowed for a comparison of attitudes at the beginning and at the end of the project. This longitudinal perspective facilitated an assessment of change both within a cohort and between school years.

Wave One of the research generated 4073 completed questionnaires from year seven and year nine students from 27 schools. Wave Two of the research received 2216 responses from a total of 19 of the pilot schools..

As well as analyses of data within each wave, Wave One (year seven) and Wave Two (year nine) responses from these two surveys were subsequently compared to observe the extent of changes in attitudes between the two survey periods and year groups. In this way the success of the timeline initiatives could be understood. Key findings from the research are summarised below.

Acknowledgements

Considerable thanks are due to the teachers in the pilot schools who have supported the implementation of the survey and to the students who completed it. The research team would also like to acknowledge our gratitude to the school leadership teams, colleagues who provided mentor support and members of the wider stakeholder community who have supported the development of the STEM Career Awareness Timelines project.

Key findings

Subject preferences

Students were asked to name their most and least favoured subjects. Analysis of Wave Two data showed PE, art, and design and technology, to be the most popular subjects. Science was the fourth most popular subject overall. These findings are

consistent between Waves One and Two. A similar number of respondents nominated maths among their top three favourite subjects as allocated it to their bottom three least favoured subjects. Engineering was not often cited, but when it was students were more likely to report it as being among their least favourite subjects. There is no new evidence of science declining in popularity between years seven and nine which was indicated in Wave One results. Girls were generally as likely as boys to choose maths and science as favourites.

Design and technology was the subject most likely to be rated both as easy and enjoyable. There is no simple correlation between thinking a subject is easy, enjoyable and that their self-perception of being good at it, for example science is popular despite only half thinking that it is easy. The proportions reporting ease and enjoyment of STEM subjects has fallen between the waves, but enjoyment of maths declined by twelve percentage points between the two years – the most significant decline of all the subjects. While the proportion of students saying that maths and science are important and needed has risen, these proportions have fallen for engineering and design and technology. Self reporting of knowledge of STEM jobs has declined between year seven and year nine for all STEM subject jobs save for science.

STEM activities in schools

There is significant enrichment and enhancement activity in schools for science, with 45% of year nines reporting going on a science related trip and 19% of respondents saying they participate in a science club or similar. Maths clubs are taken up by 13% of respondents. Visits out of school to study technology, engineering and maths are much less common. However, some schools are inviting people in to talk about their jobs and about particular projects as 37% of students at key stage 3 can recall this activity. Take up of STEM clubs, activities, trips and talks generally increases between year seven and year nine. Non White British students report a greater involvement in all STEM enrichment and enhancement activities than White British students. Pupils from non-STEM specialist schools report greater participation in enhancement and enrichment activities than those from STEM specialist schools.

Awareness of qualifications

The majority of students are aware of Diplomas, Apprenticeships and A Levels. Fewer than a third are aware of Vocational Qualifications. Most students are considering more traditional A Levels as options. Gender comparisons reveal girls to be less likely than boys to be aware of Apprenticeships or Vocational Qualifications and less likely to be considering them.

Sources of information

Students at key stage 3 remain most likely to ask their families for information about jobs and careers. 59% in 2010 said they would ask a subject teacher, an increase from 48% in 2008. All of the sources of information were more likely to be consulted for information about jobs and careers among year nines in Wave Two than year sevens in the first wave of the research. The internet is considered a source of information about jobs and careers by over 50% of year nines, although social networking is not considered to be a source of information on careers for the majority of key stage 3 students.

Interest in STEM careers areas

The majority of students said they wanted to find out more about and would consider careers in science, technology and maths areas. Less than 50% had the same interest in engineering. Science was the career area most likely to be chosen by students of all the STEM areas. Interest in, and consideration of, science and maths rose between the waves of research. The proportion interested in, and considering, engineering and technology fell across the two waves. Males and Non White British groups were most interested in finding out more about STEM careers.

Interest in specific STEM careers areas

Specific career areas most and least chosen overall remained the same between the two waves of research. Design arts and crafts, performing arts, and leisure, sport and tourism were the areas most likely to be chosen. Education and training was rated much more highly in Wave Two of the research. Some career areas associated with STEM were less likely to be chosen in Wave Two compared with Wave One. Career choice remains highly gendered and gender disparities often widened between Wave One and two.

1 Introduction

1.1 Action Programme 8, STEM Cohesion Programme

The DFE (formerly Department for Children, Schools and Families; DCSF) developed a suite of 11 Action Programmes within a strategic framework to prioritise science, technology, engineering and maths (STEM) issues and bring coherence and co-ordination to the diverse range of activities being delivered in schools to promote interest in, and take up of, learning of STEM subjects throughout school, FE and HE. Action Programme 8 focussed on careers and seeks to achieve two objectives:

- For all young people to be made aware of the fulfilling and attractive careers open to them through the continued study of science and mathematics
- To provide the knowledge and skills to enable young people to make informed subject choices to achieve qualifications to keep their options open for further study and careers in STEM.

The Centre for Education in Industry (CEI) with the International Centre for Guidance Studies (iCeGS) and Isinglass Consultancy are partners in the delivery of a STEM Careers Awareness Timeline Pilot project which is a part of Action Programme 8. As part of this three year project, iCeGS managed two surveys of young people in Key Stage 3 that explored attitudes to STEM study and careers.

The two research waves took place towards the beginning and end of the three year 'timeline' initiatives. These set the context for the pilot schools and helped to show the effectiveness or otherwise of STEM related interventions in the participating schools. Year seven and year nine students from participating schools were sent a questionnaire in September 2008 and September 2010 to gauge interest in STEM (and other) subjects and careers. The first wave ran from September 2008 until March 2009, and the second wave lasted from July 2010 to January 2011 (at the end of Key Stage 3 learning). This report summarises the main findings of the survey work.

1.2 The attitude survey

Surveys were designed using SNAP software, and during both fieldwork waves questionnaires were completed online and imported using SNAP then subsequently analysed using SPSS, (a statistical package for social sciences). Paper copies of the questionnaire (2008 only) were received through the postal system and manually inputted, then analysed as part of the full dataset using SPSS. Following receipt of all of the responses from each school, two school specific data reports were produced for year seven and year nine giving answers to each question in a set format (please see appendices for a copy of the template). This was then submitted to school mentors (for a full list of mentors please see next section), and then to contacts within the participating schools. Most questions were kept the same between the two surveys to ensure comparisons could be carried out. However some questions were refined and others added as part of the Wave Two survey.

Questionnaires were made available to the project team. Schools were instructed to select proportions of year seven and year nine students to take part in the study, and

students were able to respond within lesson time to either an online or a paper (2008 only) version of the questionnaire.

School mentors liaised with school contacts to ensure paper copies of the questionnaire were received and word documents enclosing a link to the online version of the questionnaire made available. Mentors were also on hand to ensure questionnaires were completed and project timelines were adhered to.

Following the individual analysis of the school responses and initial submission of school reports, an overall analysis of the data was carried out. Following the first wave of the research, findings were presented in the iCeGS Occasional Paper series as the paper; STEM Careers Awareness Timelines. Attitudes and Ambitions Towards Science, Technology, Engineering and Maths (STEM at Key Stage 3).

This report presents a summary of responses to the 2008 and 2010 surveys. This report concludes the overall analysis, presenting all findings and analysis from 26 schools that eventually submitted questionnaires in Wave One, and the 19 that submitted in Wave Two. A full list of schools that responded to the survey waves can be found in the appendices.

1.3 Responses to the surveys

A total of 27 out of the 30 pilot schools returned questionnaires between January 2008 and March 2009 in Wave One of the survey. A breakdown of all questionnaire returns analysed by year, gender, and numbers of students from schools with above average black and minority ethnic (BME) students, and those schools with above average take up of free school meals (FSM), used as a proxy for economic disadvantage, can be seen in Table A below.

A total of 4073 year seven and year nine responses were analysed, with slightly higher numbers of females responding to the questionnaire than males, and more year seven responses than year nine.

Table A: Responses Wave One (September 2008- March 2009)

	Year seven	**Year nine**	**Total**
Males	1029 (47%)	920 (48%)	1949 (48%)
Female	1142 (53%)	982 (52%)	2124 (52%)
Total	**2171 (53%)**	**1902 (47%)**	**4073**

Responses from schools with:	**Year seven**	**Year nine**	**Total**
above average BME	316 (15%)	300 (16%)	616 (15%)
above average FSM	386 (18%)	393 (21%)	779 (19%)

A total of 19 schools submitted a response for inclusion in the analysis in Wave Two of the fieldwork. A summary of the responses is shown below in Table B. Wave Two saw a higher proportion of response from females, and year nines.

Table B: Responses Wave Two (September 2010- January 2011)

	Year seven	**Year nine**	**Total**
Males	316 (43%)	622 (42%)	938 (42%)
Female	418 (57%)	860 (58%)	1278 (58%)
Total	**734 (33%)**	**1482 (67%)**	**2216**

Responses from individuals:	**Year seven**	**Year nine**	**Total**
'Non white British'	157 (21%)	297 (20%)	454 (20%)
FSM	68 (9%)	136 (9%)	204 (9%)

Both waves of the survey generated a significant number of responses giving a high degree of confidence that the results are representative of those held across the sample of schools, and the differences between the two years and both male and female students. The sample itself may not be representative of all schools in England as they were selected with an emphasis on STEM specialism and/or achievement of a careers quality award. However, as there is sufficient congruency between the results from Wave One and Wave Two, and few exceptions to tests of logical deduction conducted on the data sets we can be confident that the results are typical of those of similar schools. On the same grounds we can be confident that the comparison between Wave One and Wave Two is valid despite the lower number of responses (attributed to inevitable attrition and the requirement just for online returns in Wave Two).

The report does not seek to repeat the main findings of the survey presented from Wave One of the research and reported in the STEM Careers Awareness Timelines paper previously mentioned (Hutchinson *et al.*, 2009)[1]. Consequently this report focuses on where there are significant differences that have emerged through time. Year group and gender analyses are conducted throughout, and where relevant, analyses of the BME and FSM sub groups are presented.

1.4 Report Structure

The results section firstly looks at a breakdown of responses, before presenting key findings with regard to subject preferences. As well as analysis of the most and least enjoyed subjects, a more in-depth examination of the perceived characteristics of certain subjects has been analysed. The report moves on to analyse STEM activities undertaken - such as school trips and clubs - sources of advice and guidance, and

[1] Hutchinson, J., Stagg, P. and Bentley, K. (2009) STEM Careers Awareness Timelines. Attitudes and Ambitions Towards Science, Technology, Engineering and Maths (STEM at Key Stage 3). Derby: International Centre for Guidance Studies, University of Derby.

intentions to pursue STEM careers and specific industries are addressed. The results were analysed using year group, gender, socio-economic classification (using free school meals as a proxy) and ethnicity classifications. Where such analyses were found to be significant they are presented in this report.

Of specific interest to the research team was the extent to which such attitudes may have changed during the lifetime of the project, and where the timeline initiatives may have affected STEM attitudes. Comparisons of year seven (in 2008) and year nine (in 2010) are made where survey questions were the same. Where comparisons are not possible recent findings are presented. Tables of all findings reported are available in the appendices.

1.5 Acknowledgements

We would like to thank school contacts and their mentors who have agreed to support the STEM project within their schools, and the students who took the time to fill in the questionnaires.

School contacts included;

Geoff Buck (Rugby High School for Girls)
Eva Carroll and Claire MacDonald (Riddlesdown High School)
Simon Carson (Bridge Learning Campus)
Zoe Conneally and Shirley Clementson (Rushey Mead School)
Jo Cox (Redmoor High School)
Charles Dalleywater (Abbey College)
Katie Dye (Brigshaw High School)
Judith Finnemore (Phoenix High School)
Susan Fraser (Holsworthy Community College)
Moira Hairsine (St Aidan's County High School)
Sandra Hayton (Stretford Grammar School)
Peter Lane and Ian Gilbert (Bradfield Comprehensive)
Karen Leung / Rumi Khatun (Tom Hood Community Science College)
Robert MacKenzie (Challney High School for Girls)
Seamus McKenna (Finchley Catholic High School)
Alisdair Nicholas and Catherine Purvis-Mawson (Framwellgate School)
David Page (Claverham Community College)
John Patino (The Alsop High School)
Mike Shanks and Ingrid Claydon (St Aidans C of E High School)
Adam Shelley (The Woodroffe School)
Adrain J Sproson (The Westgate School)
Eileen Stead (King Charles I School)
Alyson Steels (Top Valley School & Engineering College)
Jackie Stent (Cramlington Community High School)
Gill Stott (St Peter's Catholic HS and 6th Form Centre)
Neil McCall(The King Edward VI School)
Sandra Wright (Penketh High School)

School mentors included;

Craig Grewcock
Malcolm Hoare
Jo Hutchinson

Nicki Moore
Sandra Morgan
Faith Muir
Peter Stagg

2 Key findings, 2010 compared with 2008

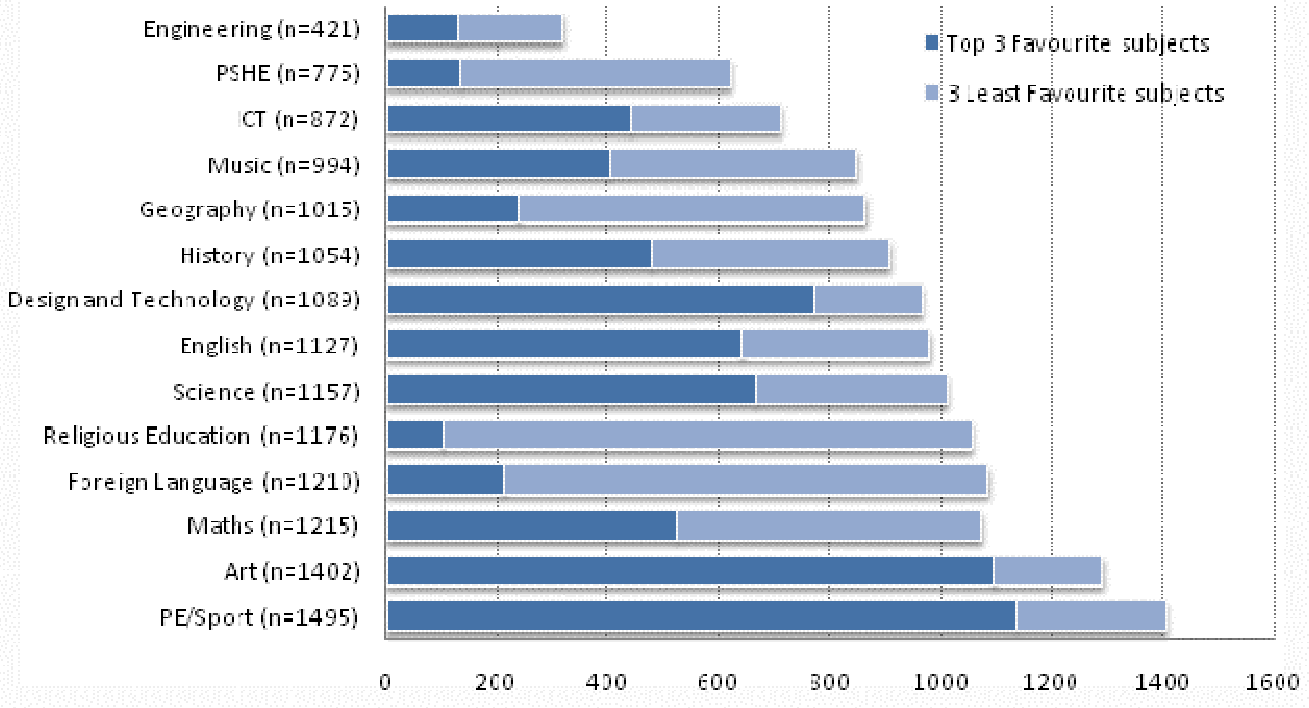
2.1 Subject preferences

Participating students in both waves were initially asked about their subject preferences. The question style differed between the waves. Whereas in Wave One students were asked to select their top and bottom three subjects, in Wave Two students were presented with a ranking exercise. Results discussed below are shown in Tables one to seven of the appendices.

Figure 1 shows that in Wave Two PE, art, and design and technology were the most popular of the subjects. PE was chosen as a number one subject by 46% of students who rated PE (given the style of the question students were not required to rate all subjects). Art was chosen by 33% of students, and design and technology by 19%. Science was the next highly rated subject in Wave Two with 17% of students marking this as their favourite (see Table three). The three most popular subjects in Wave One were the same three as those in Wave Two with science in both waves being the 4th most popular subject overall (see Tables one to seven for a summary of this data).

English, science and maths were often rated as either among the top three or the bottom three. Maths, along with history and music are 'Marmite' subjects, either loved or hated with very similar numbers of students rating them as either their most or their least favourite subject. Overall though, maths is the sixth subject most likely to appear in students' top three choices.

Figure 1: Preferences for subjects at Key Stage 3, 2010



Source: Appendix 1, Table One.

Engineering and ICT were not mentioned by many students, perhaps unsurprisingly as very few schools offer engineering as a distinct subject choice. In fact barely 18% of students mentioned engineering but of those that did one third rated it among their top three although 44% put it amongst their three least favourite subjects. ICT was more popular with it coming eighth in students' subject rankings.

Most subjects remained in similar positions between years seven and nine in Wave Two (see Tables two and three). However the popularity of English and science rose among the year nine group relative to year seven. This contrasted somewhat with Wave One findings in which science decreased in popularity between year seven and year nine. There was also no evidence of science declining in popularity between the two waves.

Analysis of Wave Two subject preferences by gender found few major differences. Girls were often as likely as boys to choose STEM subjects as their favourite Tables four and five show this.

Analysis of Wave Two data showed PE, art, and design and technology, to be the most popular subjects. Science was the fourth most popular subject overall. These findings are consistent between waves 1 and 2. Maths is equally cited as being among the top 3 favourite subjects and the 3 least favoured subjects. Engineering was not often cited, but when it was students were more likely to report it as being among their least favourite subjects.
There is no new evidence of science declining in popularity between years seven and nine which was indicated in Wave One results. Girls were generally as likely as boys to choose maths and science as favourites.

2.2 Opinions about STEM subjects

Students across both waves were asked for their opinions on specific STEM subjects. Students were asked whether they agreed that STEM subjects were, easy, enjoyable, important for adult life, needed for a good job, and whether students thought they were good at that subject. Students were also asked whether they were keen to study various subjects, and whether they thought those subjects were important. Another question was added in Wave Two asking students whether they knew about jobs relating to each STEM subject. Figure two below displays a selection of these findings. Table eight in the appendices shows these results.

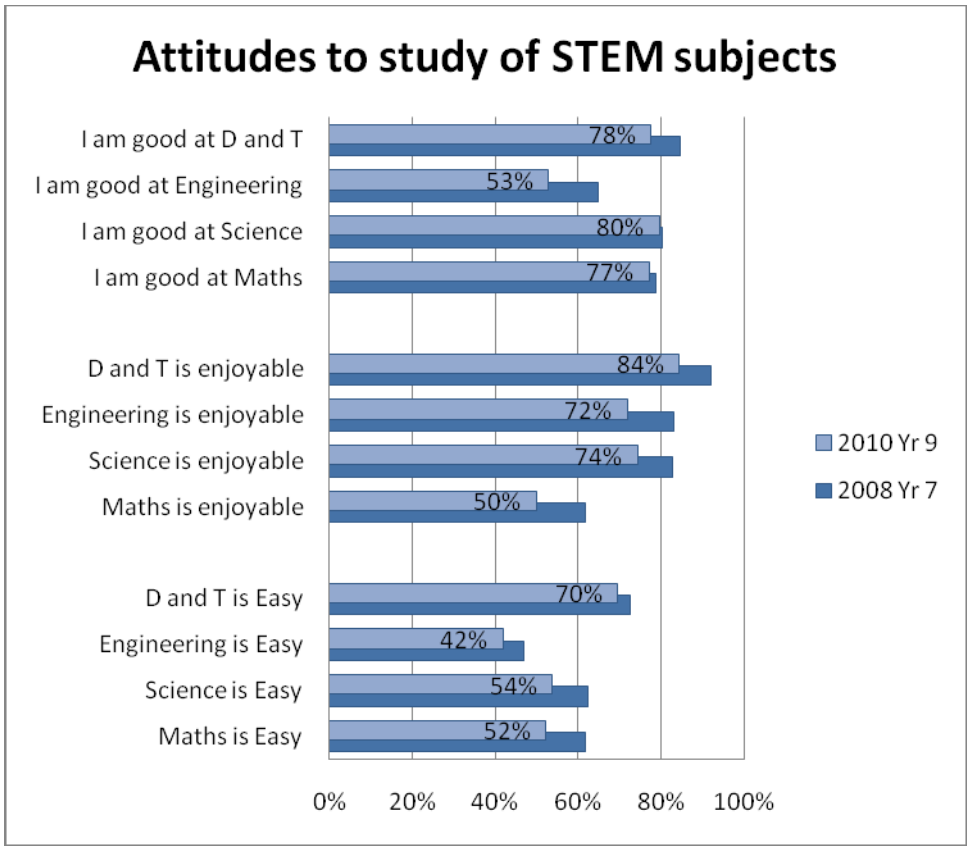


Figure 2 Attitudes to studying STEM subjects, Wave One Y7, Wave Two, Y9.
Source: Appendix 1, Table eight.

Wave Two results showed that design and technology was thought to be the easiest subject with a 70% response, compared with only 42% that thought engineering was easy. Around a half of all students think that both maths and science are easy. Fewer students think that any of the STEM subjects are easy in year nine compared with year seven.

Similarly, the proportion of students who say that they enjoy STEM subjects falls between year seven and year nine for all subjects. Design and technology is the most enjoyable at year seven and at year nine, while maths is least likely to be called enjoyable.

Correlations between ease, enjoyment and being good at the subject are not straightforward. In the case of science for example, 80% said they thought they were good at it, 74% said it was enjoyable while only 54% said it was easy – so the study of science appears to be popular in spite of its perceived difficulty. On the other hand, while only 52% think maths is easy, and only 50% think it is enjoyable, 77% think that they are good at it. The enjoyment of maths is the area which saw most erosion in results with a 12 percentage point difference between the responses from year seven in 2008 and year nine in 2010.

Students were also asked to say whether they thought STEM subjects were important for adult life, and needed to get a good job in the future. Wave Two data showed that STEM subjects differed in their ratings of importance and ‘need.’ Maths was most likely to be rated as most important and needed for a good job with more than nine in ten saying that this was the case. Science was also rated highly in these terms with 86% agreeing it was important, and 72% that it was needed for a good job. Please see Table eight for these results.

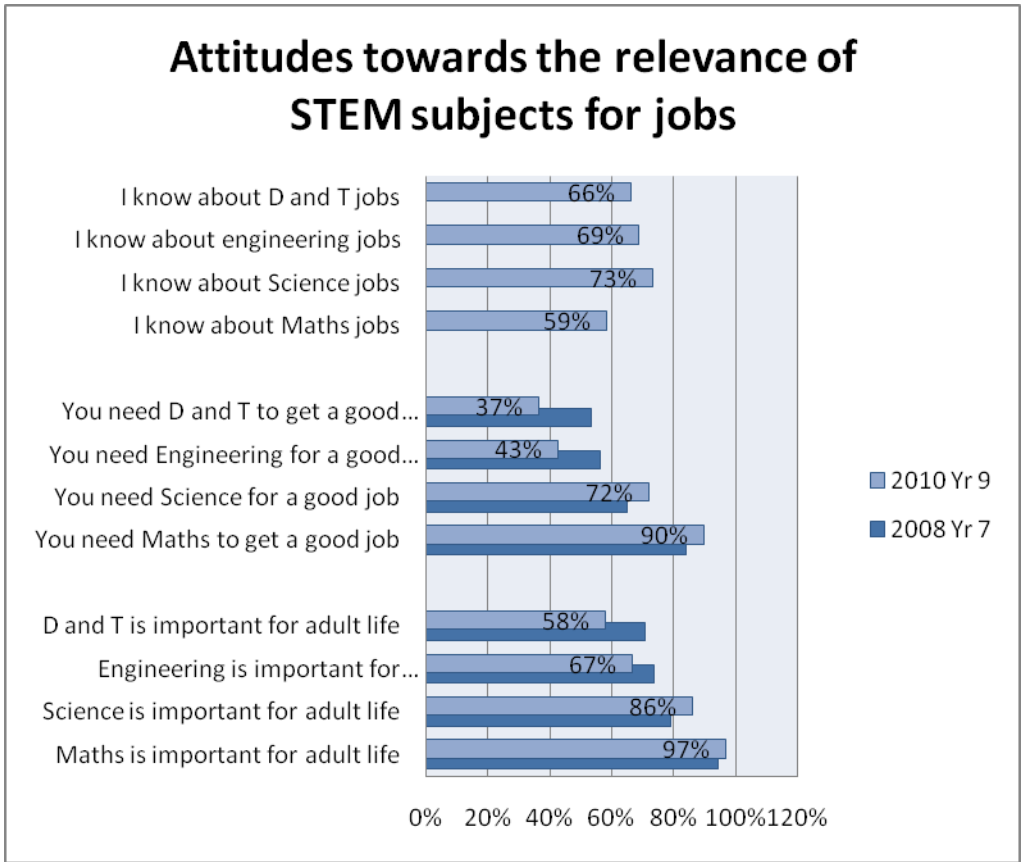


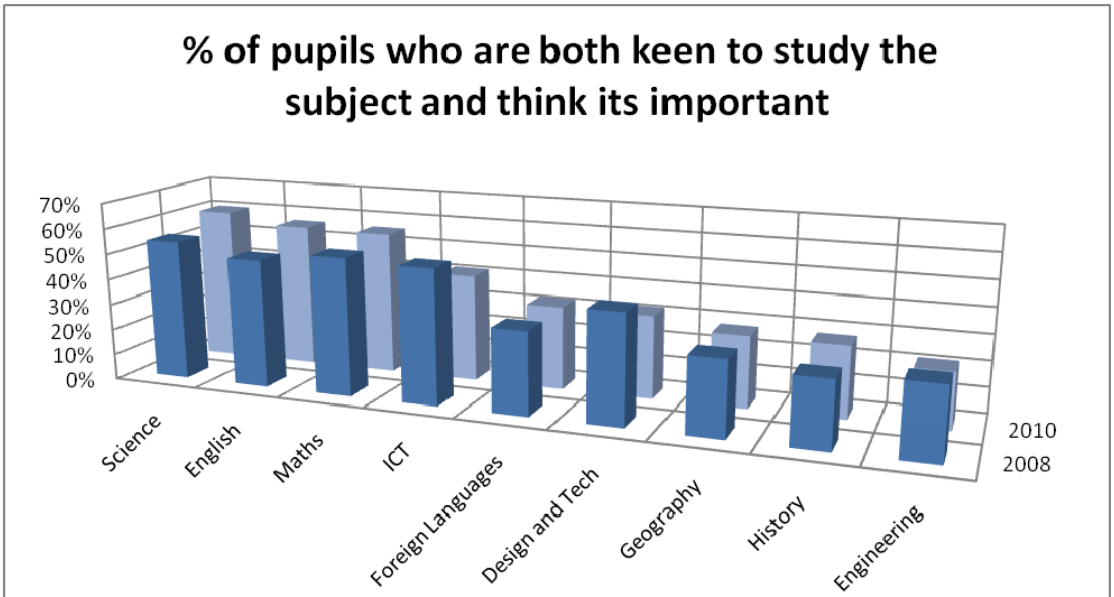
Figure 3: Attitudes towards the relevance of STEM subjects for jobs and adult life, Wave One Y7, Wave Two, Y9.
Source: Appendix 1, Table eight.

Figure 3 shows that there was an increase between Wave One and two in the proportion reporting that science and maths were both important and needed for the future. This was slightly greater for science (seven percentage points for both measures) than for maths (two and six percentage points respectively). In the case of engineering and design and technology these proportions fell. In the case of engineering this proportion fell by seven percentage points (important) and 13 percentage points (needed). For design and technology they fell by 13 percentage points (important) and 16 percentage points (needed). While the perceived increase of the importance and need of science and maths between the waves might be encouraging, there has not been a corresponding increase in perceptions of importance for engineering and design and technology. These results are shown in Table eight.

Interestingly, students say that they think they know about STEM jobs with nearly three quarters of year nine students saying they know about science jobs, while 59% report that they know about maths jobs. Perhaps in reflecting an increasing sense of realism between the year seven responses and the year nine responses, a lower proportion of students reported that they knew about STEM jobs from year nine than from year seven (see Table eight).

The research also addressed the extent to which students were 'keen' to study STEM subjects *and* thought they were important, and these results are shown below in figure 4. As such, this question addressed the interaction between subject preference and perceived importance. In Wave Two, the result for science was again

the highest at 60%, for maths this was 55%, 26% for design and technology and 20% for engineering. In comparing results for each wave, differences between the STEM subjects were found. Namely while the proportions reporting 'keen and important' for science slightly increased, the proportion fell for other STEM subjects. For design and technology, this was from 51% to 26%. In the case of engineering this was from 34% to 20% and for ICT from 57% to 36%. Therefore, the ratings for design and technology, engineering and IT fell by large amounts in comparison to the slight movements found in the cases of science and maths. Please see Table nine.



	Science	English	Maths	ICT	Foreign Languages	Design and Tech	Geography	History	Engineering
2008	55%	50%	53%	52%	32%	42%	29%	26%	28%
2010	60%	56%	56%	42%	32%	32%	28%	28%	22%

Figure 4: the % of students who are keen to study the subject and think it is important, Wave One and Wave Two.
Source: Appendix 1, Table nine.

Thus, students were more likely to rate science as 'keen and important' relative to other STEM subjects. Students were also far more likely to rate STEM subjects as 'important' rather than say they were both keen *and* important to study them.

Design and technology was the subject most likely to be rated both as easy and enjoyable. There is no simple correlation between thinking a subject is easy, enjoyable and that their self-perception of being good at it, for example science is popular despite only half thinking that it is easy. The proportions reporting ease and enjoyment of STEM subjects has fallen between the waves, but enjoyment of maths declined by twelve percentage points between the two years – the most significant decline of all the subjects.
While the proportion of students saying that maths and science are important and needed has risen, these proportions have fallen for engineering and design and technology. Self reporting of knowledge of STEM jobs has declined between year seven and year nine for all STEM subject jobs except for science.

2.3 STEM activities involvement

The question 'have you been involved in any of the following in Key Stage 3' was asked of students for STEM clubs or similar school activities, STEM related school trips or visits, and talks from people about what their jobs were like. These questions were only asked of students in Wave Two of the research, and so the analysis addresses the two year groups who responded in Wave Two, before discussing results by school STEM specialism, gender and ethnic group. These results are presented in Tables 10 to 12 in the appendices.

Table C shows how over one third (37%) of the respondents had experience of talks from people about what their jobs or subjects were like, and science related school trips or visits were also experienced by 37% of students. Trips relating to other STEM subjects were experienced by far fewer - or one in ten - students. Science clubs were the most likely of the STEM clubs to have been experienced, although less than one in five reported experience of these. In the case of the other STEM related clubs, around one in ten reported experience of these.

Table C: Participation in enhancement and enrichment activities

	2010 Year 7	2010 Year 9	2010 total
N	**723-734**	**1476-1461**	**2208-2221**
A science club or similar school activity	18.0%	19.2%	18.8%
A design or technology club or similar school activity	12.1%	10.8%	11.2%
An engineering club or similar school activity	4.3%	7.2%	6.2%
A maths club or similar school activity	13.3%	13.0%	13.0%
A science related school trip or visit	21.6%	45.2%	37.3%
A design or technology related school trip or visit	5.1%	9.0%	7.7%
An engineering related school trip or visit	4.8%	9.2%	7.7%
A maths related school trip or visit	7.0%	15.1%	12.4%
Talks from people with different jobs about what their jobs are like?	28.6%	41.9%	37.4%
Talks from people about different subjects or projects?	29.5%	41.0%	37.1%

Source: Appendix 1, Table 10.

As might be expected the proportions of students reporting involvement in these activities generally increased between year seven and year nine. However, these increases were not large and involvement in all activities remained below 50% for students in year nine. For students in year nine, talks from people about their subjects or jobs (41-42%) and science related school trips or visits (45%) were the

most prevalent experience. Generally fewer than one in five year nines reported experience of other activities. That the proportions of students reporting experience of talks from people about jobs or subjects and school trips is still well below 50% in year nine suggests that there is further work to be done to embed career related learning into the curriculum.

Analysis by STEM school specialism (see Table 11) revealed that students from the three schools with no STEM specialism reported greater involvement in these activities. This was especially so in the case of talks from people about careers or subjects, where 44% of students from schools without a STEM specialism reported experience of these compared with 36% of students from schools with a STEM specialist status..

Gender differences to this question (presented in Table 12) were not large when the responses were analysed, and are presented in Table nine. However, females were likely to report greater involvement in science related school trips or visits than males (41% compared with 32%) and were slightly more likely than males to report having had a maths or related school trip or visit (14% compared with 10%). Males were slightly more likely to be involved in science, maths or engineering related clubs.

Responses to this question were also analysed by ethnicity, and differences between the 'Non White-British' and 'White British' response was stark (please see Table 12). Firstly, Non White British take up of clubs and activities outstripped White British consumption of such activities by up to 13% in the case of maths clubs. When involvement in school trips was analysed however, differences between these groups was less apparent. It was only for engineering and maths related trips where non White-British student involvement was greater than their White British counterparts. Here, the differences were smaller 4% (engineering) and 8% (maths). Non White British students were again more likely to report experience of talks from people about what their subjects or jobs were like (42% compared to 36% White British).

There is significant enrichment and enhancement activity in schools for science, with 45% of year nines reporting going on a science related trip and a 19% of respondents saying they can participate in a science club or similar. Maths clubs are taken up by 13% of respondents. Visits out of school for technology, engineering and maths are much less common. However, some schools are inviting people in to talk about their jobs and about particular projects as 37% of students at key stage 3 can recall this activity. Take up of STEM clubs, activities, trips and talks, generally increases between year seven and year nine. Non White British students report a greater involvement in all STEM enrichment and enhancement activities than White British students. Pupils from the three non-STEM specialist schools report greater participation in enhancement and enrichment activities than those from the majority STEM specialist schools.

2.4 Importance of options choices

Both waves of the research addressed student perceptions of the importance of options choices. The results to this question are presented in Table 13. Students across both waves of the research overwhelmingly agreed that their options choices were either 'important' or 'very important', with over 9 in ten students saying that this was the case.

Between Wave One and Two there was a marginal increase of 3 percentage points responding with 'important' or 'very important'. Results from Wave One of the research also showed a 3 percentage point greater tendency for year nines to comment that they were 'important.' This – albeit small - increase shows year nine students as being slightly more likely than year sevens to perceive their options choices as important.

2.5 Awareness and intentions of undertaking qualifications

Students in Wave Two of the research were asked about their awareness and intentions of taking qualifications including, A-Levels, Apprenticeships, Diplomas and Vocational Qualifications. Along with overall findings year group and gender analyses are presented in Tables 14 to 17.

Overall in Wave Two, 91% of students were aware of A Levels, the highest level of awareness for any of the qualifications. For Apprenticeships this figure was 64%, Diplomas 63%, and in the case of Vocational Qualifications this was just 29%. A Levels were therefore the most well known of the qualifications among the students. Figure 5 below shows these results.

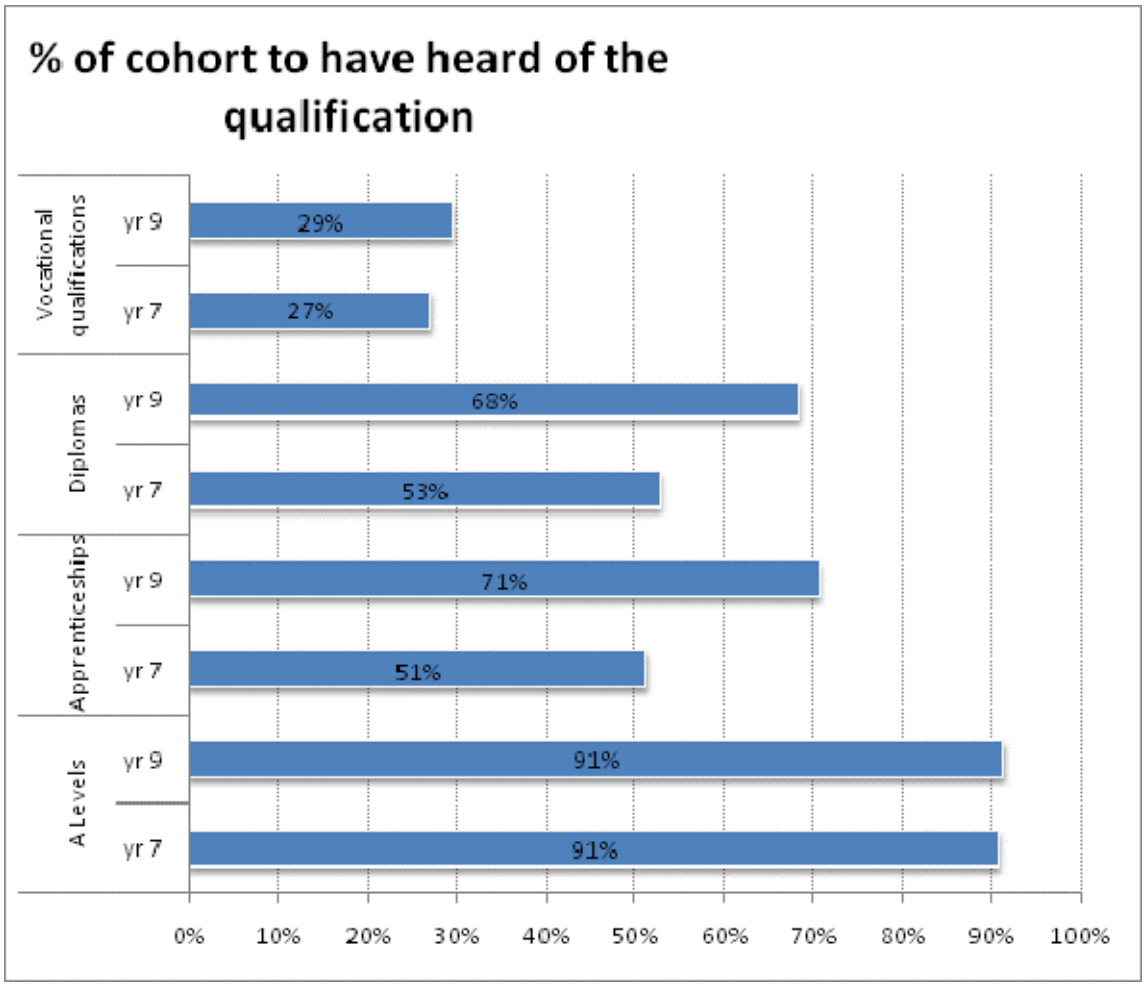


Figure 5: Percentage of each year group who have heard of the qualification, Wave Two.
Source: Appendix 1, Table 14.

When spilt by year seven and nine, the responses to the survey show that awareness of all of the qualifications was higher in year nine. This was with the exception of A levels where over 9 in 10 students reported awareness regardless of their year group. Over 50% reported awareness of Diplomas and Apprenticeships in year seven, and among year nines awareness of Diplomas was at 69%, and Apprenticeships 72%. As expected therefore, awareness rose for some qualifications. Awareness of Vocational Qualifications remained low regardless of year group, with less than three in 10 reportedly aware of these qualifications across both years.

Students were also asked if they were considering the same qualifications as a course of study. Figure 6 below displays these results.

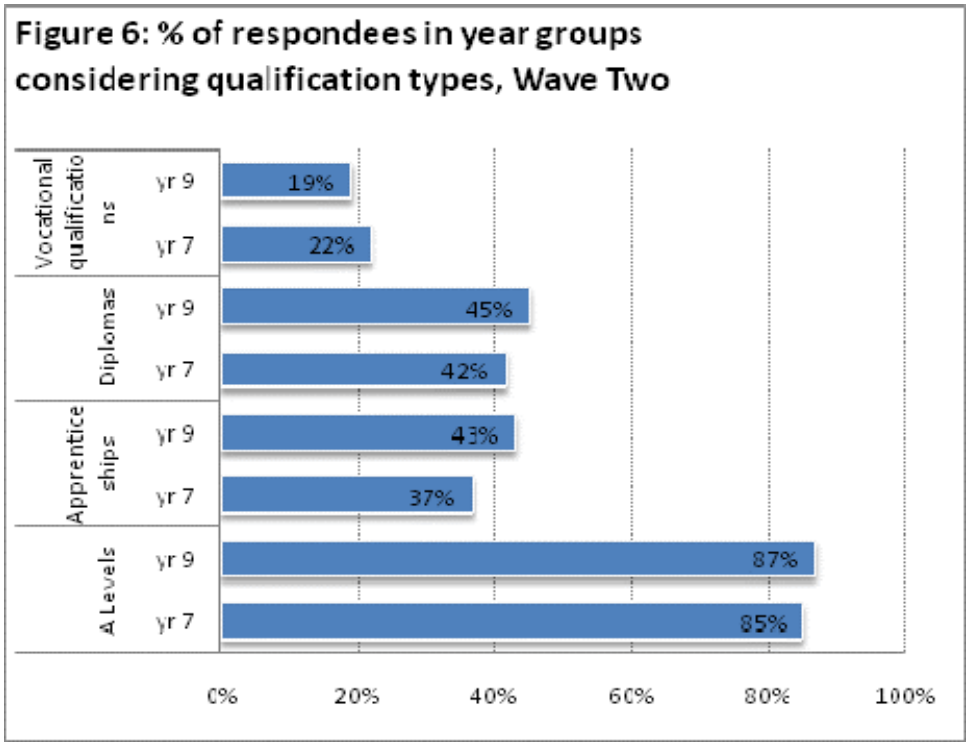


Figure 6: Percentage of each year group who are considering taking the qualification type, Wave Two.
Source: Appendix 1, Table 15.

Again, A Levels were the most likely to be considered. Overall, 86% of students were considering A Levels relative to 45% in the case of Diplomas, 41% for Apprenticeships, and just 21% for Vocational Qualifications. Similar to the case for awareness, it is the most traditional route that students are reportedly considering. In the case of Diplomas and Apprenticeships when the proportion 'considering' the various routes was analysed, this was much lower than the proportion 'aware' of them. Therefore although students have been informed of these options they are not likely to be considering them as serious alternatives to A Levels.

When a year group analysis was carried out, there were slightly increased proportions considering Diplomas, Apprenticeships and A Levels in year nine than year seven. Year nine consideration levels of each qualification was at 86% for A Levels, 46% for Diplomas, 44% for Apprenticeships, and 20% for Vocational

Qualifications. In the case of year seven, these proportions were 86% for A Levels, 43% for Diplomas, 38% for Apprenticeships, and 23% for Vocational Qualifications. There was a lower proportion of year nines than sevens considering Vocational Qualifications. (Please see figure 6 for these results)

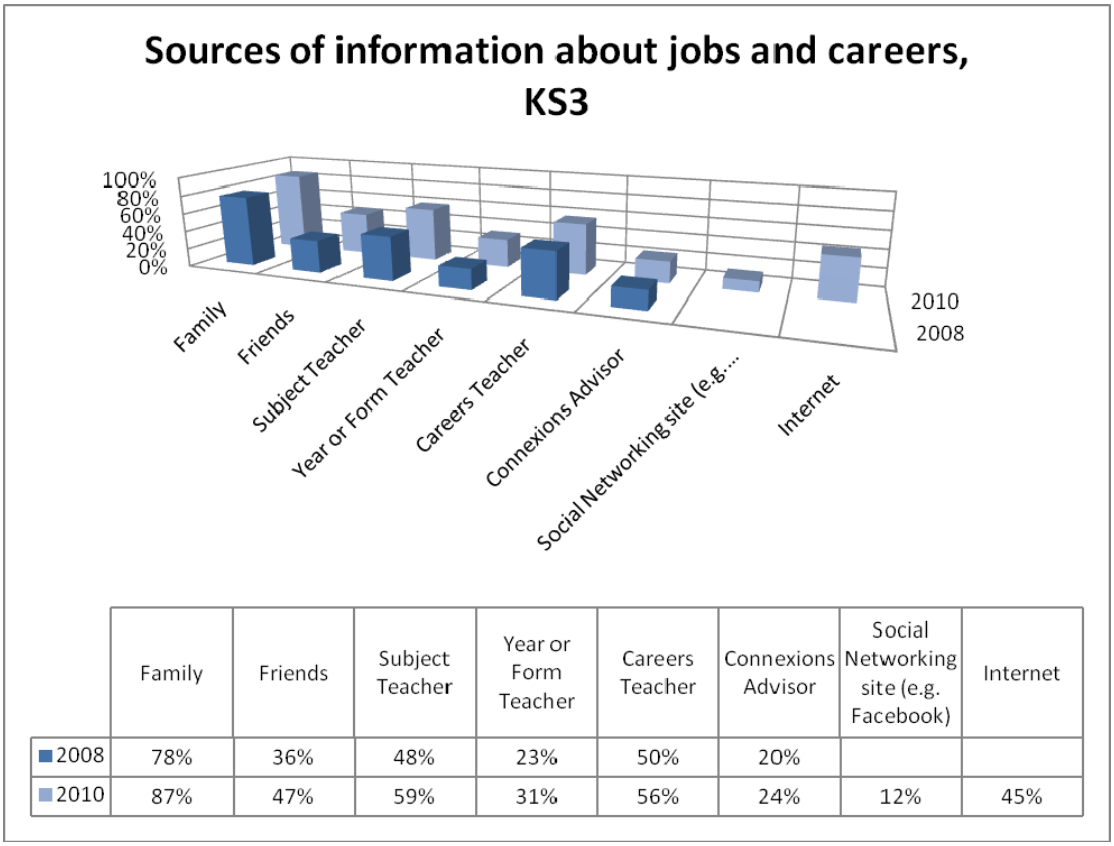
Responses to qualification awareness and consideration were analysed by gender. Results of this analysis showed girls less likely to be aware of Apprenticeships or Vocational Qualifications than boys. Awareness of these qualifications was around ten percentage points lower for girls in each case (see Table 16). Awareness of Diplomas and A Levels was at around the same proportion for each gender.

When qualification consideration was investigated by gender, girls were slightly more likely than boys to report considering A Levels or Diplomas (however these differences were small at around two to three percentage points). Girls were less likely to be considering Apprenticeships (11 percentage points lower than boys) or Vocational Qualifications (six percentage points lower). Please see Table 17 for these results.

The majority of students are aware of Diplomas, Apprenticeships and A Levels. Fewer than a third are aware of Vocational Qualifications. Most students are considering more traditional A Levels as options. Gender comparisons reveal girls to be less likely than boys to be aware of Apprenticeships or Vocational Qualifications and less likely to be considering them.

2.6 Sources of information about jobs and careers

Students across both waves of the research were asked who or what sources they would consult for information about jobs or careers generally (see Table 18). This was a multiple response question, allowing students to tick all options if applicable. In Wave Two of the research extra options were added following analysis of ‘other’ responses following Wave One. These extra options included ‘the internet’ and ‘social networking (e.g. Facebook).’



	Family	Friends	Subject Teacher	Year or Form Teacher	Careers Teacher	Connexions Advisor	Social Networking site (e.g. Facebook)	Internet
2008	78%	36%	48%	23%	50%	20%		
2010	87%	47%	59%	31%	56%	24%	12%	45%

Figure 7: Sources of information about jobs and careers, Wave Two
Source: Appendix 1: Table 18

In Wave Two, family was by far the most likely course of information to be consulted with 87% of respondents selecting this source. Subject teachers (59%) and careers teachers (56%) were also chosen by over half of respondents – the latter category was presented as an option even though most schools do not have a teacher with that designation. 47% of respondents said they would consult their friends, and the internet was chosen as a source of information by 45% of respondents. 31% of respondents chose their year or form teachers as a source of information. Fewer than one in three (or 28%) chose connexions advisors as a source.

The internet (added as an option in Wave Two) was a popular source of careers information (see figure 7). Nearly half of all students said they would consult the internet for information on jobs and careers. Social networking was the least likely source for careers information, with just over one in ten reportedly using social media for this purpose. Thus, while the internet and websites appear to have been embraced by some young people for jobs and careers information, social networking appears to play a limited role for students at Key Stage 3 in this respect.

As figure 7 also shows, the proportions selecting all sources of advice rose between the waves of research. Increases were most notable for sources outside friends and family. These included connexions advisers (increased from 12% to 29%) and for careers teachers (from 43% to 59%). In the case of subject teachers the proportion in Wave One was 44% and in Wave Two 61%. For year or form teachers the Wave One proportion was 19% and in Wave Two 30%. While the proportions reporting that they would consult their family and friends in Wave One were at 77% (family) and 35% (friends), these were at 87% and 48% in Wave Two. While these increases could be argued to reflect a natural increase in career thinking between years seven and nine, such increases were not apparent between the years within each wave.

When the responses of those who selected 'social networks' and 'internet' as sources of information were analysed there was little difference in the way they consulted other sources (such as family) for information about jobs and careers. However the two groups reported different levels of awareness of qualifications. Those reporting that they used the internet were slightly more likely to be aware of Diplomas, Apprenticeships and A Levels than those who reported that they used social networking for job and career information. Gender and ethnicity analyses were also conducted into the question of 'sources of information', although no significant differences were found.

Students at key stage 3 remain most likely to ask their families for information about jobs and careers. 59% in 2010 said they would ask a subject teacher, an increase from 48% in 2008. All of the sources of information were more likely to be consulted for information about jobs and careers among year nines in Wave Two than year sevens in the first wave of the research. The Internet is considered a source of information about jobs and careers by over 50% of year nines, although social networking is not considered to be a source of information on careers for the majority of key stage 3 students.

2.7 Desire to find out about and consideration of STEM careers

Students across both waves were asked whether or not they would consider working in a science, technology, engineering or maths related career and then whether they would like to find out more about such careers (see Tables 19 and 20).

When Wave Two responses were analysed, the majority of students said they wished to find out more about careers in science, technology and maths. In the case of science the proportion wanting to find out more information was 56%. For technology this was slightly lower at 54%. For maths this was 52%. The proportion was the lowest for engineering at 33%.

The majority of students in Wave Two also said they would consider careers in science, technology and maths. In the case of science the proportion considering this area was 60%. For technology this was slightly lower at 58%. For maths this was 53%. The proportion was again the lowest for engineering at 41%.

Both interest in and consideration of science and maths rose between the waves of research. However these proportions fell for engineering and technology. Interest in and consideration of science (increases of eight and four percentage points respectively) rose by a greater proportion than maths (increases of five and three percentage points respectively). Interest in, and consideration of, engineering fell by at five percentage points for both measures and seven percentage points for both measures in the case of technology (see Tables 19 and 20).

84% of respondents in Wave Two were interested in finding out information about any of the STEM careers. This is shown in Table 21 in the appendices. This was comparable to Wave One in which the same proportion were 'career curious.' However 82% of year nines in Wave Two were interested in finding out information about any STEM career. This was a slight decrease on the 84% of year sevens in Wave One who wanted more information.

When Wave Two results for 'career curiousness' were analysed by gender and ethnic group. 88% of males were curious about one of the STEM careers areas, relative to 81% of females. When the results were analysed by ethnicity, 88% of Non White British were curious about STEM careers, relative to 83% of white British. Therefore males, and Non White British tended to report being more interested in finding out about more STEM careers.

The majority of students said they both wanted to find out more about and would consider careers in science, technology and maths areas. Less than 50% had the same interest in engineering. Science was the career area most likely to be chosen by students of all the STEM areas. Interest in, and consideration of, science and maths rose between the waves of research. The proportion interested in and considering engineering and technology fell across the two waves. Males and Non White British groups were most interested in finding out about more STEM careers.

2.8 Intentions of working in specific industries

As well as general interest in learning about STEM careers and consideration of careers within STEM, student attitudes towards specific vocational areas were also addressed (see Table 24, and figure 25 for a summary of these results).

As in Wave One, industry choice in Wave Two was found to reflect subject enjoyment. The career area most likely to be chosen for a possible future route was design arts and crafts (42%). Performing arts (40%), and leisure, sport and tourism (37%) and education and training (37%) were also very popular. These were also the most popular choices in Wave One of the research with the exception of Education and training.

Careers least likely to be chosen in Wave Two included retail sales and customer service (11%), languages, information and culture (13%) and manufacturing and production (15%). These were also the least popular sectors in Wave One of the research. Therefore, careers most and least likely to be chosen as possible future routes remained largely consistent across both waves.

Interest in media, print and publishing (32% to 34%), the healthcare industries (28% to 34%), and science, maths and statistics (28% to 32%) rose between the two waves of research. However, because increases in the popularity of these industries were also apparent between year groups within Wave One, this could simply be a result of students learning about alternative career options as they get older.

The proportions of students reporting interest in STEM industries did not generally increase between the waves of research, with the exception of science, mathematics and statistics. The overall popularity of areas such as IT and computing and engineering actually declined. In the case of IT this decline was from 37% to 32%. For engineering this was from 27% to 23%.

Gender disparities typically associated with STEM industries became more apparent between the two waves. Boys were more likely to choose science, mathematics and statistics in Wave Two, this proportion rising from 30% to 37%. For girls, this proportion rose but to a lesser extent, from 27% to 31%. In the case of computers

and IT, girls were less likely to choose this career area in Wave Two compared with Wave One. Similarly with environment, plants and animals, the proportion of girls choosing this area fell from 41% to 30%. With engineering the proportion of females considering this career area dropped from 11% to 8%.

Instead, girls in Wave Two were far more likely to consider design, arts and crafts than boys. Girls were also more likely to consider education and training and performing arts. Boys were far more likely than girls to select leisure, sports and tourism and security and armed forces. Such gender differences were also stark in Wave One of the research and clearly persisted into Wave Two.

White British and Non White British student responses to this question were also compared. These findings are presented in Table 26 and figure 27 of the appendices,. The career area most likely to be chosen by students of a Non White background in Wave Two was healthcare, with 44% choosing this subject. Other popular subjects were the same for each group, namely design, arts and crafts, and performing arts. Non White British groups were more also likely to consider working in healthcare, administration, business and office work and financial services than White British groups. White British groups tended to be more likely to choose building and construction, environment plants and animals, security and armed forces and leisure, sport and tourism.

The same question was also analysed by free school meals status, and the findings are presented in Table 28 and figure 29. Those reporting that they were in receipt of free school meals were more likely to say ‘yes’ to several career areas. These included healthcare, administration business and office work, financial services, personal and other services, social work and counselling services and retail sales and customer services.

Specific career areas most and least chosen overall remained the same between the two waves of research. Design arts and crafts, performing arts, and leisure, sport and tourism were the areas most likely to be chosen. Education and training was rated much more highly in Wave Two of the research. Some career areas associated with STEM were less likely to be chosen in Wave Two compared with Wave One. Career choice remains highly gendered and gender disparities often widened between Wave One and Two.

3 Appendices

3.1 Tables of results 2008 and 2010

Q. (2010 survey) Below is a list of 14 school subjects. Which 3 subjects do you enjoy the best at school? Put a 1 against your favourite, a 2 for your 2nd favourite and a 3 for your 3rd favourite. Which three subjects do you enjoy the least at school? In order, put 14 against your least favourite, and 13 and 12 against your 2 other least favourite subjects*

TABLE 1
2010 Most and least favoured subjects*- Wave Two: year seven and year nine response

Wave Two findings	#1	#2	#3	#12	#13	#14
N	**2337**	**2327**	**2288**	**2053**	**2049**	**2026**
English (n=1121)	16.8%	19.5%	20.6%	12.5%	8.2%	9.3%
Maths (n=1209)	9.1%	16.8%	17.3%	13.8%	14.0%	17.4%
Science (n=1152)	17.0%	20.0%	20.6%	11.5%	8.7%	9.5%
History (n-1050)	10.7%	15.4%	19.1%	13.2%	14.3%	13.2%
Geography (n=1012)	5.3%	7.3%	11.0%	22.4%	23.1%	16.1%
Engineering (n=418)	9.1%	9.1%	13.2%	15.3%	16.5%	12.4%
PSHE (n=773)	3.9%	5.2%	8.4%	22.8%	22.0%	17.9%
PE/Sport (n=1491)	45.7%	16.9%	13.4%	5.7%	5.2%	7.0%
D and T (n=1084)	19.2%	27.7%	24.2%	6.9%	6.0%	4.7%
ICT (n=866)	10.4%	20.0%	20.1%	12.5%	8.9%	9.8%
Art (n=1397)	32.7%	26.8%	18.6%	5.2%	4.8%	3.9%
Music (n=998)	11.0%	15.6%	13.9%	18.4%	14.9%	11.2%
Foreign Languages (1205)	3.7%	5.8%	8.3%	18.7%	24.1%	29.1%
Religious Education (1173)	1.6%	3.2%	3.9%	22.1%	29.0%	30.1%

**Some students also marked the above subjects as their 4th to 11th popular. Therefore percentages displayed for each subject do not add to 100.*

TABLE 2
2010 – Most and least favoured subjects*- Wave Two: Year seven response

Year 7	#1	#2	#3	#12	#13	#14
N	**774**	**795**	**777**	**696**	**681**	**677**
English (n=354)	8.4%	8.1%	9.3%	6.5%	4.8%	4.3%
Maths (n=397)	4.8%	8.9%	8.4%	8.6%	7.9%	9.2%
Science (n=394)	9.7%	12.3%	12.1%	6.3%	3.4%	3.0%
History (n=325)	3.0%	5.8%	6.7%	6.2%	6.6%	10.3%
Geography (n=357)	1.2%	1.1%	3.6%	12.9%	14.5%	11.5%
Engineering (n=123)	2.1%	1.6%	2.1%	2.9%	1.9%	1.3%
PSHE (n=276)	1.4%	2.0%	2.6%	9.3%	10.0%	7.4%
PE/Sport (n=476)	27.9%	11.1%	9.1%	4.0%	3.4%	3.5%
Design and technology (n=384)	11.2%	13.7%	13.4%	2.4%	3.4%	2.1%
ICT (n=295)	3.9%	9.8%	8.9%	4.0%	2.3%	4.3%
Art (n=455)	20.7%	15.8%	12.5%	3.0%	1.9%	1.9%
Music (n=302)	4.0%	5.5%	7.3%	8.6%	6.3%	4.0%
Foreign language (n=367)	1.3%	2.9%	2.8%	12.1%	15.9%	14.3%
Religious education (n=417)	0.5%	1.3%	1.3%	13.1%	17.6%	22.9%

*Some students also marked the above subjects as their 4th to 11th popular.
Therefore percentages displayed for each subject do not add to 100.

TABLE 3
2010 – Most and least favoured subjects*- Wave Two: Year nine response

Year 9	#1	#2	#3	#12	#13	#14
N	**1563**	**1532**	**1511**	**1357**	**1368**	**1349**
English (n=767)	7.9%	10.1%	10.5%	7.0%	4.3%	5.6%
Maths (n=812)	4.7%	8.6%	9.5%	7.9%	8.4%	11.0%
Science (n=758)	7.7%	8.6%	9.5%	6.6%	5.6%	6.7%
History (n=725)	5.7%	7.6%	9.9%	7.1%	7.7%	5.1%
Geography (n=655)	2.9%	4.2%	5.5%	10.1%	9.9%	6.3%
Engineering (n=295)	1.4%	1.6%	2.6%	3.2%	4.1%	3.2%
PSHE (n=497)	1.2%	1.6%	3.0%	8.2%	7.5%	6.5%
PE/Sport (n=1018)	29.8%	10.7%	8.5%	4.2%	4.0%	6.0%
Design and technology (n=700)	7.7%	12.5%	10.5%	4.3%	3.1%	2.7%
ICT (n=571)	3.8%	6.2%	6.9%	5.9%	4.5%	4.2%
Art (n=942)	19.0%	16.2%	10.8%	3.8%	3.9%	3.0%
Music (n=686)	5.0%	7.2%	5.3%	9.0%	7.6%	6.2%
Foreign language (n=838)	2.2%	3.1%	5.2%	10.4%	13.4%	18.8%
Religious education (n=756)	1.0%	1.8%	2.4%	12.4%	16.1%	14.7%

*Some students also marked the above subjects as their 4th to 11th popular.
Therefore percentages displayed for each subject do not add to 100.

TABLE 4
2010 – Most and least favoured subjects*- Males: year seven and year nine response

Males	#1	#2	#3	#12	#13	#14
N	**989**	**962**	**963**	**840**	**837**	**830**
English (n=427)	4.2%	6.0%	7.2%	7.3%	7.3%	6.5%
Maths (n=501)	4.2%	9.6%	11.3%	7.9%	6.5%	7.2%
Science (n=491)	7.9%	13.1%	11.6%	4.8%	2.7%	4.2%
History (n=422)	4.8%	8.2%	8.3%	5.8%	6.1%	5.4%
Geography (n=397)	2.5%	3.0%	5.0%	10.4%	9.2%	7.2%
Engineering (n=198)	3.2%	3.1%	3.9%	2.5%	1.8%	1.1%
PSHE (n=328)	0.5%	1.5%	2.0%	10.1%	8.6%	7.7%
PE/Sport (n=715)	45.7%	10.5%	7.6%	2.3%	2.7%	2.3%
Design and technology (n=470)	9.3%	15.3%	10.4%	3.3%	2.7%	2.5%
ICT (n=394)	5.5%	8.5%	8.6%	4.2%	3.0%	4.8%
Art (n=505)	6.5%	12.8%	13.3%	5.1%	5.0%	4.7%
Music (n=418)	3.8%	5.9%	5.3%	9.8%	8.1%	5.5%
Foreign language (n=543)	1.4%	1.8%	3.8%	12.1%	17.1%	21.3%
Religious education (n=525)	0.4%	0.7%	1.7%	14.5%	19.1%	19.4%

*Some students also marked the above subjects as their 4th to 11th popular.
Therefore percentages displayed for each subject do not add to 100.

TABLE 5
2010 – Most and least favoured subjects*- Females: Year seven and Year nine response

Females	#1	#2	#3	#12	#13	#14
N	**1343**	**1361**	**1320**	**1210**	**1209**	**1193**
English (n=692)	10.7%	11.9%	12.3%	6.5%	2.6%	4.1%
Maths (n=705)	4.8%	8.2%	7.7%	8.3%	9.3%	12.7%
Science (n=659)	8.9%	7.6%	9.3%	7.6%	6.5%	6.2%
History (n=625)	4.9%	6.1%	9.1%	7.4%	8.0%	7.9%
Geography (n=612)	2.2%	3.3%	4.6%	11.5%	12.9%	8.6%
Engineering (n=221)	0.4%	0.6%	1.3%	3.6%	4.5%	3.6%
PSHE (n=441)	1.9%	1.9%	3.5%	7.4%	7.9%	6.1%
PE/Sport (n=770)	16.8%	11.0%	9.7%	5.5%	4.5%	7.1%
Design and technology (n=614)	8.6%	11.4%	12.3%	4.0%	3.5%	2.5%
ICT (n=473)	2.7%	6.6%	6.9%	6.1%	4.4%	3.8%
Art (n=889)	29.4%	18.3%	9.9%	2.4%	2.1%	1.3%
Music (n=568)	5.4%	7.1%	6.4%	8.2%	6.5%	5.5%
Foreign language (n=659)	2.2%	3.8%	4.8%	10.2%	12.2%	14.6%
Religious education (n=646)	1.1%	2.2%	2.3%	11.3%	15.0%	16.0%

*Some students also marked the above subjects as their 4th to 11th popular.
Therefore percentages displayed for each subject do not add to 100.

TABLE 6
Q. (2008 Survey) Please tick three subjects that you enjoy the best /least at school

Subject popularity	2008 Year 7	2008 Year 9
N	**1986**	**1714**
Top 3	PE (57.2%)	PE (51.3%)
	Art (38.4%)	Art (39%)
	Design & technology (36.2%)	Design & technology (30.1%)
Bottom 3	Maths (38.1%)	Foreign language (43.5%)
	History (38.1%)	Maths (35.1%)
	Geography (38%)	History (28.3%)

STEM subject popularity
TABLE 7
Q. Please tick three subjects that you enjoy the best at school
% enjoyed the best – STEM subjects

STEM subject popularity	2008 Year 7	2008 Year 9
N	**1986**	**1714**
Science	30.2%	24.4%
Engineering	7.5%	5.5%
Design and technology	36.2%	30.1%
ICT	26.9%	22.2%
Maths	19.1%	17.7%

TABLE 8
Q. What do you think about maths/ science/ engineering/ design and technology as a subject? [Proportion who said 'strongly agree/ agree']

% agreeing or strongly agreeing with the statements… (from those who expressed an opinion)	**2008 Year 7**	**2008 Year 9**	**2008 Overall**	**2010 Year 7**	**2010 Year 9**	**2010 overall**
N	**2012**	**1764**	**3776**	**596**	**1407**	**2003**
Maths is easy	61.8%	50.6%	56.4%	65.6%	52.3%	56.3%
Maths is enjoyable	61.7%	47.8%	55.2%	61.8%	50.0%	53.8%
Maths is important for adult life	94.5%	94.9%	94.7%	95.6%	97.0%	96.6%
You need maths to get a good job	83.9%	87.0%	85.4	91.2%	89.7%	90.1%
I am good at maths	78.8%	72.4%	75.7	85.7%	77.1%	80.0%
I know about maths jobs*				67.6%	58.5%	61.4%
Science is easy	62.5%	53.8%	58.4%	61.5%	53.8%	56.3%
Science is enjoyable	82.9%	71.2%	77.4%	88.1%	74.4%	79.2%
Science is important for adult life	78.9%	79.4%	79.1%	84.3%	86.0%	85.6%
You need science for a good job	64.9%	68.5%	66.7%	71.9%	72.1%	72.0%
I am good at science	80.3%	74.6%	77.6%	86.1%	79.6%	81.7%
I know about science jobs*				66.4%	73.4%	71.2%
Engineering is easy	46.8%	44.2%	45.5%	44.9%	41.9%	42.8%
Engineering is enjoyable	83.2%	68.8%	75.9%	85.3%	71.8%	76.0%
Engineering is important for adult life	73.8%	58.9%	66.5%	87.0%	66.5%	72.8%

I am good at engineering	64.8%	55.2%	59.8%	61.8%	52.9%	55.7%
You need engineering for a good job	56.1%	41.7%	48.9%	61.8%	42.5%	48.5%
I know about engineering jobs*				76.0%	68.9%	71.0%
D and T is easy	72.5%	68.9%	70.8%	73.4%	69.6%	70.7%
D and T is enjoyable	92.1%	81.3%	87.0%	92.4%	84.4%	87.1%
D and T is important for adult life	70.6%	55.4%	63.2%	70.6%	58.0%	62.2%
You need D and T to get a good job	53.3%	40.4%	46.9%	51.4%	36.5%	41.2%
I am good at D and T	84.7%	76.0%	80.5%	86.7%	77.6%	80.7%
I know about D and T jobs*				70.0%	66.2%	67.4%

**questions not asked as part of Wave One survey*

TABLE 9
Q. How do you feel about studying….
% 'Keen and think it is important'

STEM subject popularity	2008 Year 7	2008 Year 9	2008 overall	2010 Year 7	2010 Year 9	2010 overall
N	**1956**	**1766**	**3722**	**619**	**1388**	**2007**
English	47.8%	52.0%	49.8%	56.3%	56.2%	56.3%
Maths	53.6%	53.2%	53.4%	57.3%	55.2%	55.9%
Science	55.9%	53.0%	54.5%	61.4%	59.5%	60.2%
History	25.5%	26.1%	25.7%	29.3%	26.7%	27.6%
Geography	29.9%	28.0%	29.0%	27.2%	28.1%	27.8%
Engineering	34.2%	20.6%	27.7%	26.8%	19.6%	21.8%
Foreign languages	36.6%	27.3%	32.2%	32.5%	32.3%	32.4%
Design and tech	51.1%	32.5%	42.3%	43.6%	26.3%	32.1%
ICT	56.9%	46.8%	52.2%	47.8%	38.5%	41.6%
PSHE				28.8%	22.8%	24.8%

TABLE 10

Q. Have you been involved in any of the following in Key Stage 3?

% 'Yes'	2010 Year 7	2010 Year 9	2010 overall
N	**725**	**1461**	**2186**
A science club or similar school activity	18.0%	19.2%	18.8%
A design or technology club or similar school activity	12.1%	10.8%	11.2%
An engineering club or similar school activity	4.3%	7.2%	6.2%
A maths club or similar school activity	13.3%	13.0%	13.0%
A science related school trip or visit	21.6%	45.2%	37.3%
A design or technology related school trip or visit	5.1%	9.0%	7.7%
An engineering related school trip or visit	4.8%	9.2%	7.7%
A maths related school trip or visit	7.0%	15.1%	12.4%
Talks from people with different jobs about what their jobs are like?	28.6%	41.9%	37.4%
Talks from people about different subjects or projects?	29.5%	41.0%	37.1%

TABLE 11
Q. Have you been involved in any of the following in Key Stage 3?
By STEM specialist status

% 'Yes'	Non STEM school	STEM school	Significant level***
N	**330***	**1910**	
A science club or similar school activity	24.8%	17.7%	**x^2=9.708, df=2, p=0.008**
A design or technology club or similar school activity	10.7%	11.3%	x^2=0.122, df=2, p=0.941
An engineering club or similar school activity	8.5%	5.8%	x^2=5.553, df=2, p=0.63
A maths club or similar school activity	11.2%	13.3%	x^2=5.299, df=2, p=0.71
A science related school trip or visit	40.2%	36.8%	x^2=4.876, df=2, p=0.87
A design or technology related school trip or visit	7.0%	7.8%	x^2=6.126, df=2, p=0.47
An engineering related school trip or visit	8.4%	7.6%	x^2=2.936, df=2, p=0.230
A maths related school trip or visit	13.8%	12.1%	x^2=4.155, df=2, p=0.125
Talks from people with different jobs about what their jobs are like?	44.0%	36.2%	**x^2=12.920, df=2, p=0.002**
Talks from people about different subjects or projects?	43.6%	36.0%	**x^2=9.945, df=2, p=0.007**

** Just 3 schools submitting in 2010 have non STEM status. Brigshaw, Penketh and Redmoor schools*

***Answers by 'STEM specialism' were analysed using the chi-squared test. Where differences were found to be significant these are marked in bold.*

TABLE 12

Q. Have you been involved in any of the following in Key Stage 3?
By gender and ethnicity

	Male	Female	Percentage point difference	White British	Non White British	Percentage point difference
N	**922**	**1157**	**%**	**1781**	**459**	**%**
A science club or similar school activity	20.0%	17.8%	2.2%	17.1%	25.1%	-8%
A design or technology club or similar school activity	11.2%	11.2%	0%	9.3%	18.9%	-9.6%
An engineering club or similar school activity	7.7%	5.0%	2.7%	5.6%	8.4%	-2.8%
A maths club or similar school activity	13.3%	12.9%	0.4%	10.4%	23.2%	-12.8%
A science related school trip or visit	31.8%	41.1%	-9.3%	36.7%	39.5%	-2.8%
A design or technology related school trip or visit	9.7%	6.3%	3.4%	7.8%	7.3%	0.5%
An engineering related school trip or visit	8.6%	7.0%	1.6%	6.9%	11.0%	-4.1%
A maths related school trip or visit	9.7%	14.3%	-4.6%	10.6%	19.3%	-8.7%
Talks from people with different jobs about what their jobs are like?	36.2%	38.2%	-2%	35.6%	44.3%	-8.7%
Talks from people about different subjects or projects?	36.9%	37.1%	-0.2%	36.0%	41.2%	-5.2%

TABLE 13
Q. How important do you feel your option choices in Year 9 are?

%	2008 Year 7	2008 Year 9	2008 overall	2010 Year 7	2010 Year 9	2010 overall
N	**2102**	**1869**	**3971**	**577**	**1189**	**1766**
Very important	66.1%	65.8%	66.0%	63.1%	65.0%	64.4%
Important	27.3%	30.5%	28.8%	28.6%	31.1%	30.3%
Not important	0.6%	1.4%	1.0%	0.7%	1.1%	1.0%
Don't know	5.9%	2.3%	4.2%	7.6%	2.8%	4.4%

TABLE 14
Q. Are you aware of any of the following qualifications?
% 'Yes'

%	2010 Year 7	2010 Year 9	2010 overall
N	**727**	**1474**	**2201**
Diplomas	53.0%	68.8%	63.6%
Apprenticeships	51.6%	71.6%	64.9%
Vocational Qualifications	27.6%	29.9%	29.2%
'A' Levels	91.5%	91.8%	91.7%

TABLE 15
Q. Have you thought of doing any of the following qualifications?
% 'Yes'

%	2010 Year 7	2010 Year 9	2010 overall
N	**705**	**1436**	**2141**
Diplomas	42.7%	46.1%	44.9%
Apprenticeships	37.6%	44.2%	42.0%
Vocational Qualifications	22.8%	19.6%	20.7%
'A' Levels	85.9%	88.4%	87.6%

TABLE 16
Q. Are you aware of any of the following qualifications?
% 'Yes' By Gender

%	2010 Male	2010 Female
N	**929**	**1267**
Diplomas	63.5%	63.7%
Apprenticeships	70.3%	60.6%
Vocational Qualifications	34.2%	25.3%
'A' Levels	91.8%	91.5%

TABLE 17
Q. Have you thought of doing any of the following qualifications?
% 'Yes' By gender

%	2010 Male	2010 Female
N	**900**	**1236**
Diplomas	43.2%	46.1%
Apprenticeships	48.0%	37.4%
Vocational Qualifications	24.4%	18.0%
'A' Levels	86.6%	88.3%

TABLE 18
Q. Who would you ask for information about jobs or careers?
% selected

%	2008 Year 7	2008 Year 9	2008 overall	2010 Year 7	2010 Year 9	2010 overall
N	**268**	**539**	**807**	**66**	**197**	**263**
Family	79.0%	76.5%	77.8%	87.5%	86.5%	86.8%
Friends	35.9%	35.8%	35.8%	45.0%	47.9%	46.9%
Subject Teacher	45.3%	51.7%	48.3%	56.0%	60.8%	59.2%
Year or Form Teacher	20.0%	25.3%	22.5%	33.5%	30.4%	31.4%
Careers Teacher	43.9%	56.1%	49.6%	50.5%	59.1%	56.3%
Connexions Advisor	12.7%	28.8%	20.3%	13.7%	28.6%	23.7%
Social Networking site (e.g. Facebook)				8.9%	13.2%	11.8%
Internet				33.5%	51.0%	45.2%

TABLE 19
Q. In the future, would you consider a career that was...

%	2008 Year 7	2008 Year 9	2008 Overall	201 Year 7	2010 Year 9	2010 overall
TOTALS	**1798**	**1649**	**3447**	**664**	**1389**	**2053**
Science	49.8%	53.3%	51.5%	52.9%	57.7%	56.1%
Maths	47.2%	52.6%	49.7%	53.4%	52.4%	52.7%
Engineering	37.2%	38.6%	37.9%	33.4%	32.3%	32.7%
Technology	59.6%	58.9%	59.3%	58.1%	52.5%	54.3%

TABLE 20
Q. Would you like to find out more about careers in science, maths, engineering or technology?

%	2008 Year 7	2008 Year 9	2008 Overall	2010 Year 7	2010 Year 9	2010 overall
TOTALS	**1764**	**1620**	**3403**	**682**	**1414**	**2096**
Science	55.9%	56.1%	56.0%	61.3%	60.0%	60.4%
Maths	49.0%	51.3%	50.1%	55.0%	52.2%	53.1%
Engineering	45.3%	45.5%	45.4%	40.9%	40.7%	40.8%
Technology	62.2%	59.0%	60.7%	62.0%	55.1%	57.5%

TABLE 21 Percentage 'Career curious' or those interested in finding out about any of the STEM career areas.

% career curious	2008 (Wave One)	2010 (Wave Two)
Year seven	84%	88%
Year nine	83%	82%

TABLE 22 Percentage career curious' or those interested in finding out about any of the STEM career areas. By Gender and ethnicity

% Career Curious (2010)	
White British	**Non White British**
83%	88%
Male	Female
88%	81%

TABLE 23
Q. Might you work in any of the following types of industry?

	2008 overall	2010 overall	Percentage point difference
Totals	**3883**	**2179**	**%**
Design, Arts and Crafts	42.5%	42.5%	0%
Performing Arts	41.2%	39.8%	-1.4%
Leisure, Sport and Tourism	40.5%	37.1%	-3.4%
Education and Training	31.2%	36%	4.8%
Media, Print and Publishing	32.4%	34.2%	1.8%
Science Mathematics and Statistics	28.2%	32.2%	4%
Healthcare	28.4%	32%	3.6%
Security and Armed Forces	32.4%	31.8%	-0.6%
Computers and IT	36.6%	31.5%	-5.1%
Marketing and Advertising	30.0%	30.5%	0.5%
Catering and Hospitality	26.9%	28.7%	1.8%
Environment, Animals and Plants	30.8%	28.7%	-2.1%
Administration, Business and Office work	26.9%	26.2%	-0.7%
Financial services	26.1%	24.1%	-2.0%
Legal and Political Services	22.1%	23.1%	1.0%
Engineering	27.1%	22.5%	-4.6%
Social Work and Counselling Services	20.4%	21.3%	0.9%
Transport and Logistics	20.1%	19.5%	-0.6%
Building and Construction	22.2%	19.1%	-3.1%
Personal and other services	18.1%	18%	-0.1%
Manufacturing and Production	16.9%	14.9%	-2.0%
Languages, Information and Culture	14.1	12.9	-1.2%
Retail Sales and Customer Service	12.6	10.6	-2.0

TABLE 24
Q. Might you work in any of the following types of industry?

	2008 Year 7			2010 Year 9		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Totals	**967**	**1082**	**2049**	**605**	**845**	**1450**
Design, Arts and Crafts	29.0%	56.2%	43.3%	23.7%	53.8%	41.2%
Education and Training	20.5%	38.4%	29.9%	24.7%	46.0%	37.1%
Performing Arts	31.4%	56.0%	44.4%	24.4%	45.6%	36.7%
Leisure, Sport and Tourism	51.4%	35.3%	42.9%	45.1%	28.6%	35.6%
Media, Print and Publishing	29.3%	27.2%	28.2%	32.3%	37.6%	35.4%
Healthcare	18.4%	35.2%	27.2%	20.8%	44.0%	34.3%
Science Mathematics and Statistics	29.8%	26.6%	28.1%	36.5%	30.7%	33.1%
Security and Armed Forces	46.2%	19.5%	32.2%	46.5%	21.8%	32.2%
Marketing and Advertising	16.6%	36.7%	27.2%	19.6%	40.4%	31.6%
Computers and IT	44.8%	26.6%	35.3%	43.9%	19.7%	29.9%
Catering and Hospitality	22.8%	29.4%	26.3%	20.0%	34.9%	28.7%
Environment, Animals and Plants	23.6%	41.0%	32.8%	22.4%	29.9%	26.7%
Administration, Business and Office work	23.0%	24.9%	24.0%	24.3%	28.1%	26.5%
Financial services	24.6%	21.0%	22.7%	27.7%	22.7%	24.8%
Legal and Political Services	20.3%	18.6%	19.4%	22.5%	25.6%	24.3%
Social Work and Counselling Services	10.0%	22.3%	16.5%	9.2%	34.2%	23.8%
Engineering	43.7%	10.6%	26.2%	42.9%	7.6%	22.4%
Transport and Logistics	27.3%	10.4%	18.4%	28.5%	14.9%	20.6%
Building and Construction	34.2%	6.6%	19.6%	37.1%	7.3%	19.7%
Personal and other services	8.1%	28.2%	18.7%	8.1%	23.9%	17.3%
Manufacturing and Production	18.5%	13.8%	16.0%	21.0%	11.0%	15.2%
Languages, Information and Culture	11.5%	14.7%	13.1%	10.8%	16.1%	13.8%
Retail Sales and Customer Service	10.9%	12.4%	11.7%	10.9%	10.7%	10.8%

Figure 25 – Consideration of work in specific industries

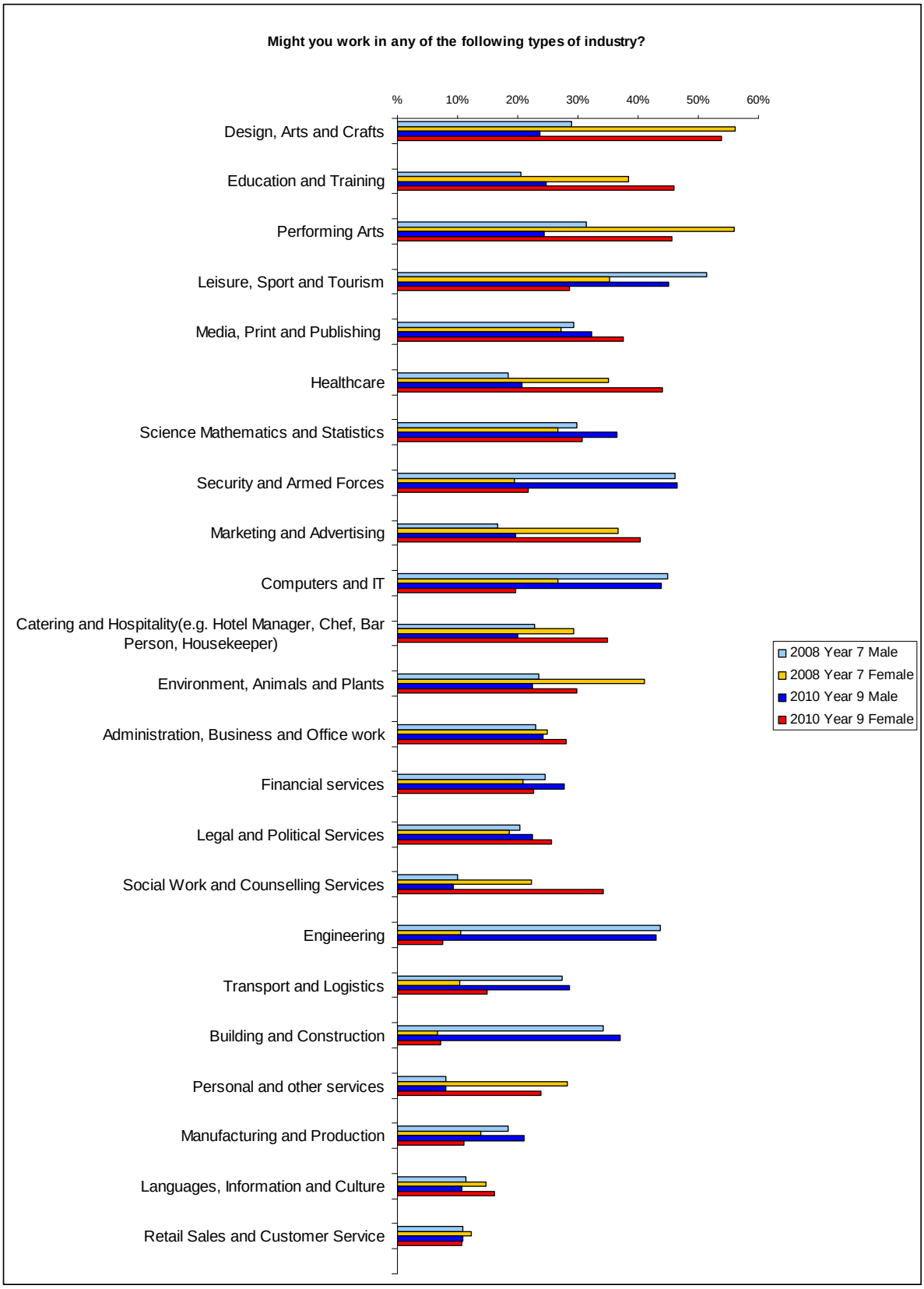


Figure 25a
Consideration of work in different industries (showing differences between year seven and year nine responses)

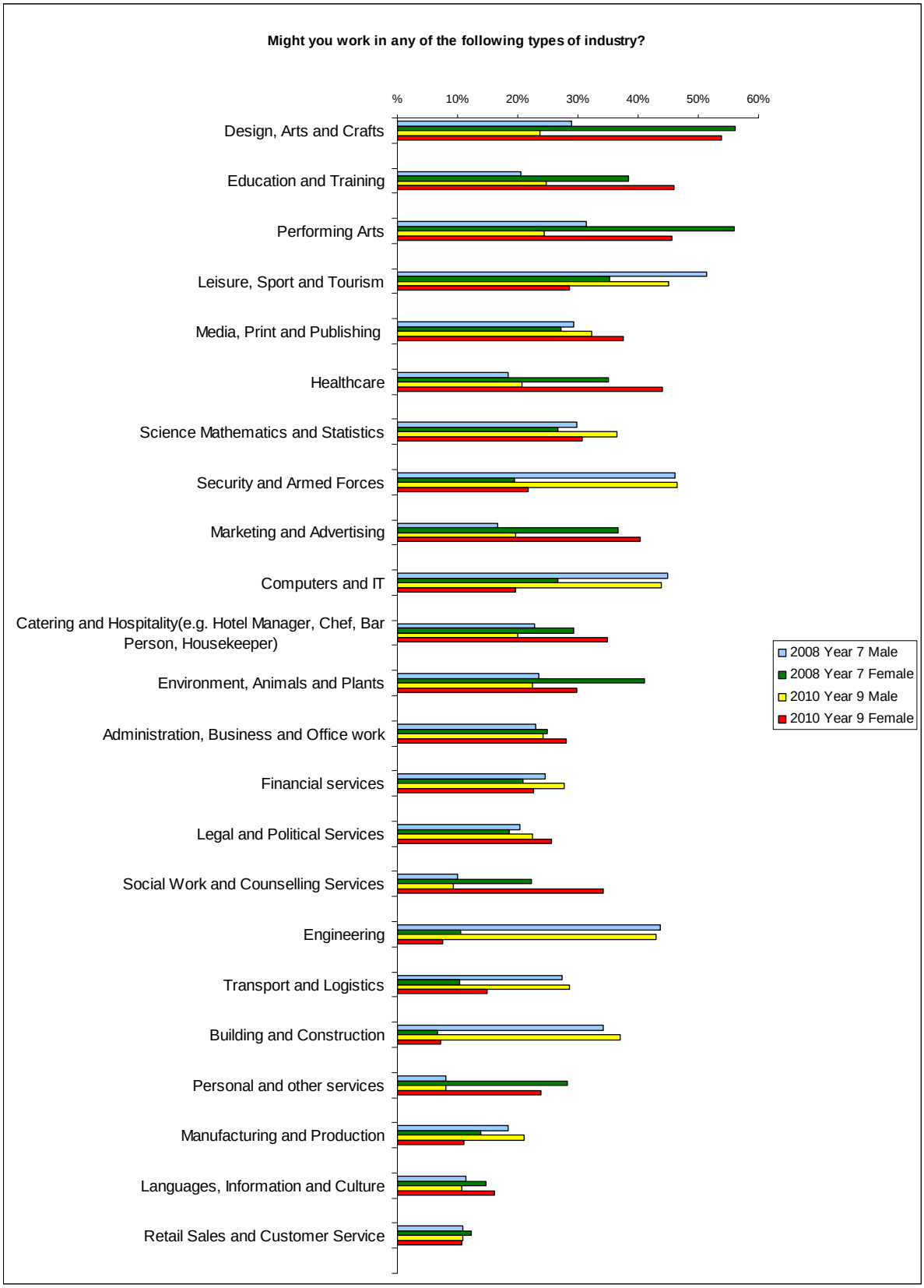


Table 26 Consideration of work in specific industries –by ethnicity

	Ethnicity	
	White British	**Non White British**
Administration, business and office work	23.60%	36.30%
Building and construction	20.7%	13.1%
Catering and hospitality	29.5%	25.9%
Computers and IT	30.5%	35.1%
Design, arts and crafts	42.8%	41.3%
Education and training	35.70%	36.90%
Engineering	22.8%	21.1%
Environment, plants and animals	30.8%	20.5%
Financial services	21.0%	36.5%
Healthcare	29.0%	43.8%
Languages, information and culture	11.70%	17.40%
Legal, and political services	20.8%	32.3%
Leisure sport and tourism	38.1%	33.1%
Manufacturing and production	15.9%	11.1%
Marketing and advertising	30.4%	31.1%
Media, print and publishing	34.60%	32.50%
Performing arts	39.8%	39.6%
Personal and other services	18.4%	16.3%
Retail sales and customer services	9.8%	13.7%
Science mathematics and statistics	31.0%	36.9%
Security and armed forces	33.60%	25.10%
Social work and counselling services	20.3%	25.1%
Transport and logistics	19.7%	18.8%

Figure 27- Consideration of work in specific industries – by ethnicity

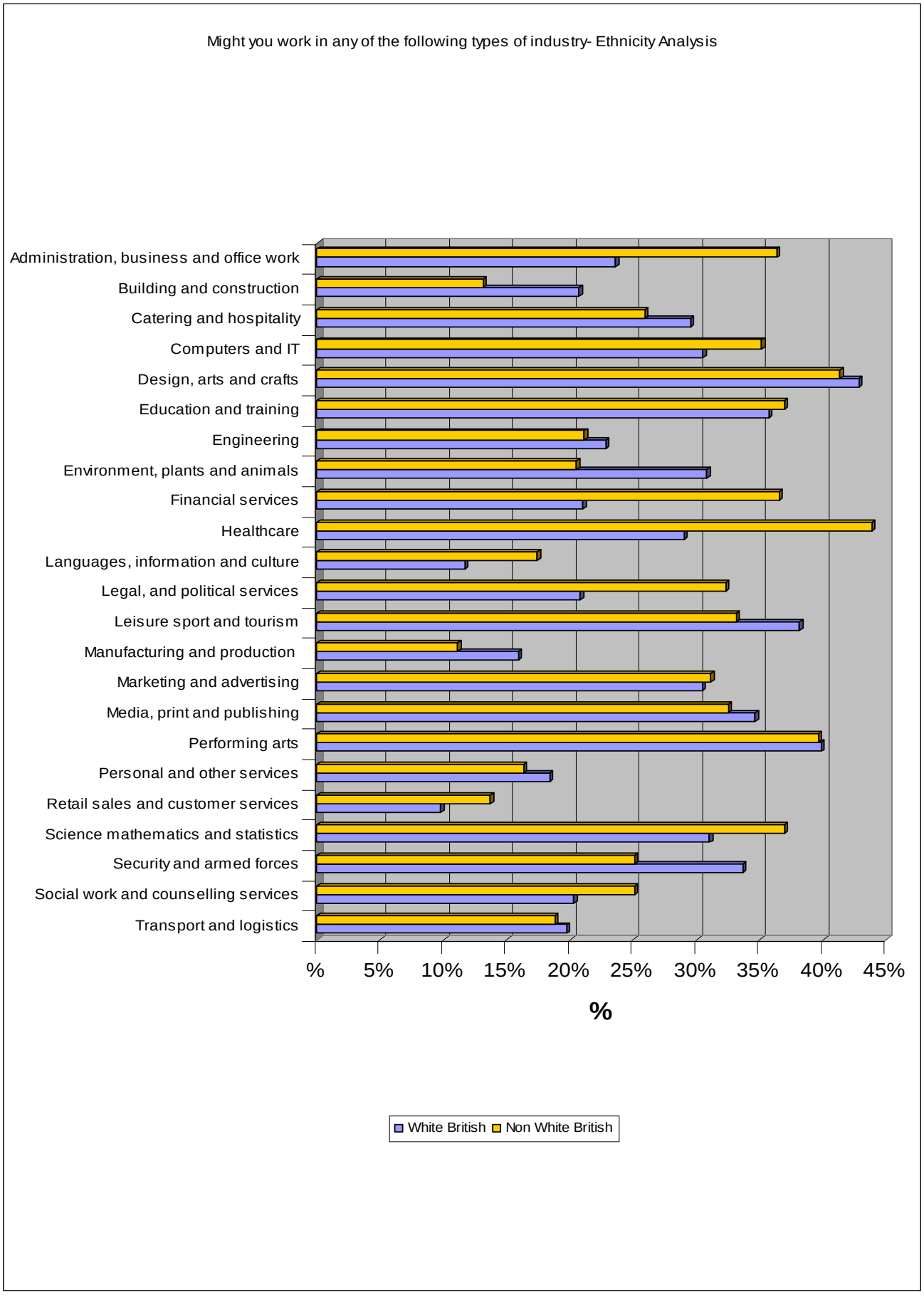
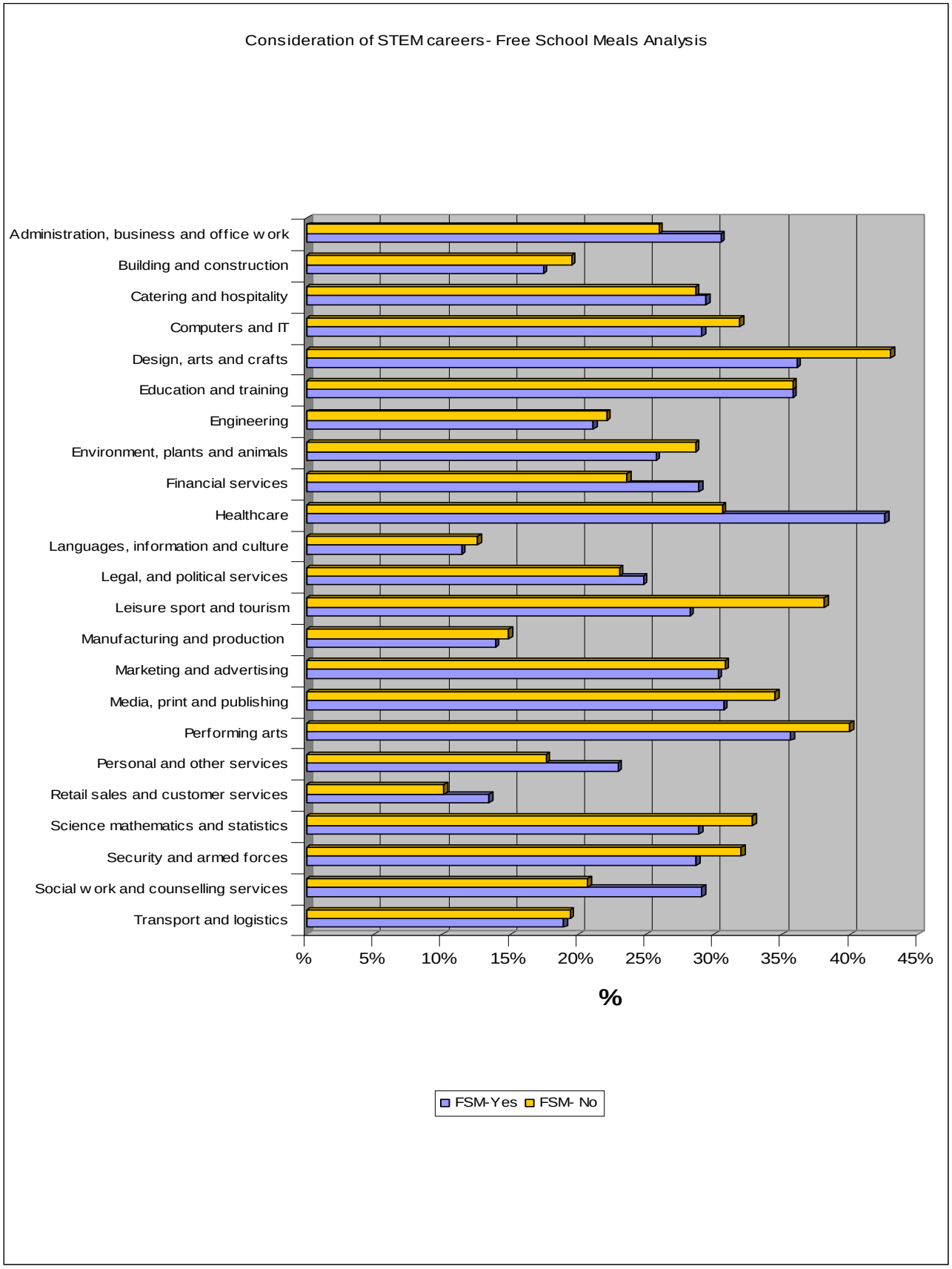


Table 28- Consideration of work in specific industries – by free school meals

	Do you get free school meals?	
	FSM-Yes	**FSM- No**
Administration, business and office work	30.5%	25.9%
Building and construction	17.4%	19.5%
Catering and hospitality	29.4%	28.6%
Computers and IT	29.1%	31.9%
Design, arts and crafts	36.1%	43.0%
Education and training	35.8%	35.8%
Engineering	21.1%	22.1%
Environment, plants and animals	25.7%	28.6%
Financial services	28.9%	23.6%
Healthcare	42.6%	30.6%
Languages, information and culture	11.4%	12.6%
Legal, and political services	24.8%	23.0%
Leisure sport and tourism	28.2%	38.1%
Manufacturing and production	13.9%	14.9%
Marketing and advertising	30.3%	30.8%
Media, print and publishing	30.7%	34.5%
Performing arts	35.6%	40.0%
Personal and other services	22.9%	17.6%
Retail sales and customer services	13.4%	10.1%
Science mathematics and statistics	28.9%	32.8%
Security and armed forces	28.7%	32.0%
Social work and counselling services	29.1%	20.7%
Transport and logistics	18.9%	19.4%

Figure 29- Consideration of work in specific industries – by free school meals



3.2 2008 Questionnaire Returns

30 schools were originally nominated to take part in the Careers Awareness timelines project. A total of 27 schools finally submitted questionnaires at the initial fieldwork wave. (Newminster and King Edward VI are included as one school, with differing names for each year.) Please see the Table below for a summary of the 26 schools included in this report, including the numbers of males and females from each year group.

	Year 7		**Year 9**	
	Male	**Female**	**Male**	**Female**
Abbey College	57	45	36	45
Alsop High School	20	24	28	10
Bradfield School	86	76	80	91
Bridge Learning Campus (formerly Hartcliffe School)	33	40	16	29
Brigshaw High School	29	22	25	29
Challney High School for Girls	0	72	0	60
Claverham Community College	41	45	35	35
Cramlington Learning Village	43	62	26	23
Finchley Catholic High School	59	0	24	0
Framwellgate School Durham	21	19	13	14
Holsworthy Community College	78	56	81	59
King Charles I School	90	86	96	81
Newminster Middle School(year7)/ King Edward VI School (year9)	41	35	35	27
Penketh High School	13	11	14	11
Redmoor High School	39	51	48	41
Richard Rose Central Academy	16	15	17	26
Riddlesdown High School	9	20	30	25
Rugby High School	0	91	0	87
Rushey Mead School	18	20	18	18
St Aidans C of E High School	101	118	30	27
St Peter's High School	35	36	38	32
Stretford High School	61	41	50	41
The Westgate School	20	20	19	20
The Woodroffe School	64	77	81	78
Tom Hood Community Science College	20	25	58	31
Top Valley School & Engineering College	35	35	22	42
Total responses	**1029**	**1142**	**920**	**982**

3.3 2010 Questionnaire Returns

A total of 19 schools submitted a response for inclusion in the analysis in Wave Two of the fieldwork (Chantry Middle school is included below with King Edward VI) A summary of the responses is shown below. Wave Two saw a higher proportion of response from females, and year nines.

Please see the Table below for a summary of the 18 schools included in this report, including the numbers of males and females from each year group.*

School	Year 7			Year 9		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Bradfield School	58	48	106	43	39	82
Bridge Learning Campus	3	8	11	8	10	18
Brigshaw High School	0	0	0	22	21	43
Challney High School	0	43	43	0	110	110
Claverham Community College	14	15	29	51	57	108
Cramlington Learning Village	1	0	1	58	58	116
Framwellgate School	0	0	0	69	74	143
Holsworthy Community College	37	55	92	68	62	130
King Charles I	0	0	0	54	51	105
King Edward VI/ Chantry Middle School	17	23	40	30	29	59
Penketh High School	7	22	29	19	23	42
Redmoor High School	49	62	111	41	62	103
Riddlesdown School	30	45	75	5	11	16
Rugby High School	0	0	0	0	75	75
Rushey Mead School	21	26	47	18	18	36
St Peters High School	0	0	0	28	23	51
The Westgate School	79	71	150	70	101	171
The Woodroffe School	0	0	0	38	36	74
Total Responses	**316**	**418**	**734**	**622**	**860**	**1482**

International Centre for Guidance Studies

iCeGS

iCeGS is an independent, apolitical, not-for-profit Centre which aims to provide creative solutions to issues that are current for practitioners, policy makers and researchers in the areas of career learning and guidance that intersect with lifelong learning, skills development, social inclusion and workforce development.

iCeGS is committed to

- Professionalisation of the careers advice workforce
- High quality careers learning for all young people
- Support for adults that transforms lives through careers advice.

All activities undertaken by iCeGS and its associates will reflect these commitments

UNIVERSITY of DERBY
International Centre for Guidance Studies (iCeGS)

www.derby.ac.uk/icegs