ENCOURAGING FEMALE PARTICIPATION IN TECH EDUCATION AND CAREERS

RESEARCH REPORT
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1 Introduction

The Tech Partnership is keen to boost the number of girls who become involved in tech careers, to help accelerate the flow of talented people from all backgrounds and ensure that companies develop the technology skills they need for the future.

Currently 17% of tech jobs are held by women\(^1\), and this proportion is falling. As more and more industries step into the digital age, technology will fill every part of our economy. The tech industry needs more top talent – if we want this country to keep its competitive edge, it is crucial that women are not left behind.

CHILD WISE was commissioned to consult with a wide range of individuals, including girls aged 9-18, parents, teachers and women in industry, to discover what can be done to make this industry more appealing to young women, and help increase the number who choose to become involved in tech careers. The project was funded by three company sponsors – BT, Hewlett Packard Enterprises and Tata Consultancy Services.

The research comprised of three stages;

1) Knowledge building – speaking with women already pursuing a career in technology, to find out what inspired them and what they think the biggest priorities concerning recruitment in the future are. We interviewed female trailblazers and female tech specialists\(^2\), to find out what made an impact on them. As a result of these interviews we were able to develop some ideas and potential solutions to explore further among key audiences.

2) Evaluating the potential solutions – this stage focused on introducing and gathering in-depth feedback about the potential solutions, as well as exploring other ways in which girls could be inspired to consider a career in technology. We interviewed girls aged 10-18, parents and teachers, to find out what they thought of the proposed ideas and how they thought these could be implemented.

3) Measuring the potential solutions – for this final stage of research we measured the incidence of views relating to technology, and evaluated the proposed solutions in terms of their popularity among a larger sample of girls, parents and teachers.

The final outcome is a prioritised set of solutions that have been thoroughly tested and evaluated – providing The Tech Partnership with a wealth of information about what needs to be done in order to boost the number of girls and young women who choose to pursue a career in technology.

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\(^1\) Tech Partnership Women in IT Scorecard 2015

\(^2\) We defined Tech Trailblazers as women with up to 3 years industry experience, and Tech Specialists as women with more than 10 years experience in the industry
2 Methodology and Sample

2.1 Stage 1: Knowledge Building

Women in industry were offered the opportunity to contribute to the project, by sharing their experiences and motivations for pursuing a career in technology. They were asked to complete a short pre-qualification survey via email, with a selection then invited to take part in an in-depth interview to discuss their experiences in more detail.

- 27 women in industry volunteered to take part, including 18 tech specialists (10+ years experience) and 9 trailblazers (up to 3 years experience).
- 8 women were selected to take part (4 tech specialists and 4 trailblazers), including representatives from BT, Hewlett Packard Enterprises, Tata Consultancy Services, Balfour Beatty, Global and New Look. The women were chosen to reflect a range of different views and experiences.
- Interviews were conducted by experienced researchers, Jenny Ehren and Karen Wigley.
- Each interview lasted 30-45 minutes – with conversations audio recorded and transcribed.
- A 60 minute interview was also carried out with research psychologist, Dr Amanda Gummer, a leading authority on child development, to help gain a better understanding of gender differences in relation to education, careers and technology.
- Fieldwork took place during w/c 11 April 2016.
2.2 Stage 2: Evaluating Potential Solutions

2.2.1 Girls aged 10-18

Five discussion groups were carried out among girls aged 10 to 18 (school years 6 to 12), from schools selected from the CHILDWISE panel.

- A total of 34 girls took part, with between 6 and 8 girls in each group
- We asked to speak to girls who enjoy and are good at the following lessons – Design and Technology, ICT / Computing, Science and / or Maths
- Groups were conducted in urban and rural areas, and from more and less deprived catchments, to ensure a diverse mix of backgrounds and experiences
- Four different locations were used – Birmingham, London, Suffolk and Norfolk
- Groups were moderated by Jenny Ehren – an experienced child researcher, holding an enhanced DBS certificate
- Groups lasted approximately one hour. Discussions were audio recorded and transcribed
- Parental consent was obtained via the schools
- Research took place during w/c 9, 16 May 2016

2.2.2 Parents of Girls aged 9-18

Two discussion groups were carried out among parents of girls aged 9 to 18.

- Group 1 – parents of girls aged 9-13
- Group 2 – parents of girls aged 14-18
- A total of 16 parents took part, including 12 Mums and 4 Dads
- Recruitment focused on those with daughters who were in the broadest sense potential candidates for a career in technology e.g. interested in any of science, maths, ICT / Computing, design and technology plus making / designing things, games and jigsaws, gadgets etc. They were also non-rejecters of university
- We recruited a mix of parents with different occupations, representing a range of socio demographic groups (BC1C2D)
- Groups took place in Watford (North West London) and were moderated by Karen Wigley – an experienced researcher
- Each group lasted 90 minutes, with discussions audio recorded and transcribed
- Fieldwork took place on 12 May 2016

2.2.3 Teachers involved in STEM / ICT

Seven telephone interviews were conducted with teachers involved in STEM / ICT, via schools from the CHILDWISE panel.

- 7 teachers took part, two from primary schools and the rest from secondary schools
- Their involvement in STEM / ICT was varied. Job titles included ICT Co-ordinator, Head of Computer Science and ICT, Director of Design Technology and Engineering, Head of Physics and, STEM Co-ordinator
- Two of the teachers we spoke to were female, five were male
- Interviews were conducted by Sarah Dudde, an experienced researcher
- Each interview lasted 30-45 minutes, with discussions audio recorded and transcribed
- Fieldwork took place during w/c 9, 16 May 2016
2.3 Stage 3: Measuring Potential Solutions

The Tech Partnership was keen to measure the incidence of views and opinions towards the potential solutions, to help inform the launch of a major new My Tech Future campaign to address the problem.

2.3.1 Parents of 9-18 year old girls

An online survey with parents of girls aged 9 to 18 using a proprietary online panel of adults.

- **A total of 505 parents took part in the survey**
- Parents were asked 22 questions relating to the proposed solutions, and technology careers
- The sample was divided between mums and dads to allow comparison of their view
- The sample was regionally representative across the UK
- Research took place from Friday 10th June to Wednesday 15th June 2016

2.3.2 9-18 year old girls

An online survey with girls aged 9 to 18 using a proprietary online panel of adults.

- **A total of 505 girls took part in the survey**
- Girls were asked 23 questions relating to the proposed solutions, and technology careers
- These girls were the daughters of the parents taking part in the online survey
- Parents answered their questions first, and were then available to help the youngest girls complete their surveys
- The sample was spread across three age groups – 9 to 11, 12 to 14, and 15 to 18
- The sample was regionally representative across Great Britain
- Research took place from Friday 10th June to Wednesday 15th June 2016

2.3.3 Teachers of ICT / STEM subjects

An online survey with teachers involved in STEM / ICT subjects scripted and hosted by CHILDWISE.

- **A total of 248 teachers took part in the survey**
- Teachers were asked 22 questions relating to the proposed solutions, and technology careers
- Teachers were approached by email using three sources
  - An emailer to approximately 10,000 STEM / ICT teachers by a third party provider of school and teacher contact information
  - An emailer to approximately 25,000 schools from a schools data disk
  - An emailer to approximately 600 ‘warm’ schools from the CHILDWISE schools panel
- Our final sample was spread evenly across male and female teachers, skewed towards secondary schools (as per the other elements of the research)
- Research took place from Wednesday 8th June to Tuesday 21st June 2016
3 Executive Summary

Knowledge Building Research with Women in Industry

A career in technology was not an obvious first choice for any of the women we interviewed. They all considered pursuing alternative options first – including accountancy and nursing. These industries are regarded as familiar and traditional, and are widely endorsed by family and teachers. Technology on the other hand, is still regarded as a non-traditional career – typically because it is fast-paced and constantly changing.

Some of the women we spoke to completed degrees in different disciplines, and went on to discover technology at a later stage, but for others, questions and doubts about their career choices set in at an earlier age, often as they approached higher education (age 16-18). In some cases these doubts resulted in course changes and last minute switches to technology. These late decisions typically required great courage and determination – characteristics that were evident in many of the women we interviewed.

Technology is all-pervasive nowadays, yet many of the women we spoke to agree that those without links to the industry still struggle to appreciate the vast range of career opportunities available within it. Several described their own first experiences of technology at school, with comments often referring to boring and uninspiring ICT lessons. Yet these women now realise that the industry has so much more to offer. Some feel there is too much focus on mainstream roles, and instead girls need to be shown that there is a wide range of very rewarding and creative jobs available within the industry, that don’t involve coding or sitting at a computer all day. These types of jobs infer that only a computer science degree will lead to a career in technology, when they know that this is absolutely not the case. There was some consensus that a skills framework focusing on the broad types of career choices available would be very effective.

Although technology was initially not an obvious choice for any of these women, they were all able to identify character traits that they now regard as key to their success in the industry – a logical and analytical mind, enjoying puzzles and board games as a child, a keen problem solver, an interest in using computers, and an aptitude for maths and science. However, it also became apparent from the interviews that these women share some other important qualities – they all had a willingness to try new things, to grab opportunities when they arise, and a strong work ethic. Several also referred to an inner confidence and not being afraid to do something a bit different. But in addition to all of this, many of them regard the support and encouragement of others as the keystone to their success.

Encouraging teachers, supportive parents and inspiring mentors – these are the people who helped to uncover the potential of the women we spoke to, often before they could see it for themselves. Several of the women were able to name teachers who inspired them and championed their success, and parents who encouraged them to consider options that otherwise would have been overlooked. There is so much potential for teachers and parents to help guide girls towards a career in technology, and the evidence from these interviews illustrates just how effective this can be – but it cannot happen if the people with the greatest influence do not know what skills and characteristics are required, and indeed what opportunities the industry has to offer.

A career mentor was regarded as a valuable source of support for several of the women we spoke to – particularly those working for technology focussed companies. One interviewee crediting her
mentor with helping her overcome confidence barriers and take on new challenges when otherwise she would probably have held back.

The value of these relationships is something that several of the women feel could and should be replicated among young people making career related decisions. Inspiring talks in schools have long been seen as a positive approach to educating young people about what the industry has to offer, but as one interviewee commented, these **visits need to be followed up with a co-ordinated and sustained approach that builds on the need that many girls and young women have to discuss and talk things through.** There should be many opportunities for consultation and discussion (these can be online as well as face to face), and importantly there should also be room to involve parents and teachers in the process as well.

**Several of the women also recognise how important it is to have someone who believes in you, someone who takes an interest in what you are doing professionally.** Not all of the women we spoke to had this – one of the women said she had struggled with moments of doubt and confidence barriers throughout her education and career journey, and that this lack of confidence has undoubtedly held her back at times.

The findings point towards an inherent need for women to talk things through with other people, a need which isn’t perhaps so prominent among men. **Women like to talk in situations where they are sustaining relationships, they like to discuss and analyse things, and there is a great deal of evidence that this pattern starts early in childhood.** There is a role for building relationships with trusted individuals, especially for girls who don’t already have supportive adults in their lives – someone who can relate to the challenges they face and help guide them on their career journey. It is also important that girls are given lots of opportunities to build their confidence at school. Overcoming challenges, doing well, surpassing expectations, even changing perceptions in some cases, all help to boost girls’ confidence, and help provide a source of inner strength and determination.

The reality of working in the technology industry is a good one for the women we spoke to. They enjoy the variety of work, the challenges, the pressures and being part of a team. **On a day to day basis few say they are really aware of their gender, although they all commented on the lack of women in senior management roles.**

There was some feeling that the industry is often portrayed as being too ‘techy’, when in fact, there are lots of important roles that don’t confine you to sitting in front of a computer all day. Yet some of the women acknowledged that it is important to keep up with the ‘techy’ side of things if you want to progress and have credibility within the industry.

**All of the women we spoke to feel that a career in technology is becoming a more popular prospect,** with some actively involved in career events and school visits. However they also recognise that the majority of young people don’t know enough about what the industry has to offer and the vast range of opportunities available – and there is no easy solution to this problem.
This first stage of knowledge building research with women in industry resulted in the development of six ideas, designed to give girls a better understanding of the opportunities available in the technology industry. These ideas were put forward for consideration by The Tech Partnership and project sponsors, with four chosen for further evaluation.

**Ideas selected for evaluation**

1) **A Tech Mentoring Scheme in Schools** – students who would like to know more about what a career in tech would involve would be matched up with young people already making a career in the sector. These mentors would develop a working relationship with the students, supporting and encouraging them throughout the academic year, and offering regular opportunities to meet, exchange ideas and work together.

2) **A Tech Skills App** - an app, and associated website, that help students find out more about careers in technology, and decide what sort of role would suit them best, based on their aptitudes and the activities they already enjoy. The app could include articles, games, quizzes, vlogs and blogs, case studies and Q&As, all helping students see how their particular strengths could translate into a tech career.

3) **A campaign to build knowledge and awareness among parents and teachers** - parents and teachers have a vital role in uncovering the potential of young people, often before they can see it for themselves. The technology industry is fast moving and the campaign will give parents and teachers the inside track on the careers available in technology, the many routes into the sector, and the skills and characteristics that are most in demand.

4) **A campaign to tackle social stereotypes and promote more female role models** - popular media, especially round science and technology, often reinforce the stereotype that these industries are geeky and more for men. But in reality the tech sector is welcoming and exciting, and there are many women making interesting and dynamic careers in it. This campaign will show girls the true face of the tech sector, introduce them to real life role models through school visits, and highlight what women have already achieved.

**Evaluating and Measuring Potential Solutions**

The second stage of research focused on introducing and evaluating the potential solutions, in discussion groups and in-depth interviews. This was followed by a third and final stage which measured the incidence of views towards the four propositions, among girls, parents and teachers.

The girls in the groups were not particularly surprised or concerned that more men than women currently work in technology roles – provided that girls can do so if they want to. They felt it was important that girls be given the opportunity if that is their choice, although some were suspicious that the industry is trying to recruit women to fill roles that men no longer want to do themselves. Most girls and teachers were also keen that any potential solutions target boys and girls equally. In particular, teachers feel that any proposed approach should not positively discriminate. Instead they would like to see initiatives that target boys and girls, but with a focus on female role models.

There is a lot of groundwork to do with girls to convey the wide range of exciting and different jobs available in technology, beyond their immediate associations. There is a degree of innate resistance to the concept from many girls who simply do not perceive themselves as a ‘tech girl’. However, from an early age they are interested and enthusiastic to know more, and this presents an opportunity to show them that technology features in just about any area they can think of.
When asked what they think needs to be done to help boost the number of women in technology roles, the overwhelming response was “show us what we can do”. When they are encouraged to think beyond the stereotypes, most girls are interested to know a bit more, but they want to see things with their own eyes – they want video content, workplace visits, open days, visits to schools and work experience opportunities. Parents and teachers echo these views, but also highlight that the presentation and delivery of this information is just as important as the content itself – it needs to capture their enthusiasm, challenge their perceptions and most of all be relevant to them.

The Tech Skills App was a popular solution in all of the girls groups, but especially among girls aged 10-15. They felt it could be introduced around the age of 12/13, when girls are starting to become curious about the working world and where they could potentially fit in, and whilst they are still keen to know more. Several of the older girls feel that the current process of careers interviews in Year 9 is too rushed and impersonal. They would like the opportunity to find things out informally before this, so they feel more prepared when they have to start making decisions.

But in order to appeal to this age group the resource needs to be fun and exciting, preferably an app of some kind, and with a subtle focus on careers. The emphasis should be on building their knowledge and expanding their horizons, rather than imposing a decision or encouraging them to focus their choices too soon.

Older girls (16-17) were also interested in this concept, but their requirements were slightly different. They would like a resource that alerts them to open days and local activities, gives them opportunities to chat (online) with industry ambassadors, and helps them prepare a CV. Along with some of the 14-15 year olds, they also liked the idea of being matched with other like minded people, so they could discuss mutual interests and potentially find new friends – they think this could be a useful source of support as they get older.

All of the girls were interested in the idea of an app that acts as a portal, directing them towards new content, people/companies of interest, games and competitions. Video content is especially popular, across the age range.

Parents also responded positively to the Tech Skills App in the groups, recognising that it could “sow the seeds” for a future career in technology. They felt it would be a good opportunity to show the youthful and playful side of the industry, and step away from the serious and complicated image that people typically associate with it.

But in its current form, this idea was less appealing to teachers. It was felt that a “one stop shop” resource with up to date information about careers in technology would be beneficial to teachers and students, but their concern was that it would be text heavy and it would fail to engage the girls. However, they all agreed that a resource featuring lots of video content would be more appealing, especially given girls’ love for video sharing sites such as YouTube. Suggestions for content included ‘virtual’ workplace tours, video conferencing with ambassadors and, video conferencing Q&A sessions with women in industry. Using online technology to promote the technology industry was a popular suggestion, and all of the teachers felt this would sit comfortably with the girls. Several of the teachers also felt this type of content could be used in lessons, presentations and parents evenings, and would be especially helpful when girls were choosing their options.
Survey results for the TECH SKILLS APP:

<table>
<thead>
<tr>
<th>Question</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How helpful do you think a TECH SKILLS APP would be in giving girls a better understanding of the opportunities available in the technology industry?</td>
<td>39 / 49</td>
<td>41 / 46</td>
<td>45 / 43</td>
</tr>
<tr>
<td>How interested would your daughter / you / your students be in this?</td>
<td>27 / 48</td>
<td>34 / 42</td>
<td>35 / 45</td>
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The Mentoring Scheme was also a popular suggestion in the groups, with interest peaking among girls aged 14-18. The general consensus among the girls was that a mentor would be most helpful to those who have chosen their GCSE options, and are starting to think about their post 16 choices (age 15-16). This is when girls feel they start to have questions about the best route for them, the type of qualifications needed and what opportunities are available to them. It is also the point when parents say they begin to feel out of their depth.

All of the girls liked the idea of speaking to someone young (early to mid 20s), who can relate to their situation. The prospect of face to face interaction and the opportunity for someone to take a real interest in them and what they’re capable of is really appealing to them. Some of the girls said they don’t get as much contact time with teachers when they reach secondary school, and this is something that they miss. They also feel this approach would help them to feel more involved in the industry. A few of the oldest girls were keen on this idea because it might give them the opportunity to speak to people who have followed a less conventional path into technology, and this would help to reassure them that it is never too late to change your mind.

Parents were equally enthused by the Mentoring Scheme in the groups. They feel it could work with girls as young as 13. In particular they like the idea of it bringing roles to life, and helping their daughters to appreciate what life is really like in the working world, plus the prospect of it not being a ‘one off’ visit. However, they are quick to stress that mentors would need to be “young and funky” in order to build a rapport with their daughters. They were also unsure exactly how the girls would be selected to take part – they would need to be chosen, they couldn’t be relied upon to put themselves forward because technology is simply not an obvious choice for them.

The Mentoring Scheme was initially greeted with much enthusiasm by teachers, although further exploration did highlight some issues. The most appealing elements of the scheme were the prospect of building better links with industry (something that teachers struggle to do themselves), and the opportunity to challenge the negative gender stereotypes associated with the technology industry. It was also felt that the scheme would have longevity, and could potentially have a real impact on girls’ commitment and enthusiasm for STEM subjects. In particular the teachers felt it would be most suited to highflyers who already show confidence in these areas, and those who might be lacking confidence and direction. Based on its current description, teachers were generally in agreement that this idea would work well for girls who had already selected their GCSE options and showed an aptitude for STEM (15-16).

However, whilst initial reactions to the idea were positive, further exploration did reveal some potential issues. Teachers were unsure how the concept would work in practice – would girls need
to have time out of lessons, could it fit in with the curriculum, would they be expected to convince the headteacher that time away from planned activities would be worthwhile? There were also concerns about pupil safeguarding and risk assessments, particularly if girls were to meet mentors on their own, and if there was a continued relationship – who would be responsible for monitoring this? Teachers were also apprehensive about whether the success of this scheme would be dependent on them sourcing mentors, as well as organising and managing their visits.

But despite their concerns, several of the teachers felt the principle of this idea was very good. During the interviews some of them shifted away from the mentoring idea towards one where female representatives could come into school and run group sessions, set challenges and have Q&A sessions, rather than one to one mentoring. The idea of group activities was felt to fit a wider range of girls, and could potentially be introduced in primary schools, where early preconceptions and stereotypes are often formed. It was also felt that it would be easier to organise and manage for a group or class – both in terms of safeguarding, but also including boys and fitting it around the curriculum. Some also argued that in their experience, girls tend to prefer attending sessions or taking part in activities as a group, and are less confident to take part on their own. This supports the findings from the groups with girls.

It was felt that through mentoring and the exposure to female industry ambassadors, that real life role models could be developed. This was regarded as really important among the teachers. They also felt that building better links with businesses and industry would encourage better quality work experience opportunities.

The idea of workplace visits also generated a positive response, from teachers, girls and parents. In particular, girls really liked the idea of open days and opportunities for relevant work experience – they want to see first hand what the working world is all about, they want to feel inspired rather than anxious, and they want to feel more confident about the choices they are making. Teachers were slightly concerned that they would be responsible for finding the places to visit, there would be issues around safeguarding, and more time away from lessons – but in principle they thought it would be a very good idea.

The majority of girls, teachers and parents said they feel the mentoring scheme would be more effective if it included boys as well. Most of the girls were uncomfortable with an initiative that is just for girls. They recognise the need to recruit more women into tech roles, but also feel that boys could benefit from an approach that helps increase knowledge of the opportunities available within the industry and challenges the negative gender stereotypes.

Survey results for the TECH MENTORING SCHEME in schools:

<table>
<thead>
<tr>
<th>Question</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
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<tbody>
<tr>
<td>How helpful do you think a TECH MENTORING SCHEME IN SCHOOLS would be in giving girls a better understanding of the opportunities available in the technology industry?</td>
<td>47 / 45</td>
<td>42 / 46</td>
<td>63 / 32</td>
</tr>
<tr>
<td>How interested would your daughter / you be in this?</td>
<td>26 / 50</td>
<td>34 / 42</td>
<td>42 / 48</td>
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<td>Base</td>
<td>505</td>
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<td>248</td>
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A campaign to build knowledge and awareness among parents and teachers was the top choice for half of the oldest girls (16-17), who feel their parents have no idea about the pressures they face. They would like their parents (and teachers) to be a source of knowledge as well as support.

Parents were initially very receptive to this idea as well, and they cite the effectiveness of similar campaigns that have raised the profile of midwives, and the Barclays coding campaign. However they were unsure about how this campaign could be effectively executed. They want to know how they can support their daughters, but at the same time, they don’t want to be overwhelmed with information. The most obvious route to them is TV advertising, but others also suggest targeted year group newsletters from school, and events during school holidays. However parents of older girls in particular questioned whether schools would have the time or resources to be able to engage with such a campaign given the cuts that have been made to careers services to date, and the continually increasing pressures on their time.

The teachers were very keen on this idea and felt it could potentially tick a lot of boxes – keeping teachers up to date, allowing girls to find out about the range of careers available, educating parents that tech is a valid education and career path, and addressing social stereotypes. It was also felt that the awareness campaign could easily incorporate elements from the other ideas, such as building links with female ambassadors, industry and local businesses, and developing an online resource showing the different types of careers available and the different types of women working in those careers. Teachers were very candid about their struggle to build links with local businesses and wider industry, and to show pupils real life examples of the career opportunities available to them. Building networks and links with businesses is an area where teachers genuinely feel they need help and support, and anything that could facilitate this would be welcomed. Online resources, face-to-face meetings and representatives coming into school are preferred methods of finding out information among teachers. They were very dismissive of email, and felt this would not be an effective method of contact because emails often get put to one side and not read.

Aside from keeping themselves up to date, teachers also feel strongly that there is a need to raise awareness among parents. They think that more needs to be done to help parents appreciate the range of careers available, and to reassure them that technology is a rewarding and exciting career path. Their ideas centered on showing parents video clips when they attended school events e.g. open days, parents evening, option evenings. Besides showing them real examples of different roles within the industry, they also felt it would be important to highlight some of the different lifestyle benefits including, opportunities to travel or work from home.

Survey results for a CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS:

<table>
<thead>
<tr>
<th>How helpful do you think a CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS would be in giving girls a better understanding of the opportunities available in the technology industry?</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
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<td>40 / 50</td>
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<th>How interested would you / your parents and teachers be in this?</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
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<td>30 / 51</td>
<td>28 / 46</td>
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Base 505 505 248
A campaign to tackle social stereotypes and promote more female role models was a popular concept in theory, but girls struggle to see who the role models would be as they couldn’t think of any, beyond their teachers or parents. Equally parents could not think of any female role models they could associate with the industry. The characteristics that girls admire most are confidence, work ethic, determination, enthusiasm and a general likeability. They want to see people they can relate to, people who have similar backgrounds to them, and people who have worked hard to achieve success. Parents suggested the role models should be bright, young, professional, smart women – who above all are passionate about what they do.

The idea of highlighting positive female role models from the tech industry was considered by teachers as an important step towards tackling social stereotypes. They drew comparisons with sport and athletics, with references made to the increasing focus on female athletes such as Jessica Ennis and the impact this has had on perceptions of women in sport. The idea of girls meeting role models from local businesses was very popular, and it was felt this would probably have more impact than reading about high profile female role models such as Sheryl Sandberg, COO of Facebook.

Opinions towards a campaign focused on tackling social stereotypes were mixed. Parents felt it was important, but they regarded it as low priority – it was seen as too ambitious and unlikely to have much impact in the short term. Teachers however regarded this as a high priority – perhaps because they have closer links to the industry and see it as worthwhile in the long term. They recognise that it will be a hard task, but feel it is achievable if some of the other ideas are introduced – including more mentors and female representatives coming into school, advertising campaigns showing women in industry, and case studies focusing on women in different roles, as part of the skills framework.

The idea of a guide to good practice when teaching girls was also discussed in the interviews with teachers. Interestingly, the male teachers said this could be useful, but they were unsure what it would contain. The female teachers were less enthusiastic however, and actually questioned how teaching technology to girls is any different to teaching boys. The overall interpretation of this idea focused on a guide that would suggest ways to tailor activities towards girls, although most of the teachers we spoke to said they already tailor activities towards pupils own interests. It was suggested that girls themselves should be asked to help with development of the guide, to ensure it genuinely reflects their interests and needs. Initial suggestions from the teachers included tapping into girls usage of social media and YouTube, making the approach to tackling social stereotypes more subtle – including avoiding positive discrimination, and case studies and examples that are based on reality – it was felt that if these were too gimmicky or ‘made up’ girls would see through them and switch off.

Ultimately, positioning the technology industry as a valid career choice is regarded as an important part of tackling stereotypes. Teachers feel that more needs to be done to help parents understand this. They believe that parents have a tendency to focus on and positively reinforce traditional roles such as doctors, teachers and lawyers, and that technology is often overlooked because they don’t know enough about it. Promoting the positive aspects of a career in technology would help parents see it as a more valid career choice. When the girls themselves were encouraged to think beyond the stereotypes, most of them were interested to know a bit more
Survey results for a CAMPAIGN TO TACKLE SOCIAL STEREOTYPES AND PROMOTE FEMALE ROLE MODELS:

<table>
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<tr>
<th>How helpful do you think a CAMPAIGN TO TACKLE SOCIAL STEREOTYPES AND PROMOTE MORE FEMALE ROLE MODELS would be in giving girls a better understanding of the opportunities available in the technology industry?</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
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<td>45 / 44</td>
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<th>How interested would you / your daughter be in this?</th>
<th>Parents very / quite (%)</th>
<th>Daughters very / quite (%)</th>
<th>Teachers very / quite (%)</th>
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<td>27 / 49</td>
<td>26 / 47</td>
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Prioritising the potential solutions

At the end of the online surveys, respondents were asked to choose which of the four ideas they thought would be most effective in helping to show girls the range of opportunities available in the technology industry.

Which ONE of these four solutions do you think would be most effective in helping to show girls the range of opportunities available in the technology industry?

<table>
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<tr>
<th>Which ONE of these four solutions do you think would be most effective in helping to show girls the range of opportunities available in the technology industry?</th>
<th>Parents (%)</th>
<th>Daughters (%)</th>
<th>Teachers (%)</th>
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<tr>
<td>A tech mentoring scheme in schools</td>
<td>44</td>
<td>36</td>
<td>39</td>
</tr>
<tr>
<td>A campaign to tackle social stereotypes and promote more female role models</td>
<td>22</td>
<td>20</td>
<td>31</td>
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<tr>
<td>A tech skills app</td>
<td>15</td>
<td>25</td>
<td>14</td>
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<tr>
<td>A campaign to build knowledge and awareness among parents and teachers</td>
<td>12</td>
<td>10</td>
<td>15</td>
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When considering these solutions, all were positively received, but the **tech mentoring scheme in schools** is seen as the most effective solution by all groups (parents, daughters and teachers)

- Teachers are the most positive about this, in terms of how helpful they think it will be
- The scheme should be aimed at students aged 13 to 16 years old
- To ensure the best response from teachers mentors should support students in groups
- Students should see their mentors once a month at most, once every 2-3 months at the least
- The scheme should be aimed at both girls and boys, but girls should be allowed to participate in girls only groups if required

A campaign to tackle social stereotypes, and promote more female role models came in second place amongst teachers and parents

- Teachers are the most positive about this, in terms of how helpful they think it will be
- The scheme should be aimed at students aged 11 to 16 years old
• The best role models would be young women who have recently started in technology careers (trailblazers), women who have worked in tech several years (specialists) and high profile women in tech

A tech skills app is the third choice overall, but second amongst girls themselves

- All groups were positive about this solution in equal measure
- The scheme should be aimed at students aged 11 to 16 years old
- Including Q&A sessions with women in tech would gain the support of parents and teachers, plus alerts for local activities and open days to further engage teachers, and support for CV writing to engage parents
- Girls themselves would want videos, games / puzzles, competitions, quizzes, but as they get older this would need to adapt to more career orientated features

A campaign to build knowledge and awareness amongst parents and teachers was the last choice for all (marginally for parents and teachers)

- Teachers are the most positive about this, in terms of how helpful they think it will be
- According to teachers, the scheme would have the most benefit on students aged 11 to 16 years old
- The best method of delivery would be through schools, but this would need to include material for teachers to use at parents’ / careers evenings, and teachers would like this backed up a social media campaign
4 Conclusions and Recommendations

The majority of parents agree that they would encourage their daughters to consider a career in technology (70%), and encouragingly, girls themselves say this is an appealing proposition (72% would consider a job in tech) – but enthusiasm drops as girls get older. Likewise, the majority of girls enjoy their ICT lessons at primary school (53% of 9-11s), but as they make the transition to secondary school, they quickly lose interest – describing their lessons as boring, repetitive and out of date.

The research findings indicate that people are the most effective source of inspiration – teachers, parents and mentors. But these individuals need to know what skills and characteristics are required in tech careers, and what opportunities the industry has to offer, in order for them to effectively guide girls in this direction. Worryingly though, a considerable number of teachers (45%) say they do not feel well informed about the different career opportunities available in the technology industry, and confidence among parents also drops off as girls start secondary school.

Going forward, teachers and parents feel the industry should make better use of technology to promote the opportunities available to girls – including video content for teachers to use at school events, video conferencing sessions with tech ambassadors, virtual workplace tours, and online helpdesks.

Research psychologist, Dr Amanda Gummer, also suggests that as girls get older more effort needs to be made to “meet girls where they are, and take them where you want them to go”. Girls’ lives are dominated by life online, and so any potential solution needs to consider how much they value the opportunity to watch, read and write about their favourite things in this way.

Help to build girls’ confidence and knowledge

A tech mentoring scheme in schools

This is considered the most effective solution among all groups – reinforcing the view that inspiring and knowledgeable people are the biggest influencers of education and career choices.

The suggested age is 13-16 when girls are starting to think about further education, and when they typically begin to exhaust parental (and often teacher) knowledge.

Girls of this age need reassurance that a career in tech is rewarding and exciting. They also need knowledge, confidence and conviction to deviate from a traditional career path.

To ensure support from teachers, the scheme should target students in groups, and be aimed at boys and girls. Several teachers argue that girls prefer to attend sessions as part of a group, and are less confident to take part on their own.

Girls would expect to see their mentor once a month at most, and once every 2-3 months at the least. They don’t expect contact to always be face to face however, and are keen on the idea of video conferencing and Q&A sessions.

It was felt that through mentoring and the exposure to female industry ambassadors, that real life role models could be developed.
Encourage girls to see beyond ICT at school

A campaign to tackle social stereotypes and promote more female role models

ICT is the most enjoyable subject among girls aged 9-11, but willingness to consider tech as a prospective career drops with age.

Without more accessible female role models in STEM / ICT, and more exposure to the true face of the tech sector, girls will struggle to relate to technology as an option for their future.

Teachers and parents regard this idea as high priority, but recognise that it will take time to have an effect.

Women who have recently started their tech career are considered the best role models for girls, followed by women who have worked in tech for several years and high profile women such as Sheryl Sandberg.

Groundwork needs to be done whilst girls are still at primary school, to ensure they remain open minded and interested in tech education – female ambassadors could help tackle negative gender stereotypes and give girls the confidence to see tech as a positive choice.

Campaign delivery should be subtle and avoid positive discrimination wherever possible.

Make tech education and careers more relevant and personal

A tech skills app

This was third choice overall, but second amongst girls themselves.

The suggested age is 11-16, with girls generally becoming curious about the working world and where they could potentially fit in at age 11-12.

Teachers feel the app should feature lots of video content, given girls love of YouTube, and should avoid being too text heavy. This view is reinforced by the girls themselves, who say they would rather watch something than read about it.

Primary teachers also believe a resource of this kind could work well among younger children, provided the focus is on fun and engaging activities and games.

Girls themselves want videos, games / puzzles, competitions and quizzes – but as they get older this would need to adapt to more career orientated features – Q&A sessions with women in tech, alerts for local activities and open days, and support with CV writing.

The Tech Partnership could consider involving girls in the design and development of the app to ensure authenticity and broad appeal. Regular consultation with girls would also provide opportunities for others to become involved and keep the content up to date.
Maximising the potential for teachers and parents to guide girls towards a career in tech

A campaign to build knowledge and awareness among parents and teachers

This idea resonates most with teachers – they are keen to update their own knowledge and recognise the potential they have to sow the seeds of interest.

Building networks and links with local businesses is also an area where they genuinely feel they need more help and support.

There is some disparity between what parents think they know and what they actually know. They do acknowledge that the range of opportunities is far greater nowadays, and many aren’t aware of how their daughter’s strengths could translate into a modern tech career.

All audiences agree that the best method of delivery for a campaign of this kind would be through schools – with teachers appealing for more resources to show parents and girls e.g. at parents evening, options evenings, open days.

Online content such as YouTube videos is seen to ‘fit’ well with the technology industry and the careers it is trying to promote. Videos should showcase young and inspiring women, and highlight the wide range of opportunities available.

“Oh yeah. Yeah, I mean I could think of three or four girls off the top of my head that I know are great at ICT, and that with the right push in the right direction could go that way. Yeah, if they could just see other people that have done it.”

Male Teacher, Primary
5. Research Findings

5.1 Stage 1: Knowledge Building

5.1.1 Research with Women in Industry

About the interviewees

The women were selected to represent a range of different views, experiences and academic backgrounds. Four had chosen a technology related degree – including IT Management for Business (a Tech Partnership accredited degree) and Creative Music Technology. Two had chosen a degree in a different discipline – Accountancy and Politics, whilst another had studied for an NVQ in Business Administration. One was accepted onto an apprenticeship scheme with BT.

Choosing a career in Technology

A career in technology was not an obvious first choice for any of these women. They all considered pursuing alternative options first – for example accountancy, politics or nursing. These industries are regarded as familiar and traditional, and are widely endorsed by family and teachers. Technology is still regarded by most of the women we spoke to as a non-traditional career, typically because it is fast moving and constantly changing.

A few of the women went on to complete degrees in different disciplines, and would go on to discover technology at a later stage, but for others (mostly the trailblazers), questions and doubts about their career choice set in at an earlier age. One of the trailblazers talked about how several of her family members had followed careers in nursing, and that seemed like an obvious choice for her. She chose to study Biology, Psychology and Social Care at A Level, but it was during her first year that she began to question how much she enjoyed the healthcare element. A work experience placement in a hospital was the defining moment for her, when she realised she had been swept along by other people’s ambitions for her. She dropped her healthcare A Level and replaced it with IT, and went on to study IT Management for Business at university. This late decision took courage and determination – characteristics that were evident in many of the women we interviewed.

“Most of my family is from the science side...so naturally when I was doing my GCSEs because of that influence from my family I chose to take on biology, psychology and social care and I did some volunteer work in a hospital in the first sort of six months of college and I think it’s safe to say I absolutely did not like it and I thought to myself okay, there’s one thing about liking a subject but there’s another thing doing a job that you don’t want to do for the rest of your life. And in my second year I thought okay do you know what, I’m going to take IT and drop health and social care so I kept on biology and psychology and took IT and I think it was from that second year of college that I sort of never looked back.”

Trailblazer

Two of the other trailblazers were encouraged to pursue a career in technology by their Dad’s, when they admitted they had no real idea what they wanted to do. One of the women was encouraged to apply for an apprenticeship with BT (her father already worked for them). This wasn’t something she ever envisaged doing, and she had assumed she would need an engineering qualification to apply, but she was interested in Science and was swayed by the prospect of a
'guaranteed’ job at the end – so she agreed to try it for a year. Now she feels ahead. She has the experience of working already, she has her NVQ and her Foundation degree, she is earning money and she enjoys it.

The second trailblazer describes herself as creative, with a real passion for music. Her Dad found a graduate scheme online, when searching for jobs for himself. They share similar interests, and she describes him as having always been encouraging and supportive, but never pushy. She would never have considered ‘straight technology’, but it was the links to music that attracted her to this graduate scheme and made it an easy choice for her to apply. **Neither of these women describe themselves as particularly ‘techy’, but they do love what they do.** They both feel, along with the other trailblazers, that there is too much focus on mainstream job roles in the technology industry (e.g. project manager, software developer). These infer that only a computer science degree will lead to a career in technology, when they know that this is absolutely not the case.

“**I did a degree in creative music technology. I've always been musical. My dad actually found the scheme and sent me the link because he was actually job hunting at the time too and I was getting panicky that I hadn't got anything. I say I'm like a technology graduate. I wouldn't say what I'm doing at the moment is particularly technical but then there are definitely roles within technology which don't need technical skills, if that makes sense.**”

**Trailblazer**

“I was going to go to university, I did apply and I was going to do either biology at Queen Mary’s or teaching at Middlesex but my parents persuaded me to have a go at an apprenticeship. Not only do you get trained but also you get a paid job and a foundation degree as well so yeah, it is quite a good opportunity but I wasn’t too sure about it at first so I had to try it out. **But I really enjoyed it at the end of my first year so I decided to go for the full two years. My dad actually worked at BT for a long long time and he knew about it and he knew that kids around 16 or 18 years old, they come in and they get trained and they have a full time job after three years and he told me to apply.**”

**Trailblazer**

Although technology is all pervasive nowadays, all of the women we spoke to recognise that people outside of the industry still struggle to appreciate the vast range of jobs available. A few said they were never introduced to anything except IT at school, and that they found this quite boring. Instead they would like **more focus on the development of a skills framework that is relevant in the industry**, with an emphasis on highlighting the broad types of choices available, and less focus on what they regard to be mainstream job roles. Two of the women also made the point that for many young people interested in technology, **there is the very real prospect that their future job role doesn’t even exist yet.**

“**I mean I would never have been interested at school I don’t think. I think schools absolutely need to somehow grasp the nettle. And I think there’s also a thing about teachers. Maybe they are a little afraid of technology. Technology is still not something that girls generally take very seriously. They don’t see the fun in it.**”

**Tech Specialist**

“(The industry) is so focussed on very mainstream job roles, so for example, project manager. There are other things like obviously software developers, system analysts and I don’t know system designers and things like that which are very very specific. It doesn’t really give you insights of, oh by the way, when you’re looking for a job for example, a placement job, a graduate job, don’t search for project management, just search for graduate roles within business or within IT and there will be many more available than just trying to focus on project management for example. **Because in IT job role doesn’t really mean anything, the actual name, it’s what you do that means something.**”

**Trailblazer**
"I think it's about helping schools do a better job of explaining the huge variety of roles available in technology and that they're gender neutral. And helping remove some of those gender biases that are influencing teachers, influencing parents, and influencing groups like Scouts and Guides. I think we need to really step up in terms of graduates and apprentice schemes. There's not enough structure and formality around the program helping them collect the skills and experiences they need to be a much more rounded technologist. That guidance could come from a framework being developed for technology, these are the skills and experiences you should be acquiring on a grad scheme or apprentice scheme, or even at school.”

Tech Specialist

"IT is more about what kind of skills you have and how you can try and fit that to a role rather than 'I am a nurse and I'm looking for a senior nurse role' "

Trailblazer

The women who discovered technology at a later stage (typically tech specialists, but not exclusively), generally reached a point of re-evaluation. For some this came after a certain amount of trial and error, at which point they were able to make a more measured and informed decision about what they wanted to do, whilst for others it was more by chance. In each of these cases, careers in technology became more visible with age, often because they had only been made aware of the more traditional and obvious careers when they were younger. One of the women felt she would have pursued a career in technology much sooner, had she had better help and support from teachers and careers advisors at school. This view was reinforced by one of the trailblazers who said one of her teachers had been really helpful, responsive and had a real impact on the path she chose to pursue – a good sign that awareness and perceptions of the industry among teachers are moving in the right direction.

"I had a very non traditional route into technology. I started off as an accountant. While doing my accountancy training I moved sideways into the IT consultancy practise as I realised book keeping and preparing accounts wasn't going to rock my world. It was in the days when companies were starting to think about e-commerce and what having an online presence would mean for their organisations. And I just found myself fascinated by what transformation that would bring to their businesses. And I wanted to be part of that journey. So that was the start of my career in technology.”

Tech Specialist

"I started work...I messed up my degree...so I started temping for the Fire Brigade of all people. And they trained me up to do a PC support job. But because it's such a small company I got more involved. I think because I showed a natural aptitude or natural interest in that, they realised I knew what I was kind of talking about. And I wasn't shying away from it. I was quite naturally competent. Then I got a temping job at New Look. And then a vacancy came up in the IT department and basically that's where I've stayed in relatively the same role.”

Tech Specialist

"So on the day that I graduated with my politics degree I thought what on earth am I going to do now? I didn't really have a career plan as such and I didn't know what I wanted to do. I got the postgraduate prospectus and I went home and I looked to see what was a non quota course. Information management was one of the ones that came up as a non quota course degree ... And it wasn't going to cost me anything to do my postgrad. So I did it and I loved it. It was pure fluke, it really was. The only exposure that I'd had to any kind of computers before that was sitting typing up my dissertation. When I did my postgrad I really enjoyed it. It was very challenging. I loved the kind of problem solving and logical approach to a lot of the things that we did. And from that point on I knew that's kind of where I wanted to be. It really was. It was fluke more than anything but once I was there, once I had my eyes opened as to what a kind of career in IT would look like I knew that was the place for me.”

Tech Specialist
“This is a second career for me. I actually started out in insurance a long, long time ago, in the seventies. Then I got married and had children. Then I stayed at home for fourteen years looking after my children. Then I went back to work when I was thirty eight, thirty nine, something like that. And at that point I wanted to do something different. At school I did a language degree, I was on the Arts side. I wasn’t science based at all. And it was before the age of computer science. But I really wanted to get into IT at that point. I think it was largely my husband’s idea. He thought IT was a good thing to get into. I actually got a job with the Employment Training Service and worked with them for a year. And then as a result of that I made a contact with the NFU Mutual Insurance Company. They were recruiting people to run their information delivery service. And they were struggling to recruit people. So they decided to train people from scratch. And I was very lucky I was in the right place at the right time. And they gave me a job.”

Tech Specialist

“It’s been difficult, obviously, because I didn’t do a technology degree or anything like that. I was working within a retail company, New Look, and when an opportunity came up, to work in IT, I thought it was something I was interested in personally. I had to prove to them, although I didn’t have the degree, that actually I was technically minded and that I could easily pick that up. Also I had to prove that I had the business knowledge and match that with the technical experience I had had from my previous role. I managed to blag it somehow. I got into an analyst role and that’s how I started.”

Tech Specialist

Although technology was initially not an obvious choice for any of these women, they were all able to identify character traits which they now regard as key to their success in the industry – a logical and analytical mind, enjoying puzzles and board games as a child, a keen problem solver, an interest in using computers, and an aptitude for maths and science. However, it also became apparent from the interviews that these women share some other important qualities – they all had a willingness to try new things, to grab opportunities when they arise, and a strong work ethic. Several also referred to an inner confidence and not being afraid to do something a bit different. But in addition to all of this, many of them regard the support and encouragement of others as the keystone to their success – and often this support continues far beyond education.

“It’s been all about really jumping at every opportunity that’s been offered me I think.”

Tech Specialist

“Don’t care about what people say. I don’t care if someone says something behind my back, if I’m doing a good job, I’m doing a good job.”

Tech Specialist

“It comes from the kind of upbringing you have. My parents said to me, if you study hard you can get a good job and then you know you can have a good life kind of thing. And because that’s sort of been drilled into me I’m always motivated to be better”

Help and Support

Encouraging teachers, supportive parents and inspiring mentors – these are the people who help to uncover the potential of young people, often before they can even see it for themselves. One of the women we spoke to recalled one of her primary school teachers taking her parents to one side and telling them how their daughter should go to university. This vote of confidence inspired her to do well and continue with subjects such as Science and Maths because she had been told how good she was at them.
Several of the women were able to name teachers who inspired them and championed their success – although with hindsight some now recognise that their knowledge of careers, especially non-traditional ones, was not always up to date. One of the trailblazers explained how she had expressed an interest in technology to one of her teachers, and the advice she was given was to make sure she practiced using Microsoft Excel and Powerpoint – advice which she now knows was poorly informed. Several also acknowledged that their parents still have no idea what their job in technology involves – “they think I fix computers” – reflecting just how limited knowledge can be, even among those who know someone within the industry. There is so much potential for teachers and parents to help guide girls towards a career in technology, and the evidence from these interviews illustrates just how effective this can be – but it cannot happen if the people with the greatest influence do not know what skills and characteristics are required, and indeed what opportunities the industry has to offer.

“I think with good teachers if they see that you want it they will always help you. If I was a teacher and there were students who absolutely didn’t care about something and it was just me trying to motivate them I would probably give up after a few times but if there are students who really want to do well and come to me and ask for help I would do everything in my power to help them”

Trailblazer

“In school it was individual teachers but particularly my last Form Teacher at Primary School, he had a conversation with me and my parents that really stuck in my head for many years that I should go to university. And that’s the first time that was planted as a seed that I wanted to...and go into a profession of some kind. Then it was in the first, second and third years of High School where I thoroughly enjoyed all of the sciences, maths and languages and had some very inspiring maths and physics teachers in particular. And then ended up taking those as A Levels”

Tech Specialist

For those working in the industry, a career mentor is regarded as a valuable source of support – particularly for those working for technology focussed companies. In some cases the mentor is someone outside of their company, but often it is someone who works for the same company but in a different department. Generally it is someone in senior management with many years experience, and among the women we spoke to, more often than not it was someone female (although not always).

In these cases, the role of a mentor is to offer objective advice, help the mentee set out a personal development plan and help them make rounded and informed career decisions, as well as help them with personal issues on occasion. The value of this support is beyond measure for some of the women we spoke to, with one crediting her mentor with helping her overcome confidence barriers and take on new challenges when otherwise she would probably have held back. Several of the women are also strong advocates for reverse mentoring – a process which involves more experienced executives being paired up with younger employees to help keep them informed about current trends, social media and even the effectiveness of graduate schemes.

The value of these relationships is something that several of the women feel could and should be replicated among young people making career related decisions – suggestions included a two tier system where tech specialists mentor trailblazers, who in turn are ambassadors for girls in schools. Inspiring talks in schools have long been seen as a positive approach to educating young people about what the industry has to offer, but as one interviewee commented, these visits need to be followed up with a co-ordinated and sustained approach that builds on the need that many girls and young women have to discuss and talk things through. There should be many opportunities for
consultation and discussion (these can be online as well as face to face), and importantly there should also be room to involve parents and teachers in the process as well.

“I had an excellent mentor who helped me figure out what my technology career path would ultimately end up being. He helped me figure out the areas I would need to get experience in across the IT domain...so we sort of mapped out a career plan covering off all those building experiences. And over the years I’ve gone along and acquired them. A bit like Brownie badges. I actually reverse mentor him now on things like Cloud and collaboration technologies. So our relationship has evolved over that period as well where it’s much more of an equal conversation now.”

Tech Specialist

“I think most of the time you get told, career plan, create this, create that but when you actually come to it, anyway my brain freezes and I can’t think of anything to write down and that’s where my mentor really helped because she basically told me, you don’t have to write down a job role, you have to write down what kinds of things you would have done by the time you are you know, I don’t know 28 or 29 or whatever, so you’ve done, I don’t know, one IT project which was like 10 million or something like that for example and you can then sort of build upon what kind of roles you can go into”

Trailblazer

“Someone who is in the industry who can help a student who’s in their crucial years of making the choices about a different college or about maybe taking an apprenticeship or whatever they’re going to do, someone to just be there to answer some of the questions they might not know or even your parents might not. With me, my parents had no clue about IT, they don’t even understand what I do now.”

Trailblazer

Visible Role Models

Role models are regarded as an important source of inspiration and encouragement, but there simply aren’t enough of them. In most cases, the trailblazers identify parents and family members as their biggest role models – the majority of women we spoke to came from families with a strong work ethic and a professional background, recognising that you have to make your own opportunities and work hard to do well. They see their parents and siblings leading by example, and this gives them inner strength and confidence. Some of the tech specialists were able to identify colleagues who have been inspiring throughout their career, but they admit these are few and far between. Characteristics that they say they admire include confidence and humility. One of the trailblazers had recently read the book, ‘Lean In: Women, Work and the Will to Lead’, by Sheryl Sandberg, COO at Facebook – she found this incredibly inspiring.

Several of the women also recognise how important it is to have someone who believes in you, someone who takes an interest in what you are doing professionally. Not all of the women we spoke to had this – two of the women said they have struggled with moments of doubt and confidence barriers throughout their education and their career journey, and that this lack of confidence has undoubtedly held them back at times. One of the tech specialists described how she sometimes feels unable to contribute in meetings where she is the only female, and she even chose not to apply for a new position because she didn’t have enough confidence in her own abilities. She described how she has spent a great deal of time trying to establish and develop mentoring relationships, but for her, these always end when a person leaves the company.
“I have some issues around self-confidence, although not many people would probably pick that out from the outside. I sit and watch the guys round about me who can speak out very easily and you know they never seem to have any doubt. Quite often I kind of find myself sitting quietly in the corner listening rather than contributing when I should probably be contributing. But I think women are more afraid of failure and looking silly than men are. We kind of go home and self-deprecate if we say something daft. In my first role I had a very good ‘techy’ who sat behind me and answered all my daft questions and really kind of put me on the path to where I wanted to be.”

Tech Specialist

These findings do point towards an inherent need for women to talk things through with other people, a need which isn’t perhaps so prominent among men. Women like to talk in situations where they are sustaining relationships, they like to discuss and analyse things, and there is a great deal of evidence that this pattern starts early in childhood.

With this in mind, it is important that girls of school age are given lots of opportunities to build their confidence at school. Overcoming challenges, doing well, surpassing expectations, even changing perceptions in some cases, all help to boost girls’ confidence, and help provide a source of inner strength and determination. But importantly, there is also a role for building relationships with trusted individuals, especially for girls who don’t already have supportive adults in their lives – someone who can relate to the challenges they face and help guide them on their career journey.

“We went on a school visit recently. It was part of an initiative trying to encourage the young. They were about fourteen. It was a really good session. But they were, they weren’t very sure. They were very keen. And very enthusiastic. But they weren’t particularly thinking in terms of technology as a career. I felt as if they needed more, I think that’s what’s driving me to say that there needs to be more in schools”

Tech Specialist

“I am finding that schools aren’t preparing them as well as I felt prepared when I entered the workplace. In terms of their awareness of how businesses function and the variety of roles available to them; that a role isn’t for life. No you’ll have a role for two years at most probably, three years at a push.”

Tech Specialist

“Don’t worry too much about the ultimate career you’re going to have because it will be very different. Even if you plan it it will turn out very, very differently. Most of the roles I’ve had didn’t exist when I was at school. And I wouldn’t worry about that. I would choose a technology subject or a maths subject at university or at college that you’re passionate about. And the rest will fall into place. By the time you’ve finished that course new options will be available to you. But start building a network, use your parents, your parent’s family, your friend’s parents, they’ve all got jobs. A lot of them will have them in technology. Ask questions. Go and find out what they do, what’s their life, what’s their career journey been?”

Tech Specialist

“I think as leaders we now have to have more personal and deeper relationships at all layers of our organisations rather than sitting in an office and seeing the layer below you. I spend a lot of time with our grads and MA’s and give them little innovation challenges just to give them a problem and let them go and solve it. It works really, really well.”

Tech Specialist
Working in the Industry

Despite their varied paths into a technology career, **all of the women we spoke to enjoy working in the industry**. The aspects that appeal most to them range from a love of strategy, operations, and transformation, through to client liaison and coaching. In particular, several of the women said they enjoy having the opportunity to interact with others, liaise with company partners, colleagues and the public. **Some feel that often the tech industry is portrayed as being too ‘techy’, and that there are lots of important roles that don’t confine you to sitting in front of a computer all day.** However, two of the tech specialists made the point that you do need to keep up with the ‘techy’ side of things if you want to progress and have credibility within the industry. One added that Project Management type roles are well suited to women because of their management and interpersonal skills, but technical knowledge and understanding are also important if you want to work alongside the ‘techies’.

“**I like working with people** because people are endlessly difficult and a bit challenging. I think what is interesting about my job is the planning and designing of projects. And that does mean it helps if you have a good technical understanding. **You don’t need to know the nitty-gritty. But you do need to be able to work with the technical people.** You need to command the respect of them otherwise they just pull the wool over your eyes all the time. And my role is really facilitating. It’s removing obstacles, getting people to agree, thinking of the strategy, anticipating what’s coming down the road and what’s going to knock us off course.”

*Tech Specialist*

All of the tech specialists, and most of the trailblazers feel they now have a good appreciation of the many different roles available in the industry, but they do acknowledge that this takes time to develop. One of the tech specialists recalled how she once took on an operations role, despite it not being an area she was keen to progress in – but having discussed it with her mentor she recognised that it was a department she needed to gain experience in, in order for her to move forward with her career. As a result she is a strong believer that young people need to be pushed outside of their comfort zone in order for them to become a more rounded individual and discover where their talents really lie – and on this basis she is keen that **young people should not be encouraged to specialise too soon**, but instead remain open minded to the opportunities the industry has to offer them.

The realities of working in the industry are largely very positive for the women we spoke to. They enjoy the variety of work, the challenges, the pressures and being part of a team. **On a day to day basis few are really aware of their gender, although they all commented on the lack of women in senior management roles.** Several of the tech specialists said the challenges of being a woman in a male dominated industry become more pertinent as they work their way up the ladder, and they begin to feel increasingly outnumbered. Being the only female in a meeting can feel quite daunting and it can take courage to speak up, although one interviewee argued that you have to have a “no nonsense attitude” if you want to succeed in this industry. Most of the tech specialists were able to describe occasions when they have experienced negative behaviour, but typically this was years ago. Conversely, none of the trailblazers said they had encountered negative behaviour, although they did admit to feeling quite daunted when they first started out. One of the women said her first placement was in an all male office – she found this hard at first, but says she is now used to it. Another said she is used to being outnumbered by boys, having studied Music Tech at school. Instead she is far more uncomfortable with the idea of being positively discriminated against because she is female. When applying for university places she was told she would be fine because of her gender – however she wanted the place on merit, not because she is a woman.
Another trailblazer had recently joined a ‘Women in IT’ group at her company. She feels that IT can be portrayed quite badly and is generally stereotyped as a man’s world, and so she is keen to help ensure that men (and the general public) have a better understanding of what women are trying to achieve. She also recognises that groups such as these are a great networking opportunity, a chance to meet other like minded people and establish herself as someone who is committed to helping improve perceptions of the industry. She also advocates that young people make the most of networking opportunities, to help further their careers. She stopped short of saying it’s about who you know, but did acknowledge that people tend to respond positively if you show them that you’re proactive, keen and enthusiastic.

“It is tough. It is tough. I’ve been in some difficult situations. If you get on a project where there’s a very macho culture it can be very, very difficult. I think there is a general feeling that men are still technically more competent. I do think that is changing though. But I think it is changing slowly. I think there are a lot more women around. And a lot more very well qualified and competent women. So I do think that’s changing.”
Tech Specialist

“I think looking at it now, the graduates that we started, there is a fair number of women as well as men who joined but looking at the manager levels, that’s where the real issues are. There’s not enough women managers or senior leaders in the company and that’s where I may find an issue. Just because you see there are a lot of people coming in who are women, doesn’t mean that they are carrying on doing the work.”
Trailblazer

All of the women we spoke to feel that a career in technology is becoming a more popular prospect, with some of the younger ones actively involved in career events and school visits. However they also recognise that the majority of young people don’t know enough about what the industry has to offer and the vast range of opportunities available — and there is no easy solution to this problem.

“I would go into the schools and talk to students, and give a chance for them to come back to us and say I’m really interested to find out more, can I please have a chat with you kind of thing. And then those students can actually come on site and spend the day looking at how the offices look, how our labs look, what kind of work people do and for them to see that we’re not in a corner coding, we’re all doing different kinds of things which impact the business differently. And then be able to have some sort of mentoring programme in process. I can mentor maybe a student who’s really interested to help them through not specifically in their studies but the career side of things.”
Trailblazer

“I think what I see in my colleagues is that they get too obsessed about wanting a particular thing. And they have a route all planned out. And if there is any deviation from that route they get panicky. So then they’re less prepared to take maybe a sideways step or do something else.”
Tech Specialist
The Impact of Gender Differences
As part of this knowledge building stage we met with research psychologist, Dr Amanda Gummer, a leading authority on child development, to help gain a better understanding of gender differences in relation to education, careers and technology. Her key points for consideration are included below.

1) Meet girls where they are, and take them where you want them to go - use trends data to identify the lifestyle features of girls aged 9-18, to enable creative solutions that are based around activities that girls already enjoy and aspire to.

2) Learning Styles – girls like to understand what they have to do before attempting to do it, whereas boys jump straight in to experimentation - research has shown that boys tend to prefer multi-modal learning – they need to see, do and hear it, so the practical nature of STEM experimentation, and trial and error learning suits boys more. Girls tend to learn more socially, so teaching methods that tap into girls’ learning preferences need to be employed, and teachers need to be aware of these differences.

3) Boys overestimate their ability, girls underestimate theirs – this can lead to them switching off from ‘hard subjects’ – the perception that STEM subjects are ‘more academic’ and therefore more challenging can be a turn off for children with low self-confidence. Pre-teens and young teenage girls often go through a period of lower self-esteem as they hit puberty, so the timing of choosing options may lead girls to ‘play it safe’ and choose subjects that they feel less likely to fail at

4) Hide and disguise technology within subjects they do like - the skills required for a successful career in technology (analytical thinking, critical analysis, problem solving etc) are not only developed through STEM subjects. By embedding these skills in other activities and lessons, girls will find STEM less scary and gain in confidence as they find they already possess many of the skills required

5) Tap into girls’ social conscience, regarding creativity and inventing – make it clear that technology based careers can help ‘make the world a better place’. This is likely to be motivating for teenage girls who are becoming more aware of global and social issues, and are keen to be part of the solution to some of these issues

6) Better Careers advice – let young people know what they can do with their qualifications, and how they can keep the doors open – with the disappearance of a ‘job for life’ it is increasingly important for children to develop a wide base of skills and knowledge, and STEM subjects form an integral part of this. Careers advice at Secondary schools needs to be updated to reflect the changing world of work, and students made aware of the broad range of careers that benefit from the skills learnt in STEM subjects. In addition, parents and wider society need to understand the role that technology has to play in living a healthy and fulfilling life.

7) Tackling societal gender differences - things are improving but there are still popular media, especially around science that reinforce the stereotypes (e.g. Big Bang Theory). Mass-media role models are powerful in addressing this, and in the UK there are some good preschool programmes that challenge these stereotypes e.g. Doc McStuffins, Nina and the Neurons.

8) More female science and technology teachers – this could happen as a result of other initiatives working – the imbalance between the gender of teachers is a natural result of the disparity between the number of boys and girls taking STEM subjects, and without more accessible female role models, girls are going to continue to struggle to relate to technology as an option for their future.

9) Increase boys’ interest in Art, English and reading, in order to make Maths, Science and Technology less male, and therefore more attractive to girls – the well-documented delay that boys have in learning to read and write many lead to arts subjects being inadvertently seen as more ‘girly’ as they gain confidence from early advances when compared to their early peers. Boys, therefore may choose STEM subjects more because the alternatives are perceived as girly, which then creates an imbalance that results in girls perceiving STEM as ‘boyish’. By addressing the early approaches to English and the Arts, and making them more accessible and appealing to boys, the imbalance will become less obvious and all children will be able to access all subjects on a level playing field.
This first stage of knowledge building research with women in industry resulted in the development of six ideas, each designed to give girls a better understanding of the opportunities available in the technology industry. These ideas were put forward to The Tech Partnership and project sponsors for consideration, with five chosen for further evaluation in the qualitative groups and interviews. Two of these ideas were later combined, reducing the number of propositions to four for the final quantitative stage.

The six ideas derived from research with women in industry:

1) A mentoring scheme in schools  
2) Development of a technology skills framework to help girls discover what ski  
3) A campaign to build knowledge and awareness among parents and teachers  
4) Making the most of female role models in tech  
5) Tackling societal gender stereotypes – a guide to good practice  
6) Partner with like-minded organisations and initiatives, with the aim of encouraging girls to try new experiences, develop new interests and acquire new skills
5.2 Stage 2: Evaluating Potential Solutions

The second stage of research focused on introducing and evaluating the potential solutions among girls, parents and teachers – as well as exploring other ways in which girls could be inspired to consider a career in technology.

The five ideas nominated and refined for evaluation were:

1) A tech mentoring scheme in schools - invite young women already working in tech careers to mentor students who would like to know more about what the industry has to offer. These women would support and encourage girls by offering suggestions and knowledge throughout the academic year, helping them to make more informed decisions about their future.

2) A skills framework - a place where students can find out more about careers in technology, and try games and quizzes to find out what sort of tech career would suit them best, based on the things they enjoy doing.

3) A campaign to build knowledge and awareness among parents and teachers - the technology industry is fast moving and more needs to be done to help keep parents and teachers informed about the careers available to girls, along with the skills and characteristics that are most in demand.

4) Making the most of female role models in tech – lots of women are already having exciting careers in tech, but girls need to know more about them. Role models are an important source of inspiration and encouragement, and we need to find more ways to show girls what real women are doing in tech.

5) Tackling social stereotypes: A guide to good practice – although things are slowing improving, there are still lots of popular media, especially around science and technology (e.g. Big Bang Theory, IT Crowd) that reinforce the stereotype that these industries are geeky and more for men. It is important that tech companies consider examples of good practice when preparing advertising campaigns, educational resources and other material that the public can view e.g. website. A guide to good practice could help ensure that they avoid gender stereotyping, and instead use language and visuals that reflect positively on the technology industry.

4.2.1 Research with Girls, Parents and Teachers

About the Girls

The girls in the discussion groups were all bright and articulate, enjoying the opportunity to offer their opinions and to be consulted on issues relating to them and their future.

The youngest girls (age 10-11) were settled at Primary school and beginning to gain more experience of the world outside of their family. They enjoy taking part in after-school clubs, hobbies and sporting activities, and are becoming more involved in school life. Interests included drama and singing, swimming, cheerleading, computer games and playing outside. A few of the girls also expressed a keen interest in science and maths. Being liked and accepted by friends and having fun is very important to girls of this age – they have bundles of enthusiasm and are keen to find out about the world and try new things. This particular group of girls were also strong advocates for fairness and gender equality, and this was reflecting in their evaluation of the
potential solutions. **Even at this young age they had already picked up on sensitivities around gender and ability**, having been told that boys can do certain things better than girls – one girl even claimed that her teacher had told her that boys are better at maths than girls. They weren’t put off by this though, and instead were keen to dispel the myths and prove that girls can achieve just as much as boys. The energy and enthusiasm from these girls was quite charming, but as they approach secondary school they are beginning to lose some of the carefree attitudes of earlier years, as an increasing appreciation of reality sets in.

“Sometimes I feel pushed down, because some boys say what girls can and can’t do. Sometimes the teachers say it. Miss Jones said that people have said maths is more for boys than girls. I like maths. I’m better at maths than English.”

*Girl aged 10-11*

“I was watching this video where someone was complaining about sexist toys, like flowers and stuff for girls and cars for boys, and they said why can’t I just have cool toys? And they had a doctor’s costume for boys and for the girls it was a nurse’s costume, which is just not on. **A long time ago there was this group of girls that were protesting and standing up because the girls weren’t allowed to vote and stuff like that. And they were saying just because we are girls, it doesn’t mean that we can’t do this. And I found that really inspiring**”

*Girl aged 10-11*

**By age 12-13 (Year 8) girls have made the transition to Secondary school.** School is a much busier environment for them – there are more opportunities, but also more uncertainty. They are generally quite excited about what the future has to offer them, but also apprehensive about choosing their GCSE options and recognising what they are most talented at. They say they have received little careers guidance or direction from their school so far, but they expect this to increase when they start Year 9 and begin thinking about their options – most would prefer this process to start earlier to give them more time to think things through. Like their younger counterparts, they are still quite positive and enthusiastic about the prospect of finding out more, and although academic demands are steadily increasing, most say they are still willing to actively involve themselves in activities and events that will help build their knowledge and give them more confidence about the choices they need to make. But their interest can be quite varied – for several, spending time with friends is their preferred way to enjoy their spare time, whilst for others it’s dancing, climbing or playing computer games. They are still very reliant on their parents for support and encouragement, but they are already beginning to question whether they have the expertise or knowledge to offer careers advice.

**By age 14-15, most girls are pushing for greater independence**, and they become quite reluctant to talk things through with their parents. They are beginning to break away from the family unit and identify with and depend more on their peer group and their friends. Most have also discovered the world of social media – Snapchat, Instagram, Whatsapp, Facebook, Periscope, and ooVoo were all mentioned. The pressure to do what other girls are doing, to conform to expected norms of behaviour is increasingly important to some, although others already have an inner confidence that helps them to see beyond what other people think – this is a quality that was evident among several of the women we spoke to in stage 1. **When challenged about their knowledge, several of the girls had unanswered questions relating to further education, qualifications and careers, but they don’t know where to direct these.** By this age there is little evidence of the energy and enthusiasm shown by their younger counterparts. Instead they might carry out their own research online, seek out a supportive teacher, or more often than not, simply push it to the back of their minds. They were all quite critical of careers advisors, with those who had experienced a careers interview describing it as
impersonal, uninspiring and in some cases, demoralising. For girls of this age, day to day concerns are centred on school work and exams – and outside of school, homework and their social life. Their interests included street dancing, photography, sport (netball, skiing), music and beatboxing, hair and beauty, YouTube and eating out with their friends. They are reluctant to give up the precious spare time they have, to seek out information about the different careers available to them, even though the cloud of uncertainty hanging over them can be a source of angst for some. Instead they want someone to engage them and take an interest in them, someone who can relate to their worries and concerns, and show them opportunities that are of relevance and interest to them. They want a personal approach that is tailored to them, not another online resource that directs them towards something they feel they have little interest in.

“My careers interview was in a cupboard. I’d never spoken to this woman before, and she was really like blatant. She was like, so what do you want to do...what are your grades. And she was like, you’ll get sent a piece of paper. I’d like more advice, and not being quizzed. Because she was like quizzing me...putting me on the spot”

Girl aged 14-15

The oldest girls (16-17) were in their first year of sixth form. They lead quite different, more independent lives compared with those at the start of their secondary school career. Most have part time jobs (e.g. cleaner, shop assistant, waitress, barista), giving them a first taste of the working world. Peer pressure is less of an issue for these girls, and most have an emerging ability to make independent decisions and think about what is best for them. Having said that, a couple of the girls were already beginning to doubt some of the educational choices they’ve made, wishing they had taken different AS subjects – but they feel it’s ‘too late’ to make a change now. The findings from stage 1 revealed that some of the women in industry had made last minute decisions to switch courses and subjects, but this takes great courage and conviction. Girls need to be made aware that it is never too late to change their mind, especially when considering a career in technology. They describe their parents as supportive, but say they don’t always understand the pressures they face – some even feel they downplay their concerns, leaving them feeling quite anxious.

“At the moment I am just like, oh I just want to do what I love doing. But then I know that money becomes more important as you get older. I don’t want to be working in a fish and chip shop forever, so I guess money is important at the end of the day, isn’t it”

Girl aged 16-17

“I didn’t really pick something I enjoyed. I went with more practical subjects and more theory subjects. I always think, oh I can’t change now”

Girl aged 16-17

About the Parents

For some of the parents we spoke to, particularly those with younger girls (9-13), the world of work and careers still seems a long way off for their daughters. It’s not a topic that is often discussed at home, with several saying their daughters are still too young to know about careers, or for them to really be able to engage them in a conversation about careers. But they do recognise that their girls are growing up fast and they are quick to acknowledge their ‘obsession’ with gadgets and technology, as well as their other interests – dance (ballet, hip hop, street dance), sport (trampolining, gymnastics), Scouts and, gaming (Xbox). Parents are central to the organisation of out of school activities and social engagements for younger girls - their commitment, support and often their encouragement, can have a significant bearing on whether girls have the confidence
and inclination to pursue an interest further – this is an important consideration when thinking about ideas and solutions that might appeal to younger girls. Observations about their daughters tended to focus on a growing confidence, increasing social skills, commitment and perseverance, as well as evidence of increasing tenacity and ‘attitude’ among some. Parents particularly noted changes in their daughters’ confidence and attitudes when they moved from primary school to secondary school.

For parents of older girls (14-18), the world of work is more pertinent. They are more engaged by the topic of careers and are much more likely to name some of the different career options being considered by their daughters. Their observations centre around their daughter’s academic abilities and their interests, but also personality traits including, being caring, a people person, loving, and confident. One or two parents also describe their daughters as quite challenging at times.

Some of the oldest girls have already got part time jobs – one works at a Chemist and is considering training to become a pharmacist dispenser, whilst another is focussed on being a retail fashion buyer, because that’s what her Auntie does. Few parents feel they know enough to help their daughters pursue their dreams, largely because the world of work for their children is very different to the world of work they are in, or went in to straight from school. In particular, older parents who had gone straight to work from school felt especially helpless. All of the parents acknowledged that girls have much more choice nowadays, but some also feel they have a much harder financial future. Several of the parents feel there are fewer jobs available, there is more competition, and moving out of the family home and buying properties are all much more difficult now. This can make their lack of knowledge about careers feel more acute.

“I’m 50 something and I still don’t really know what I want to do. I went on a careers evening and it was fab. I went, I could do that, I could do that, it was really good. But she’s 15. She needs to find her strength”
Parent of girl aged 9-13

“It’s a minefield going to that careers evening. You think it’ll be simple. You know the accountant is there, the beauty, but there are just so many. Different sorts of internships and things they can do before they even consider university and stuff.”
Parent of girl aged 9-13

“I can’t answer any questions she’s got, so it’s got to be Google. When they come home with homework, I’m like what”
Parent of girl aged 9-13

About the Teachers

All of the teachers that we spoke to felt they had a good knowledge of their subject areas and were passionate about what they do – their enthusiasm and willingness to take part in this research was evidence of this. However, increasing time pressures and limited links with industry mean that their knowledge of the different career opportunities now available to students, is out of date. Furthermore, they all agree that the social stereotypes surrounding STEM and ICT are impacting on girls’ perceptions and choices.
“As a primary school teacher, I don’t feel that I know anything really about technology (careers). Because for us, they feel this is too far in the future for them. To know what strands are involved within technology, that would be really good”
Male Teacher, Primary

“I am only hearing about things through the papers and chatting to my friends. I am a little bit out of touch with that so I do think, having some training to say, well actually do you know this and do you know this, would be really helpful”
Male Teacher, Primary

“Hand on heart, it’s always been boys that are far more interested in the mechanics of how something works. And a lot of the apps, a lot of the software we use, it seems to be very sexist towards the boys. It doesn’t seem to involve the girls as much”
Male Teacher, Primary

“Once you can get the children to think about their career prospects, and see that they are not just going to be sat at a desk, they could actually be liaising with people, maybe sourcing materials, you might even be doing the programming, you know, once they can see the logistics, I think they actually get quite into it”
Male Teacher, Secondary

Aside from mentions of BBC Bitesize and Rory Cellan-Jone’s technology blog, none of the teachers felt they could name any resources or references that can be relied upon to keep their knowledge up to date. There was also a feeling that since lessons have to be prepared and agreed so far in advance to fit with the set curriculum, it is often difficult to keep up with and incorporate new developments.

Yet there was some evidence of teachers finding ways to inspire girls, including one teacher who has directed pupils towards Adafruit’s wearable technology website, which was founded in 2005 by engineer, Limor “Ladyada” Fried. The website also provides a link to an inspiring article on magazine site, Glamour, entitled ‘35 women under 35 who are changing the Tech industry’ - http://www.glamour.com/gallery/top-new-women-leaders-in-technology#8. Whilst another teacher said that attending an event run by the SmallPeice Trust - http://www.smallpeicetrust.org.uk/ - had resulted in a really positive effect on girls’ perceptions, particularly in relation to ‘geeky’ stereotypes.

But despite these moments of inspiration, what teachers value most are ideas and solutions that take some of the time and pressure away from them, particularly with regards to researching information and findings ways to present it in a fun and engaging way. Most of all they would like solutions that are easy for them to use, make it easier for them to motivate girls to use, and content for presentations to pupils and parents e.g. parents evening, options etc. In terms of the overall delivery of information, teachers suggest looking at how girls use social media and interact with content online in general. They believe that online / virtual methods such as YouTube videos, blogs, vlogs, would have a good ‘fit’ with the technology industry and the careers it is trying to promote.
“I don’t necessarily think it is the activity. I think it is how you sell it. I have an all girls robotics team, but rather than putter a general list up or making announcement, I started targeting girls by saying, you know, Amanda do you know what, I really think you would be good at this, and maybe bring some friends along and see what happens. I found I had such a better uptake by sort of singling them out. They wanted a friend to go along with it though. You do get the odd very confident girl who would be like, well I don’t care and go for it, but I find the majority are just a little bit more reserved. I also find their design work is very neat and very accurate, but less kind of exploratory. Very, you know like, the idea has to be right from the word go”

Male Teacher, Secondary

Plans for the future

Most of the girls were looking forward to the future and the prospect of working, but as they get older, they admit to feeling worried and apprehensive – what if they’re not good enough or they make the wrong decision about what to do, once you commit to something, can you change your mind?

From a young age, their thoughts about potential careers tend to be based around their interests, the subjects they’re good at, the professions they’re exposed to on a regular basis (Teacher, Doctor, Dentist etc), and occasionally what their parents and extended family already do. Faced with a vast number of possibilities, they often learn to discriminate on the basis of limited information – the youngest girls in particular have real difficulty understanding or being able to comprehend what some jobs actually entail, and so the adult world of work can be quite ambiguous to them, and shrouded in mystery.

Most of the girls had given some thought to what they want to do when they’re older, even the youngest ones – although choices typically become more sensible and rational with age. By age 14-15 several of the girls felt they had already closed the door on some choices, as a result of choosing certain subjects at GCSE. Some feel this makes the decision process a bit easier, whilst others are concerned that they might have already limited their choices without knowing enough about what they want to do or what opportunities are out there.

“If you have an interest, you just stick to that, you kind of block everything else out really”

Girl aged 16-17

“I want to do something to do with law. My auntie is a barrister, and that’s where I’m doing my work experience”

Girl aged 14-15

“Modern jobs aren’t like the best jobs to have, they are not well paid. Some of the best jobs out there are the old ones, the traditional ones”

Girls aged 14-15

“Everything we do at school is to, to try and make you decide what you are going to do with the rest of your life. It’s nerve racking. You mess up now and that is it. I think there is a lot relying on us, when we are only like 13 and 14. You think, what if I was in training to be a farmer and then I decided to be some fancy scientist or engineer – you don’t have the qualifications to be able to do that, because of what you picked when you were 13. That affects the rest of your life.”

Girl aged 14-15
The girls had a range of career aspirations with several describing a medical career of some kind – paediatrics, neurology, dentistry, general practitioner and veterinary medicine. Other quite traditional suggestions included teacher and lawyer. Individuals suggested photographer, make up artist, wedding planner, dancer and singer. One of the older girls had aspirations to become a forensic scientist, whilst others suggested zoologist or engineer. A few had narrowed down their choices to ‘something scientific’, but were unsure about the detail. None of the girls specifically mentioned technology.

The girls know very little about the qualifications needed to pursue their chosen career paths. Several said they had purposely chosen a broad range of subjects at GCSE to ensure they keep as many options as possible, whilst others are hoping that by choosing subjects they enjoy, it will eventually lead to a career they enjoy. One or two girls in each of the older groups had absolutely no idea what they wanted to do.

In each of the groups, the girls were able to name a range of skills that they think will serve them well in their chosen careers, often opening with a list of interpersonal skills such as the ability to listen and communicate with others, a calm composure, confidence, open mindedness, perseverance and patience. All of the groups also identified creativity as an important skill, whilst individual groups spontaneously mentioned attention to detail, problem solving, good qualifications and a good work ethic.

Parents of younger girls said their daughters could be quite changeable in their career choices. If the topic was discussed several said their young daughters might suggest one of the classic professions – particularly teaching, a doctor, or a vet. Others suggested they might follow one of their hobbies as a career especially a dancer or a beautician. Interestingly some parents said they might steer their daughters away from certain careers – such as medicine as it might be too challenging and two said they would advise them against what they did themselves – namely selling, as it was unrewarding and too hard.

Half of the parents of older girls said their daughters knew what they wanted to do. Two were committed to becoming teachers and this was a passion they had had from an early age. One was determined to be a retail fashion buyer – a career she had discovered through a family member. Another was determined to combine her love of horses with her interest in design and was hoping to become an equestrian clothes designer. These girls were all in years 10 – 12. Parents of other girls in the same age group however said their daughters still had no idea what they wanted to do, while others reported they were still changeable in their ideas. These decisions and convictions about careers seemed to be based more on a passion for something and personality rather than age or careers information.

“It changes all the time – she wanted to be a vet, then a lawyer and then a social worker. Now she wants to be a social worker but I’m sure that will change”
Parent of girl aged 14-18

“With careers she’s academically very strong in maths and IT, but she has no interest. At the moment she wants to be a translator”
Parent of girl aged 14-18
Help and Support

Parents are the main source of support for girls, especially mums. Up until the age of 14-15, most girls are generally quite happy with the level of involvement from their parents, aside from some occasional nagging. They feel their parents take an interest in what they’re doing, listen to them, encourage them, and support them with extra curricular activities. Apart from one or two girls who felt quite pressurised by their parents, most said they had been encouraged to pick GCSE options that they enjoy, and to keep their options open as much as possible. Many parents agreed that GCSE choices should be based on subjects their girls enjoyed. Interestingly many felt they were often quite excluded from this process by their schools – and although invited to options evenings in year 9, they often found that these were quite late in the process and that their daughter’s choices were often mostly determined before parents became involved. Those with subsequent children felt much more comfortable and aware of the process second time around.

Most parents said they feel it is their role to support and guide, but not to dictate. They want their daughters to find something they are passionate about and something they really want to do. This is key – and it has to be their choice. In a recent research study carried out for the Institution of Engineering and Technology (http://www.engineer-a-better-world.org/research/), CHILDWISE uncovered some subtle, but indicative gender differences towards the career aspirations of their sons and daughters. While not across the board, for parents of some boys, the natural instinct was that a son needs a job that offers good money and security – based on the expectation that they are likely to one day become the ‘breadwinner’. Whilst parents of girls were typically more relaxed about this, and placed more emphasis on their daughter finding a career that she will enjoy and flourish in.

“Do you think the girls will think to themselves that one day they will just get married and the careers won’t be important? I sometimes get that from Lucy”
Parent of girl aged 14-18

“I think it’s changed now, they are made to be more independent, they can’t rely on getting married to a man with loads of money”
Parent of girl aged 14-18

In the discussion groups, parents said they feel their role is to point out the realities, such as qualifications, likely salaries, with one or two saying they want their daughters to do better than they did. But whatever their choice of career they want them to be happy in it and to love it. Parents openly admit to feeling at a loss as to how to help guide their daughters – they can only advise based on their own (often limited) career experiences.

“It’s got to come from them, you try and pave a way for them, but they have to want to do it for themselves”
Parent of girl aged 14-18

“I think you have to be supportive and give them the opportunity. Everyone has their own experiences and things do change, and they may not get it right first time. They have got to have the opportunity to make their own mistakes and to learn from their mistakes”
Parent of girl aged 14-18
Furthermore, parents of younger girls were very aware that their daughters would change during their teenage years, and subsequently their interests and abilities might change. They were therefore unconcerned that their younger daughters did not yet have career aspirations.

Girls who share similar interests with one of their parents tend to be most confident about their choices, because there is already an existing level of knowledge within the family. But other girls typically begin to question their parents’ expertise and level of knowledge around the age of 14-15, particularly if they are interested in pursuing a less traditional career or have no idea what they want to do. It is at this point that they begin to look elsewhere for advice and support. Some approach a supportive teacher or look online for help – whilst others simply push it to the back of their mind and ignore it for as long as possible.

All of the girls said they would like the opportunity to speak to people with more experience and knowledge – they want people to engage them and take an interest in them, get to know them, and show them opportunities that are of relevance and interest to them – most acknowledges that this goes beyond the expertise of their parents, but also their teachers too. One of the teachers we interviewed acknowledged that the amount of ‘contact’ time that students have with teachers is dramatically reduced at secondary school, compared with primary school, and this can make it much harder for girls to build relationships with teaching staff. Furthermore, some parents say they feel quite excluded from Secondary school, in comparison with Primary school, and they don’t really know what is being discussed with their children or what advice they are being given – the result of this can be a fragmented and inconsistent approach to careers information.

“Someone, not a teacher though, they just get boring. Someone that is interesting, that can make something hard seem fun”
Girl aged 14-15

“Someone that has lots of experience and knows about things and isn’t judgmental about what you want to do. Because you can talk more if you become familiar with them because you are more comfortable”
Girl aged 16-17

Parents commonly felt that if and when their girls wanted to find out about careers or potential jobs that they would probably be very able to find the information themselves. Googling is second nature to all of them – for school work – or anything. They felt this would probably be their daughter’s first port of call for information, rather than parents, schools or careers advisors.

Perceptions of Careers in Technology

When the topic of technology was first revealed to the girls, it was met with mixed reactions. All of the youngest girls (age 10-11) and most of those aged 12-13 were excited and enthusiastic about it. For them, technology is fun and engaging. Several of the youngest girls had recently taken part in a CoSpace Robot Competition - an educational platform providing a fun and engaging way for young people to develop their computational thinking skills and to get involved in programming and algorithm development. The girls had really enjoyed this experience and they were keen to take part again next year. They were also quick to highlight the entertainment value of technology and “what you can do on it”, including watching TV and YouTube videos, playing games and listening to music.
But when these younger girls were asked whether they would ever consider technology as a career, they were hesitant — one of the girls said she would describe it as “a hobby, rather than a job”. They immediately began talking about their ICT teacher — he is always very busy, sometimes he has to teach two classes at once and he has to use a computer a lot — this is not an image that appeals to a 10-11 year old girl. Thinking beyond teaching, their assumption is that a career in technology will be very complicated and there will be lots of pressure to get things right the first time — they volunteered coding as an example of this — “if you miss out one bracket, it won’t work”. This perception of technology was also reinforced among the older girls, and among some of the teachers we spoke to. The primary teacher said that the programmes and the software used within the curriculum appear to be more aimed at boys — he gave the example of MusicWise. Although lots of girls like to listen to music, he says they don’t necessarily want to know the mechanics of actually making music, and often they are unimpressed by the end product. However, the boys are not too bothered about the end product, but they really enjoy making the actual music and seeing how it all works. These types of activities can fail to engage the girls right from the start, and they can quickly make the assumption that ICT is not for them.

“I think it’s kind of boring if you are really into computers, there is nothing really exciting about it. You have to be very specific, if you get one thing wrong, you sort of feel disappointed in yourself. If you get one thing wrong in computers, then basically you’ve got everything wrong.”

Girl aged 10-11

“I wouldn’t do it as a job. Full time it would be exhausting, you would need to try and remember everything. If it was just a hobby, you would choose the bits that you want to do.”

Girl aged 10-11

When the topic of technology was first revealed to girls aged 14-15, it was met with an audible groan — “it’s just not something I can see myself doing”. Along with the oldest girls, they are quick to acknowledge the talent and expertise needed to pursue a career in technology, but equally quick to assume that it is not for them — too complicated, repetitive, too ‘techy’, and stressful. Many of these assumptions are drawn from their experiences of ICT at school, along with references to people they know who work in similar professions — one girl talked about her dad who works on a computer all day and is stressed because several people were made redundant in his company and now he has to do the work of five people. This is not an image that these girls find appealing.

“I think you sit in front of a computer all day, and how boring would that be? My dad works in IT and it is a lot of stress. Everyone lost their job and my dad has to do everyone’s job and he is really stressed.”

Girl aged 14-15

“It’s a bit complicated. You need to have patience and good concentration. Imagine you were making a game and then it all goes wrong. Most people who play games, like they’re just stuck in a room by themselves. I think it would be one of them jobs that you wake up and you’re like, oh I can’t be bothered today…”

Girl aged 14-15

“You can’t make mistakes with technology, like what if it’s going to be used in a hospital or something. I think you need to know quite a lot about it”

Girl aged 16-17

Instead they want a career, or more specifically a job, that is fun and exciting. A few of the girls had experienced life events that have steered them towards a particular path e.g. doctor, dentist, zoologist, but more often it is the prospect of having fun and doing something they really enjoy that
appeals most to the girls. **They are interested and engaged in new things from an early age, but this enthusiasm begins to dwindle as they get older, as school work and exams begin to take centre stage.** They are typically drawn towards subjects they enjoy and teachers they feel inspired by – but by the same token they are put off by subjects they find difficult and teachers they don’t get along with.

Some of the girls really struggle to appreciate the impact that technology has on the subjects and interests they do enjoy – they have never known a life without technology, and in some cases they overlook just how much of an impact it actually has. In one group, two of the girls said they really enjoy choreographing their own dance routines for school shows, but said they weren’t really interested in the technology behind music. Yet when they were asked whether they simply think about the different moves to include, or whether they think about the choice of music to use, the impact of different lighting, how to mix different music tracks together…they began to see technology in a different light.

**The subject that all of the girls are most likely to associate with technology is ICT.** None of the girls regarded this as a favourite subject, with most describing their lessons as boring, repetitive, out of date and often confusing. One girl described her lessons as “**horrific**”, describing how they had to watch endless powerpoint slideshows and design flow charts. However, a **few of the girls were more positive towards Computer Science**, describing this as more creative and interesting. Many of the girls also felt it would be important to work hard in Science, Maths and English, in order to pursue a career in technology. The creative link with Design and Technology was only mentioned in one of the groups (Year 8), and other than the CoSpace initiative, none of the girls had been involved in any tech projects or clubs – although the younger girls (10-14) were receptive towards the idea of these. Without more accessible female role models in ICT / Computer Science, and more innovative and engaging activities, girls will struggle to relate to technology as an option for their future.

**In the parent groups, mums and dads were able to cite a broad range of careers in technology, beyond the usual coders, developers and programmers.** Unlike some of the girls, they appreciate that technology roles are present in any company and that opportunities go way beyond what children learn in their ICT lessons. They also talk about modern roles such as web designers, social media roles, bloggers and games designers. The words they associate most strongly with the industry are innovative, inventive, analytical and technical. In addition they add essential, creative, important, problem solving and technical. Interestingly neither group associated the technology industry with the words friendly, sociable, easy, exciting or familiar.

> “I think technology is becoming more integrated into all industries, so you can be involved in IT or whatever you call it, and you can be in any of the industries sitting around the table here”
> Parent of girl aged 14-18

> “In mathematics she wasn’t interested, but now she quite likes it because it’s problem solving and she quite likes to problem solve and actually she’s satisfied when she’s worked out what the answer is”
> Parent of girl aged 9-13

But despite this initial enthusiasm and open mindedness, parents quickly revert to stereotypes when describing the types of people who work in technology – and they describe the typical technology employee as male, quiet, young, clever, determined, focused and something of a loner. This rarely meets the description of their confident, outgoing, sociable daughters.
“A lot of analysts like to work on their own and use their own initiative. They’re in their own little zone. Sitting in an office 9 to 5 on a computer is really boring”
Parent of girl aged 9-13

“I would feel that Rebecca would be wasted (in the technology industry). She is a people person. There are more people sitting in offices now and on laptops. I would like to see her out there with people”
Parent of girl aged 14-18

They later acknowledge that these views are probably quite dated, but with very limited first hand experience of the industry, it is difficult for them to think beyond this. And those who do have first hand experience of the industry did sometimes confirm that a lot of their IT support colleagues were often quite like this.

The parents of younger girls (9-13) couldn’t see far enough ahead to see their daughters choosing it as a career, but parents of older girls could – provided it was something they really wanted to do and had developed a passion for. At the moment, technology is not a career that parents would typically suggest or even encourage their daughters to pursue, but given some signs of interest and curiosity from their child (or perhaps an encouraging teacher), they all regard it as a good choice and would willingly support them on their journey to find out more. On reflection some parents suggested that since the daily use of technology is second nature for their daughters that an unspecified technology role probably should be of interest to them. Others whose daughters already had a career choice in mind were less convinced – although they acknowledged that using technology was likely to be an essential part of any career – from teaching to fashion to retail.

All parents expect their girls would have to work hard in the core subjects – English, Maths, Science and for some – ICT in order to have a technology based career.

A few of the parents said they could potentially see their daughters in a social media or blogging role. Blogging and vlogging are highly regarded among young people, with a recent survey of 18-25 year olds considering it as the top job to have, followed by sportsperson, Doctor, Politician and Musician - http://edtechnology.co.uk/Article/blogging-is-top-career-choice-for-young-people. These results show a shift in the mindset of young people, along with the domination of life online. Any potential solutions and ideas will need to consider how much young girls (and boys) value the opportunity to read, watch and write about their favourite things online. One of the teachers we spoke to questioned why there aren’t more female technology bloggers online, especially on popular news sites such the BBC – more online content from female ambassadors could help tackle some of the negative gender stereotypes associated with the tech industry, and could also help girls lacking in confidence or direction.

Boosting the number of women in Technology

The girls in the groups were not particularly surprised or concerned that more men than women currently work in technology roles – provided that girls can do so if they want to. They felt it was important that girls be given the opportunity if that is their choice, although some were suspicious that the industry is trying to recruit women to fill roles that men no longer want to do themselves – ”Is it because no one else wants to do these jobs?” Most girls and teachers were keen that any potential solutions target boys and girls equally. Similarly, teachers feel that solutions should not positively discriminate – they would like to see initiatives that target boys and girls, but with a focus on female role models.
“I think it should include boys as well, because if you leave out the boys they will think no one is there to support me. In the old times men were allowed to go to school and vote, but it was unfair on the women. So it would sort of be putting them in that position.”

Girl aged 10-11

“I don’t think it should just be girls. You can’t really be that sexist about it because you have got to let men do it because ages ago women had to fight for their own rights to do things and we want to be treated as equals, so we should let men do it as well”

Girl aged 14-15

There is a lot of groundwork to do with girls to convey the wide range of exciting and different jobs available in technology, beyond their immediate associations. There is a degree of innate resistance to the concept from many girls who simply do not perceive themselves as a ‘tech girl’. However, from an early age they are interested and enthusiastic to know more, and this presents an opportunity to show them that technology features in just about any area they can think of.

When asked what they think needs to be done to help boost the number of women in technology roles, the overwhelming response was “show us what we can do” – “seeing is believing”. When they are encouraged to think beyond the stereotypes, most girls are interested to know a bit more, but they want to see things with their own eyes – they want more video content, workplace visits, open days, visits to schools and work experience opportunities. Parents and teachers echo these views, but also highlight that the presentation and delivery of this information is just as important as the content itself – it needs to capture their enthusiasm, challenge their perceptions and most of all be relevant to them.

“If someone female does something like, I don’t know, a big computer game or whatever, put it out there. We never really see on the news, this woman did this. We know Mark, the guy beginning with Z, we know them, but they are all men. You don’t hear about the women. And not women that wear loads of makeup and have had surgery. Show us the normal women. Girls are scared of what people, other people will think. People are scared of what will happen if they say I want to be a games designer, because that is a man’s job and you can’t do that. Yeah you can! People are too scared of what other people will think of them.”

Girl aged 14-15

“I think getting involved in workshops and things, because when I get told about things, oh this is what happened, I don’t know, it just doesn’t really sink in. I have to be shown something to get more in-depth with it. Technology lessons in school, if they were just a bit more up to date...everyone just hated it. It wasn’t interesting. I have never had an IT lesson where I was like, oh I really like this. It was all old school stuff. Or coding.”

Girl aged 16-17

“I think they need a better understanding of what IT careers are available. I think far too many people have a fixed idea in their heads that it’s about programming, but it isn’t all about programming. Technology is changing and it won’t be the same in five years time. These are potential opportunities”

Parents of girl aged 14-18

“They need to start younger, because for us it’s too late. If my daughter was given more power and explanation in Year 9, I think she might have done different courses”

Parent of girl aged 14-18

“It’s definitely about role models. I still feel I am up against preconceived ideas at an early age. So I think the key is definitely younger. Having maybe female engineers coming in and having a chat, and if they run a challenge or activity, make it less focussed on girls and engineering, and more about the challenge”

Male Teacher, Secondary
**Evaluating Solutions**

**Skills Framework** – a place where girls can find out more about careers in technology, and do games and quizzes to find out what sort of tech career would suit them best, based on the things they enjoy doing.

This was a popular solution in all of the girls groups, but especially among girls aged 10-15. They felt it could be introduced around the age of 12/13, when they are starting to become curious about the working world and where they could potentially fit in, and whilst they are still keen to know more. Several of the older girls feel that the current process of careers interviews in Year 9 is too rushed and impersonal. They would like the opportunity to find things out (informally) before this, so they feel more prepared when they have to start making decisions.

All of the girls said they would like to find out about careers that are different and less well known – in two of the groups they made reference to an umbrella, describing how they would like to see all of the different careers and jobs covered under the umbrella of each topic or area.

“So there are the classic jobs – vet, doctor, lawyer…and then there are millions of others out there. It is like when you have umbrellas. So you take medicine, medicine has neurosurgery, then there is cardio…there are so many different types. You should be able to type in an idea of what you want to do, and it should show you the jobs under that umbrella”

Girl aged 14-15

But in order to appeal to this age group the framework needs to be a fun and exciting resource, preferably an app of some kind, and with a subtle focus on careers. One of the younger girls suggested an online board game, where they are encouraged to reach the end and collect information along the way. The emphasis should be on building their knowledge and expanding their horizons, rather than imposing a decision or encouraging them to focus their choices too soon.

“I think a game on the computer is a good idea, or a phone or something like that. Because usually children don’t want to bother with a piece of paper, they would probably want to go on the computer and play a game”

Girl aged 10-11

Older girls (16-17) were also interested in the concept of a skills framework, but their requirements were slightly different. They would like a resource that alerts them to open days and local activities, gives them opportunities to chat (online) with industry ambassadors, and helps them prepare a CV. Along with some of the 14-15 year olds, they also liked the idea of being matched with other like minded people, so they could discuss mutual interests and potentially find new friends – they think this could be a useful source of support as they get older.

“You know when you get live chats online as well, like maybe somebody in that industry... I think Adidas do it. I know that is completely different but it is actually quite helpful. I would much rather have a conversation than just read information. We always like a bit of reassurance”

Girl aged 16-17

All of the girls were interested in the idea of an app that acts as a portal, directing them towards new content, people/companies of interest, games and competitions. Video content is especially popular, across the age range. They would expect to access the framework via a login of some kind, affiliated with their school.
Despite their initial enthusiasm, a few of the older girls (14-18) raised a concern about how accurate the framework would be in identifying the type of tech career that would best suit them – they haven’t found ‘career quizzes’ particularly inspiring in the past. They also admit that they don’t always give honest answers, but instead give answers that they think are ‘right’. The framework would need to make allowances for this and build up a profile over time, rather than on the basis of one survey. It should also steer away from recommending specific job roles, but instead direct girls towards relevant content that might be of interest.

“Some answers, you don’t always put the truth because sometimes you don’t want to; so sometimes you make up your answer a bit or you don’t have an answer for the question.”
Girl aged 12-13

“I don’t think they are very good because I remember we had to do one in Year 9. It recommended what you were good at and I hated it, it came up with such weird things. I can’t even remember but it was like nothing that I am interested in”
Girl aged 16-17

Parents also responded positively to the Skills Framework, recognising that it could “sow the seeds” for a future career in technology. They felt it would be a good opportunity to show the youthful and playful side of the industry, and step away from the serious and complicated image that people typically associate with it. Some parents of older girls made reference to the huge social media departments that most companies have nowadays – they think this is an area that their daughters would be really interested in, and there would be lots of opportunities for them to interact with people and ask questions. However, it is important to remember that most social media apps and websites do not allow children to sign up until they are 13 years old.

“I think this is really good, because it gives them the opportunity to understand that it’s not just the old IT careers they would be channeled into, and it lays out the opportunities, and in simple terms that they can relate to”
Parent of girl aged 14-18

“I think doing games and quizzes is slightly childish. Lucy would look at that and think, do me a favour. She’s gone beyond this sort of thing. It would be good at the end of Primary school”
Parent of girl aged 14-18

The Skills Framework in its current format was less appealing to teachers. It was felt that a “one stop shop” resource with up to date information about careers in technology would be beneficial to teachers and students, but their concern was that it would be text heavy and it would fail to engage the girls. However, they all agreed that a resource featuring lots of video content would be more appealing, especially given girls’ love for video sharing sites such as YouTube. Suggestions for content included ‘virtual’ work place tours, video conferencing with ambassadors and, video conferencing Q&A sessions with women in industry. Using online technology to promote the technology industry was a popular suggestion, and all of the teachers felt this would sit comfortably with the girls. Several of the teachers also felt this type of content could be used in lessons, presentations and parents evenings, and would be especially helpful when girls were choosing their options.

“I think that would be a fantastic idea in primary schools, because it comes back to what we’ve said about knowing the career path and knowing what all the different strands are”
Male Teacher, Primary
“It is okay, but the danger is though, I feel you should always be positive. So I think, yes, do the tests but leave them open or make them so they are not closing any doors”

Male Teacher, Secondary

“Maybe having promotional videos, so that at parents evening or whatever you can say...here is what I think, but also watch this YouTube clip. Have a series of people talking...how that leads to a career.”

Male Teacher, Secondary

Mentoring scheme in schools – invite young women already working in tech careers to mentor girls who would like to know more about what the industry has to offer. These women would support and encourage girls by offering suggestions and knowledge throughout the academic year, helping the girls to make more informed decisions about their future.

The mentoring scheme was also a popular suggestion, with interest peaking among girls aged 14-18. It was suggested that it could follow on from the framework, with mentors chosen to represent areas of technology that girls are most interested in.

The general consensus among the girls was that a mentor would be most helpful to those who have chosen their GCSE options, and are starting to think about their post 16 choices (age 15-16). This is when girls feel they start to have questions about the best route for them, the type of qualifications needed and what opportunities are available to them. It is also the stage when they begin to challenge their parents’ (and often their teachers) expertise and knowledge.

“I know enough about the options, but I don’t know enough about what I want to do...what I am going to do. Like what options would you need for this?”

Girl aged 14-15

All of the girls liked the idea of speaking to someone young (early to mid 20s), who can relate to their situation. The prospect of face to face interaction, the personal touch, an opportunity for someone to take a real interest in them and what they’re capable of is really appealing to them. They don’t get as much ‘contact time’ with teachers when they reach secondary school, and this is something that many of the girls miss. This type of approach would help them to feel involved in the industry, with one girl going as far as to say it would make her feel like less of an outsider. This in turn would give them a greater incentive to succeed and do well, because someone had invested time and energy in them, and they wouldn’t want to let them down.

“You have someone who has had the experience. It is more personal that just googling. It gets through to you. IT at school isn’t great, so we don’t know what is out there, because we don’t have access to it. I feel that we don’t now how to use the computer, other than Scratch and making websites. I want to find out a bit more on what you can do on a computer. Put it out there, encourage us. Make it fun”

Girl aged 14-15

“I would prefer a person who you could see face to face, and see what they are saying. I would prefer somebody who would actually want to talk about me”

Girl aged 12-13

“They could come into school first to talk to girls as a whole, and then you would get some interest, and see how many of you would want to do it. I would like to know about them, their experiences. It would make you feel a bit more involved in the industry. You feel a bit clueless and a bit like an outsider, like you’re not sure how to get in”

Girl aged 16-17
“I like that it is so individual and specific to you. It means more when you know that there is someone that is willing to give you that help”

Girl aged 16-17

A few of the oldest girls were already beginning to doubt some of the choices they’ve made, wishing they had taken different AS subjects. They were keen on this idea because it might give them the opportunity to speak to people who have followed a less conventional path into technology, to help reassure them that it is never too late to change your mind.

Parents were equally enthused by the Mentoring Scheme — particularly since this is a familiar concept. They feel it could work with girls as young as 13. In particular they like the idea of it bringing roles to life, and helping their daughters to appreciate what life is really like in the working world, plus the prospect of it not being a ‘one off’ visit. However, they are quick to stress that mentors would need to be “young and funky” in order to build a rapport with their daughters, and they are unsure exactly how the girls would be selected to take part — they would need to be chosen, they couldn’t be relied upon to put themselves forward because technology is simply not an obvious choice for them.

“That’s really good. You can speak to someone that’s already doing it. And not just a one off, throughout the academic year, that’s good”

Parent of girl aged 9-13

“Turn up in jeans, torn jeans, but actually talk about technology. Don’t turn up in a suit, they’re not going to be interested. And have a different skill set, like maybe a couple of IT directors and then smaller fry, you know what I mean, where they build up to the bigger picture. Have a big spectrum”

Parent of girl aged 9-13

“I think this makes it more of a reality for them, it’s like getting first hand information. There is so much going on in Year 9, if you want to plant a seed with them, do it earlier”

Parent of girl aged 14-18

The Mentoring Scheme was initially greeted with much enthusiasm by teachers, although further exploration did highlight some issues. The most appealing elements of the scheme were the prospect of building better links with industry (something that teachers struggle to do themselves), and the opportunity to challenge the negative gender stereotypes associated with the technology industry. It was also felt that the scheme would have longevity, and could potentially have a real impact on girls’ commitment and enthusiasm for STEM subjects. In particular the teachers felt it would be most suited to highflyers who already show confidence in these areas, and those who might be lacking confidence and direction. Based on its current description, teachers were generally in agreement that this idea would work well for girls who had already selected their GCSE options and showed an aptitude for STEM (15-16).

“I think mentoring is the way to go. We do a lot of mentoring with the staff, from other schools and working collaboratively with each others’ schools. But we don’t do enough of it with the children”

Male Teacher, Primary

“I think that is a good idea. Mentoring is always a good way of encouraging people. I just think when people are mentoring, that is when you have what I call a real life role model, because they are doing what you want to do. How it fits into the school curriculum might be up for discussion though”

Female Teacher, Secondary
Whilst initial reactions to the idea were positive, further exploration did reveal some potential issues. Teachers were unsure how the concept would work in practice – would girls need to have time out of lessons, could it fit in with the curriculum, would they be expected to convince the headteacher that time away from planned activities would be worthwhile? There were also concerns about pupil safeguarding and risk assessments, particularly if girls were to meet mentors on their own, and if there was a continued relationship – who would be responsible for monitoring this? Teachers were also apprehensive about whether the success of this scheme would be dependent on them sourcing mentors, as well as organising and managing their visits.

But despite their concerns, several of the teachers felt the principle of this idea was very good. During the interviews some of them shifted away from the mentoring idea towards one where female representatives could come into school and run group sessions, set challenges and have Q&A sessions, rather than one to one mentoring. The idea of group activities was felt to fit a wider range of girls, and could potentially be introduced in primary schools, where early preconceptions and stereotypes are often formed. It was also felt that it would be easier to organise and manage for a group or class – both in terms of safeguarding, but also including boys and fitting it around the curriculum. Some also argued that in their experience, girls tend to prefer attending sessions or taking part in activities as a group, and are less confident to take part on their own. This supports the findings from the groups with girls – they are open minded about group work, provided they are with people who share similar interests. Furthermore, they all said they enjoyed the group discussion for this research – “this kind of group” – it is a different type of experience for them, a break from the usual routine, and several of the girls said it had encouraged them to look into different opportunities, rather than the most obvious ones. However some would also like the opportunity to speak with a mentor on a one to one basis, so that they can discuss their individual needs.

“I think that would work more within Secondary school. I think for some of our children at 11, they probably wouldn’t know what they want to do as a career, but it might open their eyes up, to think, oh I never thought of that. As groups it would work for them, probably as an after school club. Mentoring would be fantastic”
Male Teacher, Primary

It was felt that through mentoring and the exposure to female industry ambassadors, that real life role models could be developed. This was regarded as really important among the teachers. They also felt that building better links with businesses and industry would encourage better quality work experience opportunities.

The idea of workplace visits also generated a positive response, from teachers, girls and parents. In particular, girls really liked the idea of open days and opportunities for relevant work experience – they want to see first hand what the working world is all about, they want to feel inspired rather than anxious, and they want to feel more confident about the choices they are making. Teachers were slightly concerned that they would be responsible for finding the places to visit, there would be issues around safeguarding, and more time away from lessons – but in principle they thought it would be a very good idea.

“My daughter has been to a thing at the Science Museum. She’s not really science-y or technical, but she came back absolutely inspired”
Parent of girl aged 9-13
“I think this is a great idea, because sometimes we are in this nice bubble. We need to see what the industry is all about”
Female Teacher, Secondary

The majority of girls, teachers and parents said they feel the mentoring idea would be more effective if it included boys as well. Most of the girls were uncomfortable with an initiative that is just for girls. They recognise the need to recruit more women into tech roles, but also feel that boys could benefit from an approach that helps increase knowledge of the opportunities available within the industry and challenges the negative gender stereotypes. Several of them are also uncomfortable with the idea of being singled out or treated differently, in case this makes them a potential target for abuse. The pressure to fit in and conform is incredibly important to some girls.

A campaign to build knowledge and awareness among parents and teachers – parents and teachers are the people who help to uncover the potential of young people, often before they can see it for themselves. The technology industry is fast moving and more needs to be done to help keep parents and teachers informed about the careers available to girls, along with the skills and characteristics that are most in demand.

This was top choice for half of the oldest girls (16-17), who feel their parents have no idea about the pressures they face. They would like their parents (and teachers) to be a source of knowledge as well as support – some feel their parents (mostly mums) have no idea about financing higher education, the range of different routes available and the different types of careers opportunities. They think a careers evening, just for parents, would make them more aware of the different options, and could show them how best to support their daughters. All of the girls think their parents would be willing to attend an event like this.

“I think this is a really good one, my parents know nothing. I think sometimes they don’t know how to help us and what to do, especially if they aren’t sure about the industry”
Girl aged 16-17

“My dad is clueless but he likes to try and support me. He is like, I haven’t got a clue what you are talking about.”
Girl aged 16-17

Whilst parents were initially very receptive to the idea and cite the effectiveness of similar campaigns such as raising the profile of midwives and the Barclays coding campaign, they were unsure about how this campaign could be effectively executed. They want to know how they can support their daughters, but at the same time, they don’t want to be overwhelmed with information. The most obvious route to them is TV advertising, but others also suggest targeted year group newsletters from school, and events during school holidays. However parents of older girls in particular questioned whether schools would have the time or resources to be able to engage with such a campaign given the cuts that have been made to careers services to date, and the continually increasing pressures on their time.

“If your daughter shows an aptitude for something, you need to be aware of what’s available to them”
Parent of girl aged 9-13
"I wouldn’t have come across coding if it hadn’t been for the Barclays adverts with children going to Barclays to do coding. I mean, I did look and there was one in London”
Parents of girl aged 9-13

“I think this is massively overdue and I think the schools are quite a long way behind where they should be on that.”
Parent of girl aged 14-18

“I think it should be some sort of meeting through the school, but promoted in a different way, not just a careers talk, something like come in and talk about modern careers that you don’t know about. I’d like to know what subjects they would need to study and the path they would need to follow to get to the jobs available.”
Parent of girl aged 14-18

The teachers were very keen on this idea and felt it could potentially tick a lot of boxes – keeping teachers up to date, allowing girls to find out about the range of careers available, educating parents that tech is a valid education and career path, and addressing social stereotypes. It was also felt that the awareness campaign could easily incorporate elements from the other ideas, such as building links with female ambassadors, industry and local businesses, and developing an online resource showing the different types of careers available and the different types of women working in those careers.

“Within Primary Schools, we don’t have anything that keeps us up to date, in terms of what’s going on in careers and things like that. We will get a directive from the government or the local council, so like this is what you need to be doing. But that’s it. Then you live in this bubble really, and you forget that there is an outside bubble”
Male Teacher, Primary

“I mean if you think about it, Maths is always Maths, French is always French, but anything in technology, if you look even five years ago what is being taught now, you know, wow – hadn’t even thought about teaching that. So there is a real problem with giving teachers the skills to be able to deliver the lessons”
Male Teacher, Secondary

Teachers were very candid about their struggle to build links with local businesses and wider industry, and to show pupils real life examples of the career opportunities available to them. Building networks and links with businesses is an area where teachers genuinely feel they need help and support, and anything that could facilitate this would be welcomed.

Online resources, face-to-face meetings and representatives coming into school are preferred methods of finding out information among teachers. They were very dismissive of email, and felt this would not be an effective method of contact because emails often get put to one side and not read.

“If you say, can you read this, okay, well I will put it on my to-do pile and it goes further down the list of priorities and probably never gets read. So I think maybe capturing people at an event, like the Big Bang Show or maybe a short YouTube clip. I know that is an active way to try and get some information across. Like I have got a spare five minutes, watch it, move on, you know?”
Male Teacher, Secondary

Aside from keeping themselves up to date, teachers also feel strongly that there is a need to raise awareness among parents. In particular they think that more needs to be done to help parents
appreciate the range of careers available, and to reassure them that technology is a rewarding and exciting career path. However they struggled to come up with suggestions on how to engage parents. Their ideas centered around showing parents video clips when they attended school events e.g. open days, parents evening, option evenings. Besides showing them real examples of different roles within the industry, they also felt it would be important to highlight some of the different lifestyle benefits including, opportunities to travel or work from home.

“It’s getting that across to parents, that actually technology isn’t just sitting around on a computer and playing games. It does involve, this, this and this. Because a lot of parents will think, well that’s not going to pay the bills, is it. We can advise, but it’s the parents that are going to turn around and say to the child, look – this is the career path you want to take”

Male Teacher, Primary

Several of the teacher identified initiatives such as the Great British Make Off, Robotics challenge, The Smallpeice Trust and the STEM Network as existing positive influences, and they all agree that industry experts setting in-school challenges and competitions between schools is an effective way to raise awareness and help capture enthusiasm.

Making the most of role models – many women are already making interesting and exciting careers in tech, but girls need to be made more aware of them. Role models are an important source of inspiration and encouragement, and we need to find more ways to show girls what women have achieved.

This was popular concept in theory, but girls struggle to see who the role models would be as they couldn’t think of any, beyond their teachers or parents. Equally parents could not think of any female role models they could associate with the industry. The characteristics that girls admire most are confidence, work ethic, determination, enthusiasm and a general likeability. They want to see people they can relate to, people who have similar backgrounds to them, and people who have worked hard to achieve success. Parents suggested the role models should be bright, young, professional smart women – who above all were passionate about what they do.

The idea of highlighting positive female role models from the tech industry was considered by teachers as an important step towards tackling social stereotypes. They drew comparisons with sport and athletics, with references made to the increasing focus on female athletes such as Jessica Ennis and the impact this has had on perceptions of women in sport. The idea of girls meeting role models from local businesses was very popular – it was felt this would probably have more impact than reading about high profile female role models such as Sheryl Sandberg, COO of Facebook. The two female teachers we spoke to also felt that encouraging more females into teaching STEM / ICT would also provide more accessible role models for young girls. One of the teachers suggested that teaching computer skills and ICT at primary level is sometimes allocated to an individual, rather than them choosing it or applying for a specific role – due to the higher number of female teachers at primary compared to men, this should be regarded as an opportunity to show girls that women can do these jobs too – however if the individual selected for the role doesn’t have the enthusiasm and knowledge needed to motivate and inspire girls, there is a risk that they will be put off ICT and technology before they even reach secondary education.
“A lot of the females that I talk to said ‘We were given the job because nobody else in the school wanted it’. And if you don’t have that love for ICT yourself, that’s going to come across. You’ve got to try and build a rapport with them, and try and say to girls this is a great career for you to get into, you can do this, you can do that”
Male Teacher, Primary

“It would be great if people came in. We have Secondary transfer days, where they talk about what goes on. It would be great if more people from the secondary school, or from the local sixth form could come in, females especially, and say look – I was sitting there at your age, didn’t know what to do, and I thought about technology, but I didn’t know how to get there”
Male Teacher, Primary

“If you are a good teacher and you are inspirational, I think just the fact that they will associate a nice teacher or good teacher with the subject is good. That is already a massive deal, especially at school. They are not necessarily thinking about careers but they are thinking about what subjects do I enjoy?”
Male Teacher, Secondary

**Tackling Social Stereotypes – a guide to good practice** – although things are slowing improving, there are still lots of popular media, especially around science and technology (e.g. Big Bang Theory, IT Crowd) that reinforce the stereotype that these industries are geeky and more for men. It is important that tech companies consider examples of good practice when preparing advertising campaigns, educational resources and other material that the public can view e.g. website. A guide to good practice would help ensure that they avoid gender stereotyping, and instead use language and visuals that reflect positively on the technology industry.

**Opinions towards this idea were mixed.** Parents felt it was important, but they regarded it as low priority – it was seen as too ambitious and unlikely to have much impact in the short term. Teachers however regarded this as a high priority – perhaps because they have closer links to the industry and see it as worthwhile in the long term. They recognise that it will be a hard task, but feel it is achievable if some of the other ideas are introduced – including more mentors and female representatives coming into school, advertising campaigns showing women in industry, and case studies focusing on women in different roles, as part of the skills framework.

“The only way of changing things is by having more women getting into the industry I suppose, but it’s going to take a long time to change the stereotypes”
Parent of girl aged 9-13

“It is still very much seen as a, like…geeky, nerdy sort of industry. And the industry has to try and get away from that, because they could be turning down the next Steve Jobs if they’re not actually engaging young girls”
Male Teacher, Primary

“I think if they spend three years with a female teacher, and the teacher enjoys the subject and is very keen to pass on their knowledge, they will want to learn. In Year 11 we have seventeen boys and one girl studying design and technology. In Year 10 we have...fourteen boys and three girls. And I think the next option there is going to be more girls which is good.”
Female Teacher, Secondary

The idea of a guide to good practice when teaching girls was also discussed in the interviews with teachers. Interestingly, the male teachers said this could be useful, but they were unsure what it
The female teachers were less enthusiastic however, and actually questioned how teaching technology to girls is any different to teaching boys. It’s possible that there will be some female teachers who have difficulty understanding why a different approach might be needed, when they were inspired to pursue a career in technology without such efforts. The overall interpretation of this idea focused on a guide that would suggest ways to tailor activities towards girls, although most of the teachers said they already tailor activities towards pupils own interests. It was suggested that girls themselves should be asked to help with development of the guide, to ensure it genuinely reflects their interests and needs. Initial suggestions from the teachers included tapping into girls usage of social media and YouTube, making the approach to tackling social stereotypes more subtle – including avoiding positive discrimination, and case studies and examples that are based on reality – it was felt that if these were too gimmicky or ‘made up’ girls would see through them and switch off.

“Why shouldn’t it be a guide for having a successful, well-rounded student? Does it really matter if it is a girl or a boy? If you go into the real world you are not going to make something just for females. It doesn’t make sense. That is not a real world situation”
Female Teacher, Secondary

Ultimately, positioning the technology industry as a valid career choice is regarded as an important part of tackling stereotypes. Teachers feel that more needs to be done to help parents understand this. They believe that parents have a tendency to focus on and positively reinforce traditional roles such as doctors, teachers and lawyers, and that technology is often overlooked because they don’t know enough about it. Promoting the positive aspects of a career in technology would help parents see it as a more valid career choice. When the girls themselves were encouraged to think beyond the stereotypes, most of them were interested to know a bit more.

“Put it out there more, encourage us. If you want women to play a role, show us them, put them out there.”
Girl aged 14-15

“Oh yeah. Yeah, I mean I could think of three or four girls off the top of my head that I know are great at ICT, and that with the right push in the right direction could go that way. Yeah, if they could just see other people that have done it”
Male Teacher, Primary
5.3 Stage 3: Measuring Potential Solutions

The third and final stage of research focused on measuring the potential solutions. We developed three online questionnaires to help measure the incidence of views relating to technology, and evaluate the proposed solutions in terms of their popularity among a larger sample of girls aged 9-18, parents, and teachers. We also measured potential effectiveness, priority and age appeal, along with general attitudes towards technology careers.

The five concepts were refined and condensed into four well-defined propositions for this stage of the research, based on the findings from the earlier qualitative phase. Efforts were focused on writing descriptors that were all considered feasible (at different levels), and with the exception of one, gender neutral language was used throughout.

| 1) A tech mentoring scheme in schools – students who would like to know more about what a career in technology would involve would be matched up with young people already making a career in the sector. These mentors would develop a working relationship with the students, supporting and encouraging them throughout the academic year, and offering regular opportunities to meet, exchange ideas and work together. |
| 2) A tech skills app – an app, and associated website, that help students find out more about careers in technology, and decide what sort of role would suit them best, based on their aptitudes and the activities they already enjoy. The app would include articles, games, quizzes, vlogs and blogs, case studies and Q&As, all helping students see how their particular strengths could translate into a tech career. |
| 3) A campaign to build knowledge and awareness among parents and teachers – Parents and teachers are the people who help to uncover the potential of young people, often before they can see it for themselves. The technology industry is fast moving and the campaign will give parents and teachers the inside track on the careers available in technology, the many routes into the sector, and the skills and characteristics that are most in demand. |
| 4) A campaign to tackle social stereotypes and promote more female role models – popular media, especially round science and technology, often reinforce the stereotype that these industries are geeky and more for men. But in reality the tech sector is welcoming and exciting, and there are many women making interesting and exciting careers in it. This campaign will show girls the true face of the tech sector, and highlight what women have already achieved. |
Survey Findings

5.3.1 How confident do you feel about helping your daughter make decisions about her education and future career?

Overall, parents are confident that they can help their daughter make decisions about their education and future career – nine in ten (89%) are confident at all, three in ten very confident.

Dads claim to feel more confident than mums about this – 94% of dads are confident, compared to 85% of mums, 15% of whom say they are not very confident (only 5% of dads say this).

Confidence drops off slightly as girls start secondary school – 93% of parents of 9-11 year old girls say they feel confident about this, falling back to 87% amongst parents of girls aged 12 plus.
5.3.2 How much do you agree with these statements?

The majority of parents agree that they would encourage their daughter to consider a career in technology (70%).

- Dads are more likely to feel strongly about this, with 21% agreeing strongly compared to 14% of mums
- Strong agreement like this was highest amongst parents of younger girls aged 9-11 (21% agree strongly), falling back amongst parents of older girls aged 15-18 (13%)
- General agreement was also higher amongst families from ABC1 social grades (74% agree) compared to those from lower C2DE grades (65%)

The majority of parents also say that they know enough to help their daughter if they asked for advice about this (65%).

- Dads are far more likely than mums to agree they have the knowledge to help their daughter with this (75% agree, compared with only 56% of mums)
- Again, strong agreement is higher amongst parents of younger girls (22% agree strongly), dropping off amongst parents of 15-18 year old girls (14%), 42% of whom disagree at all

However, a significant minority of a third (32%) say that they don’t feel they know enough to help, especially mums (41%).
5.3.3 Why do you agree / disagree that you would encourage your daughter to consider a career in technology?

**WOULD encourage**

Parents who would encourage their daughters to consider a career in technology say they would because it is the future, it is a good career, with good prospects and opportunities, it is good money, their daughter is interested in technology.

**WOULD NOT encourage**

Parents who would not encourage their daughter to consider a career in technology say they will not because it is not an area their daughter wants to be in, they have other interests, they don’t know enough about it.
5.3.4 Are you interested in any of these things?

From the list shown, half or more girls say they are interested in gadgets and new technology (59%), drawing / designing things (58%) and games / puzzles / jigsaws (51%), with just under half saying they are interested in editing videos / photos (47%). Around a third like finding out how things are made / work (36%), whilst fewer like making / building things (30%), or computer programming / coding (26%).

Girls lose interest in most of the activities described as they get older (especially games / puzzles / jigsaws and making / building), however, interest in gadgets and new technology peaks amongst two in three 12-14 year olds (65%) before falling back, and interest actually increases (albeit marginally) in computer programming / coding (from 22% of 9-11 year olds, up to 30% of 15-18s).
5.3.5 Which subjects do you enjoy most at school?

Top school subjects amongst girls this age are English (42%) and art (41%), followed by ICT / computing and science (both 39%), maths (37%), and design and technology (35%). A minority say they enjoy PE / sports most (29%), or drama (27%), music (26%) or history (24%). Even fewer say that they enjoy modern languages or geography (17% and 16% respectively).

Whilst general interest in computer programming / coding is low, but grows as girls get older, their interest in ICT at school falls off sharply as they progress through secondary school – more than half (53%) of 9-11 year olds say they enjoy ICT, dropping to just a third of 12-14s (36%), and falling further to just 29% of 15-18 year old girls.

Interest in art, and PE / sports, also drop off markedly as girls get older.

ICT / Computing / Computer science is more popular amongst girls from lower socio-economic grades (44% vs 37% of those from ABC1 grades), with these girls also preferring art and music. Girls from ABC1 families are more likely to enjoy science and modern language.
5.3.6 What is it that you enjoy most / don’t enjoy about ICT / Computing / Computer Science?

Why **ENJOY**

Girls who say they enjoy ICT / Computing / Computer Science say this is because they like using computers, like learning new things, like programming, find it interesting.

Why **NOT ENJOY**

Girls who say they don’t enjoy ICT / Computing / Computer Science mainly say this is because it is boring, but also that they just don’t like it, it is difficult, they don’t like the teacher, prefer and enjoy other subjects.
5.3.7 How much do you agree with these statements?

Encouragingly, three in four girls would consider a job in technology (72%). However, this positivity declines with age – four in five girls aged 9-11 agree (78%), falling to just three in five (61%) by age 15-18, with three in ten girls this age actively disagreeing (28%).

Four in five girls would like a job that involves solving problems (79%).
- Again, younger girls are more likely to agree (87% do so), dropping back to 76% of 15-18 year olds, 17% of whom disagree with this
- Girls from higher ABC1 social grades are more likely to agree with this statement (81% agree compared to 74% amongst girls from C2DE families)

Three in four girls would like a job that uses technology (77%).
- Four in five girls aged 9-11 agree with this (82%), dropping to seven in ten (70%) by age 15-18, when one in five (19%) disagree
- Again, girls from higher social grades are more likely to agree (79% of ABC1s agree compared to 72% amongst C2DE sample)
5.3.8 How well informed do you feel about the different career opportunities available in the technology industry nowadays?

Opinion amongst teachers is divided as to whether they feel well informed about the different career opportunities available in the technology industry – more than half agree that they do (55%), whilst just fewer than half (45%) disagree.

Male teachers say that they feel more well informed than female teachers do – three in ten male teachers agree (59%), compared with half (52%) of female teachers.
A TECH MENTORING SCHEME IN SCHOOLS

5.3.9 How helpful do you think A TECH MENTORING SCHEME IN SCHOOLS would be in giving girls a better understanding of the opportunities available in the technology industry?

Reaction to a tech mentoring scheme in schools is very positive, with the vast majority of parents, daughters and teachers saying it will be helpful in giving girls a better understanding of the opportunities available in the technology industry.

More than nine in ten parents agree this would be a helpful scheme (92%), with almost half (47%) saying it would be very helpful.

Nine in ten girls say this would be a helpful scheme (88%). There is little difference by age, but agreement does tend to rise, from 84% of 9-11s, up to 91% of 15-18 year old girls.

Teachers are the most enthusiastic about this idea – three in five say it would be very helpful (63%), with almost all (94%) agreeing it would be helpful at all.
5.3.10 How interested do you think your daughter would be (PARENTS) / would you be (DAUGHTERS and TEACHERS) in A TECH MENTORING SCHEME IN SCHOOLS?

Three in four parents say they think their daughter would be interested in a tech mentoring scheme in schools, with the same proportion of girls (76%) agreeing with this. Parents slightly underestimate the intensity of their daughters’ interest though – a quarter of parents (26%) think their daughter will be very interested, but in reality a third of girls (34%) say they are very interested in this scheme.

For both parents and daughters, perceived and actual interest falls with age – 85% of parents of girls aged 9-11 think their daughter would be interested, falling to 61% of parents of 15-18 year old girls. Similarly, 83% of girls aged 9-11 would be interested, but by age 15-18, this has dropped back to 69% (29% actively not interested).

Teachers are the group most interested in a tech mentoring scheme in school. Nine in ten teachers express interest in the scheme (90%), with two in five (42%) saying they are very interested.
5.3.11 At what age do you think girls would benefit most from having a CAREER MENTOR?

Few overall felt that a career mentor would be of any use to girls aged 7-10 at primary school, but around a third of all groups thought that 11-12 year olds, at the start of secondary school could benefit from this relationship.

However, the most commonly selected age at which parents, daughters and teachers think girls would benefit most from a career mentor is age 13-14.

Parents and daughters also feel that having a mentor could help girls aged 15-16, at the top end of secondary school.

Teachers feel that this relationship would be beneficial for the long term, from age 13 to 18, across secondary school and on into their further education. Parents of older girls, and girls aged 15-18 themselves also shared this view.
5.3.12 Would you expect a CAREER MENTOR to support girls individually or work with a group of girls?

The consensus is that career mentors should support girls both individually and within groups of girls, but leaning more towards working in groups.

However, around a fifth of parents (19%) and daughters (21%) say that they would expect career mentors to work with girls on a one to one basis, a view not shared by teachers, who would have to deal with the practicalities of such an arrangement in school.
5.3.13 How often would you expect girls to see their CAREER MENTOR?

Around half of parents and their daughters feel that once a month is a good frequency for girls to meet up with their career mentor (56% and 50% respectively), with few seeing any point in only seeing their mentor six monthly or less often.

Teachers, on the other hand, are more likely to say that once every two to three months is a better frequency for girls to interact with career mentors (56%).
5.3.14 Do you think the TECH MENTORING SCHEME should be just for girls, or boys as well?

The vast majority of parents, daughters and teachers feel that a tech mentoring scheme should be for both girls and boys.

However, a fifth of girls and teachers feel that the scheme should be specifically for girls, not boys (22% and 23% respectively), a view not held by parents (only 9% agree with this).
5.3.15 How helpful do you think A TECH SKILLS APP would be in giving girls a better understanding of the opportunities available in the technology industry?

Nearly nine in ten parents, girls and teachers think that a tech skills app would be helpful in giving girls a better understanding of the opportunities available in the technology industry, with two in five of each group thinking it would be very helpful.

- Mums were more likely than dads to think that a tech skills app would be very helpful (42% vs 35% of dads)
- Similarly, female teachers were more likely than male teachers to say this would be very helpful (49% of female teachers, vs 39% of male teachers)
- Amongst girls themselves, more than half (53%) of the youngest girls (9-11s) say it will be very helpful, dropping to just 37% of 12-18 year olds
5.3.16 How interested do you think your daughter would be (PARENTS) / would you be (DAUGHTERS) / would your students be (TEACHERS) in A TECH SKILLS APP?

The consensus is that girls would be interested in the app. Three in four parents (75%) say their daughter would be interested, one in four (27%) saying they think they would be very interested.

Girls themselves and teachers are even more positive – a third of girls (34%) say they would be very interested in this, with three quarters (76%) interested at all. Amongst teachers, four in five (80%) think their students would be interested in a tech skills app, with more than a third (35%) saying they would be very interested.

Older girls, aged 15-18, are the least likely to say they would be interested in this app (68% interested at all), with three in ten (30%) saying they would not be interested, 10% not at all interested.

Interest is higher amongst those from ABC1 social grades.
- Three in ten (30%) of those parents from ABC1 families are very interested, compared to two in ten (21%) amongst C2DE parents
- Girls mirror this, with two in five girls from ABC1 households (38%) very interested, compared to 26% amongst girls in C2DE homes
5.3.17  How likely would you be to recommend A TECH SKILLS APP to your students?

Three in five teachers say they would be very likely to recommend such an app to their students (60%), and overall, nine in ten (90%) would recommend it at all.
5.3.18 At what age do you think girls would benefit most from using a TECH SKILLS APP?

Just over half of parents and their daughters think that age 13-14 would be the optimal age that girls would benefit the most from a tech skills app (52% and 53% respectively), although the broadly preferred age range spans 11 to 16 year olds (secondary aged girls), with only a minority thinking primary aged girls or those in further education would find it beneficial.

Teachers share the same view, with three in four (75%) picking age 13-14 as the most beneficial. Teachers are even less likely to think primary aged girls would benefit from the app, but are more likely to think the app could be useful to those in further education (aged 17-18).
5.3.19 Which of the following features to include in a TECH SKILLS APP do you think would appeal most to girls this age? – TOP FIVE

<table>
<thead>
<tr>
<th>Feature</th>
<th>Parents</th>
<th>Daughters</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q&amp;A sessions</td>
<td>44%</td>
<td>54%</td>
<td>57%</td>
</tr>
<tr>
<td>Videos</td>
<td>43%</td>
<td>51%</td>
<td>51%</td>
</tr>
<tr>
<td>Games / Puzzles</td>
<td>43%</td>
<td>52%</td>
<td>52%</td>
</tr>
<tr>
<td>Competitions</td>
<td>36%</td>
<td>43%</td>
<td>46%</td>
</tr>
<tr>
<td>Virtual tours</td>
<td>39%</td>
<td>41%</td>
<td>43%</td>
</tr>
<tr>
<td>Local alerts</td>
<td>30%</td>
<td>36%</td>
<td>52%</td>
</tr>
<tr>
<td>Links to websites</td>
<td>39%</td>
<td>36%</td>
<td>38%</td>
</tr>
<tr>
<td>Vlogs</td>
<td>32%</td>
<td>37%</td>
<td>43%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>25%</td>
<td>31%</td>
<td>43%</td>
</tr>
<tr>
<td>Support for CV</td>
<td>25%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Case studies</td>
<td>25%</td>
<td>29%</td>
<td>35%</td>
</tr>
<tr>
<td>Online helpdesk</td>
<td>22%</td>
<td>22%</td>
<td>28%</td>
</tr>
<tr>
<td>Blogs</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When asked to choose the top features to include in a tech skills app, parents and teachers tend toward the practical, whilst girls themselves opt for the more fun elements.

The feature that appeals the most overall, is Q&A sessions with women in tech – more than half of parents (54%) and teachers (57%) think this is a good idea.

- However, fewer than half of girls agree with this (44%), as they prefer more fun elements like videos (51%) and games / puzzles (52%), which are less popular with parents and teachers.

- Girls also differed from parents and teachers in that they are more likely to prefer competitions (46%), quizzes (43%) and blogs (28%).

Dads are far more likely than mums to think that virtual tours (51% vs 37% of mums), and links to websites (45% vs 35%) would appeal.

Half of teachers would like to see alerts for local activities and open days included (52%), with only a third of parents and daughters agreeing these would be a top feature.

- Teachers are also the most likely to think vlogs (opposed to blogs) would be a useful inclusion (43%), whilst parents are the most likely to want to see support for preparing a CV included (40%).

As girls get older, their views become more practical, in-line with the views of their parents, indicating a need to have an app that can adapt across the age range.
A CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS

5.3.20 How helpful do you think A CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS would be in giving girls a better understanding of the opportunities available in the technology industry?

Opinion on a campaign to build knowledge and awareness among parents and teachers is positive, with the majority of each group agreeing it would be helpful to girls.

Almost all teachers (96%) agree this would be a helpful campaign, including three in five (58%) who think this will be very helpful.

Nine in ten parents think that this scheme would be helpful (90%), with two in five (40%) saying it would be very helpful, including 44% of parents from ABC1 socio-economic grades (compared with 34% from C2DE households).

Girls themselves are the group least likely to say this will be helpful, although the majority still agree (79%), and three in ten (31%) say this will be a very helpful scheme.
5.3.21 How interested do you think you would be (PARENTS and TEACHERS) / your parents and teachers would be (DAUGHTERS) in A CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS?

Half of teachers say that they would be very interested in this campaign themselves (50%), with nine in ten (91%) interested overall.

Around three in ten parents say they would be very interested in this (30%), and a similar proportion of their daughters say their parents / teachers would be very interested in an awareness campaign (28%).
5.3.22 At what age do you think girls would benefit most from their parents and teachers BEING MORE AWARE OF THE OPPORTUNITIES AVAILABLE IN THE TECHNOLOGY INDUSTRY?

Teachers were asked at which age they thought girls would benefit the most from their parents and teachers being more aware of the opportunities available in the technology industry. A majority of four in five (83%) opt for age 13-14, which corresponds with Year 9, when most girls will be taking their options for GCSE.

However, half or more feel that all girls aged 11 upwards would benefit from their parents and teachers having greater knowledge of what is available.
5.3.23 How do you think a CAMPAIGN TO BUILD KNOWLEDGE AND AWARENESS AMONG PARENTS AND TEACHERS should be delivered?

Parents and daughters’ views on how this campaign should be delivered are similar, although parents are more likely to pick delivery methods overall compared to their daughters. Teachers views differ slightly, and their range of options selected is far great than for other groups.

The delivery method that is the standout top choice amongst parents and daughters is through schools, with around two in three choosing this (65% of parents and 61% of girls themselves). Whilst seven in ten teachers opt for this generic option (69%), it is not their top choice, with three in four of them (75%) choosing resources to show at parents’ evening etc, which will be of much more direct benefit to teachers.

Social media is a joint second option amongst teachers (71%), but parents and daughters are far less likely to choose this compared to their top choice of delivery through schools.

Open days at local businesses, teacher training days and via television are the next most common methods chosen.

Only a minority feel that newspapers / magazines, teaching publications and radio are appropriate delivery methods.
A campaign to tackle social stereotypes and promote more female role models

5.3.24 How helpful do you think A CAMPAIGN TO TACKLE SOCIAL STEREOTYPES AND PROMOTE MORE FEMALE ROLE MODELS would be in giving girls a better understanding of the opportunities available in the technology industry?

Almost all teachers (95%), and most parents (89%) and daughters (81%) think that a campaign to tackle social stereotypes and promote female role models would be helpful to girls.

A majority of two in three teachers (65%) think it will be very helpful, whilst just fewer than half of parents (45%), and a third of girls (35%) feel this way.
A quarter of parents predict that their daughter would be very interested in a campaign tackling social stereotypes, and a quarter of daughters agree (27% and 26% respectively).

- Overall, three in four parents think their daughters would be interested (76%), and about the same proportion of girls agree (73%)
- Parents and girls from ABC1 social grade households are more likely to say that they are interested at all (79% of parents, 74% of girls) compared to those from C2DE households (70% and 68% respectively)

Teachers were asked about their own personal interest, and a majority of more than half say they would be very interested in this (55%), with almost all (92%) interested to some degree.

- Three in five female teachers say they are very interested in this campaign (59%), compared with half (50%) of male teachers
5.3.26 At what age do you think girls would benefit most from knowing more about FEMALE ROLE MODELS IN THE TECHNOLOGY INDUSTRY?

Once again, the core age that all groups feel that girls would benefit most from knowing more about female role models in the technology industry is at age 13-14, when GCSE choices are made.

Amongst teachers, the core age range is a little wider, at 11 to 16, and also includes girls aged 17-18.
5.3.27 Which of the following FEMALE ROLE MODELS IN THE TECHNOLOGY INDUSTRY do you think is likely to provide the most inspiration and encouragement to girls? - TOP THREE

<table>
<thead>
<tr>
<th>Role Model</th>
<th>Parents</th>
<th>Daughters</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young women recently started in tech</td>
<td>43</td>
<td>42</td>
<td>54</td>
</tr>
<tr>
<td>High profile women in tech</td>
<td>30</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>Women working in tech several years</td>
<td>29</td>
<td>27</td>
<td>42</td>
</tr>
<tr>
<td>Females from local businesses</td>
<td>23</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Career mentors</td>
<td>21</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>Female ICT / Computing teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The top type of female role model that all groups thought would provide the most inspiration and encouragement to girls are young women who have recently started working in the technology industry (referred to as ‘trailblazers’ elsewhere in this report). Four in five teachers (79%), more than half of parents (54%), and 43% of girls chose this option.

Second choice for teachers, with three in five choosing (59%) are high profile women in the technology industry (such as Facebook’s Sheryl Sandberg), especially popular with female teachers (62% choose compared with 55% of male teachers). Parents and girls are as likely to choose these high profile women as they are to choose women who have worked in the technology industry for several years (elsewhere referred to as ‘specialists’), and female representatives from local businesses, chosen by a third to two fifths of all respondents.

A minority think that career mentors would provide the most inspiration to girls (although teachers are more likely to agree here), and fewer think that this is the role for female ICT and computing teachers (although girls themselves were as likely to choose teachers as most of the other options).
ALL SOLUTIONS

5.3.28 Which ONE of these four solutions do you think would be most effective in helping to show girls the range of opportunities available in the technology industry?

Looking at all of the four solutions together, and asked to choose one that would be the most effective in showing girls the range of opportunities available in the technology industry, a tech mentoring scheme in schools emerges as the top option chosen by parents, girls and teachers (especially male teachers, with 44% choosing vs 35% of female teachers).

However, this option was not chosen by a majority of any of these groups, and for teachers at least, a campaign to tackle social stereotypes and promote female role models comes a fairly close second (joint top option for female teachers with 35% choosing vs 26% of male teachers). This option is also the second choice for parents, and third amongst girls.

Second place amongst girls themselves goes to a tech skills app, chosen by a quarter of girls (25%). This option is third place amongst parents and teachers.

In last place for all groups, albeit marginally for parents and teachers, is a campaign to build knowledge and awareness among parents and teachers.
OTHER SUGGESTIONS

Finally, parents, daughters and teachers were asked if they had any other suggestions or ideas for ways to help girls consider a career in technology. Some of their suggestions are below:

Parents

Be interested to know how many female teachers there are who teach the subject in school if low could this be target area

Blogging and vlogging seems popular if you can get you tubers to promote it girls follow them

Get young women who went to a school to return to the school they went to

If teaching was more geared towards social media IT and the technologies that help build those sites them it would involve girls more. Sounds stereotypical but that is what my daughters and friends are heavily influenced and interested in

Just get them involved at an early age. That way they have more time to get in to it and understand it

My daughter already does coding lessons in school and enjoys them but maybe they could take time during these lessons to give examples of where they could use the skills as an adult as she's already asking about what can she be when she grows up

Promote it for girls, but don't exclude boys. We don't want the gender divide being highlighted we want to get rid of it

Daughters

A day a month in a company as an apprentice type role

A TV program about working in the technology industry

I think free training scheme will encourage more women to work in the tech industry

I think more women should be seen in business. You never see what people do and so I have no idea who does what

Need to be fun I learn more as I use it more

Show how technology is important in industries other than computing e.g. design, theatre, tv

YouTubers doing videos on it because they work in tech
Teachers

Educate the parents. Let them know that you do not have to be a doctor or a solicitor to be successful. Remove the focus from the Baccalaureate subjects and demonstrate the importance of STEM and creativity to parents. Give more students choice to determine their own pathway into a career rather than telling them that they are failures if they don't conform to the governments vision of what is successful. Let them take subjects they enjoy, rather than subjects they feel they have to do. Give them practical, hands-on experience of what it is like to be a successful women in a STEM based industry

Having been a 'woman in IT' for many years now, I find it surprising that the gender imbalance still exists to the extent that one of my ex-students tells me that she is the only girl on her Computer Science degree course. We have a real difficulty inspiring female students to take Computer Science at GCSE so the gender imbalance is already an issue at this early age. We need a broader curriculum with the freedom to choose the many different paths into an IT-based career from networks to graphic design, and with slightly less focus on programming which certainly doesn't appeal to many girls (in my experience)

Investigate why other countries have less of a problem with a female presence in the STEM industries

Parents, in particular mothers, need to know about the exciting opportunities available to their daughters. They need to see normal women being successful and happy in tech careers. If you can have an impact on them I feel there would be more girls considering technology type careers. In my opinion many mothers have a large influence on their daughter’s choices at all sorts of ages

Pressure needs to be put upon government to support technology in schools. Currently our school is closing all it's technology facilities, blaming funding AND the EBac. I know employers want women (and men) with technology backgrounds but this curriculum area is actually being killed off in many schools. Soon there will be little or no provision

We need to address the glass ceiling from primary school - which means more female 'geeks' and more male 'carers' because we need them BOTH. We need to present IT as human based - software is about helping humans solve problems, not about sitting in a dark room in the early hours slurping coffee... well not only about sitting in a dark room etc. We need to make the tech we use more overt, showing how it is created and how it can be tailored
6 APPENDIX

6.1 Attitudinal statements from women in industry

Below are responses to attitudinal statements on the recruitment questionnaire (stage 1), completed by 27 women in industry.

<table>
<thead>
<tr>
<th>Attitudinal Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I knew from an early age that I wanted to have a career in technology</td>
<td>3</td>
<td>3</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>I have had lots of help and support in pursuing my career in technology</td>
<td>5</td>
<td>9</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>I have had to overcome lots of obstacles to get where I am in my career today</td>
<td>4</td>
<td>8</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>It is challenging being a woman in the industry I work in</td>
<td>2</td>
<td>14</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>I considered several different options before ending up in a career in technology</td>
<td>2</td>
<td>17</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>It was hard to find information or guidance on my chosen career in technology</td>
<td>5</td>
<td>17</td>
<td>4</td>
<td>1</td>
</tr>
</tbody>
</table>

Base: 27 respondents
6.2 Website Review - Summary

The Methodology
- Using an evaluation grid we reviewed 52 websites
- The list of websites reviewed was supplied by Tech Partnership and is attached
- We went to the UK sites wherever possible
- In the case of consumer and retail sites we searched for the careers page which helped us then locate the appropriate corporate page
- Our interest is technical careers for young people, in particular girls, so the pages we based our analysis on were: home, about us, and careers

What we looked for
- Logo designs, colours used, language formality, any gender specific language, use of male and female pronouns
- Visual representation by gender and age
- Overuse of business jargon or technology terms
- Case studies or videos of young people’s experience, and in particular young women’s experience
- Statements of policy on diversity and equality,
- Appeal to the desire to make the world a better place
- Childcare and other benefits related to family

What we found
- In terms of gender representation, the split was males 57% / females 43%
  - Only one site had pictures of only men on the relevant pages
- A subjective estimate of % of people represented under 30 years old was 57% (bear in mind careers page is most likely to over emphasise youth)
- There was no evidence of the use of gender specific language or male/female pronouns
- There was no evidence of overuse of business jargon
- There was no evidence of overuse of unexplained technology terms
- The most popular colours/layout was lots of white space and photographs (The Apple influence?)
- Navigation and tabs were straightforward and consistent
- 38% of sites clearly made the suggestion that technology makes the world a better place
  - This could be divided into organisations that use technology to deliver more efficient services that were sustainable (and in case of the utilities – safe)
  - On the other hand companies like software, internet and games companies offered the opportunity to do something ‘meaningful’ or even ‘cool’ (Google ‘do cool things that matter’)
- Between the two was the BBC: ‘working for us means you’ll be part of something genuinely special. You’ll be making things enjoyed by millions’
- Military technology companies talked about ‘security’ and ‘making the world a safer place’
- There were no forum or discussion areas on the relevant sites - Microsoft UK had a link to a Facebook page ‘Women at Microsoft’ and Cap Gemini have a link to a Linkedin page ‘Women at Cap Gemini’
• When we looked at executive board composition they tended to predominantly 80% male in contrast with representation of other staff featured on the site (we did not include board members in representation counts).
  o In a few cases like HP Enterprise and IBM, the worldwide presidents and CEOs are women
• Work styles portrayed were team related rather than hierarchical
• Widespread stated commitment to diversity, equality and sustainability
  o Evidence in this area included statistics: figures on gender breakdown by management type and sometimes downloadable reports
  o There is also support of these claims in the listing of awards: ‘Times Top 50 Employers of Women’ (BT and Cap Gemini). Global companies particularly American companies like Hewlett Packard quote relevant awards won in the US. A particularly compelling British award is the ‘IT Transformation of The Year Award’ made in February 2016 to Jennifer Rigby Head of IT, Change and innovation at O2 by the ‘Women in IT Organisation’. It highlights her and O2’s efforts to get more women in IT in their organisation
• 15% specify maternity leave allowances, 12% flexibility of working hours and 8% childcare vouchers
• 38% had case studies of young people under 30 years old working in their organisation
  o Only slightly fewer (34%) had case studies of young women working in their organisation
  o Many of these were in the form of videos which seems much more effective than written case studies – giving the viewer a greater feel for both the environment, culture and what it might be like to work there
6.3 A web content checklist for tech companies

1. Make sure the photos on the website reflect that women are fully represented in the workforce

2. Feature statistics and awards that reflect your inclusive employment policies

3. Reflect how your company/organisation is making a wider contribution to society – ‘making the world a better place’

4. Without ‘dumbing down’ avoid jargon and inaccessible technology terms.

5. Give a feel for what it is like to work for the organisation, in particular being part of a team

6. Think about adding in links to dedicated Facebook or Linkedin pages for female employees

7. Consider setting up a women’s resource group – you may be able to come up with a better name for it!

8. Feature female leaders in the company

9. Provide case studies (ideally as video clips) of women who have fulfilling tech careers in the organisation – in particularly younger more recent joiners

10. Emphasise family friendly benefit and policies
6.4 Favourites among girls aged 9-18

‘Meet girls where they are, and take them where you want them to go’ Dr Gummer

Below is a list of ‘favourites’ for girls aged 9-18, taken from The CHILDWISE Monitor Report 2016.

**Favourite TV Programme**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretty Little Liars</td>
<td>Pretty Little Liars</td>
<td>Pretty Little Liars</td>
</tr>
<tr>
<td>Hollyoaks</td>
<td>Dr Who</td>
<td>Hollyoaks</td>
</tr>
<tr>
<td>Friends</td>
<td>The Next Step</td>
<td>Friends</td>
</tr>
</tbody>
</table>

**Favourite Website**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instagram</td>
<td>YouTube</td>
<td>Facebook</td>
</tr>
<tr>
<td>Snapchat</td>
<td>Instagram</td>
<td>Snapchat</td>
</tr>
<tr>
<td>Youtube</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Favourite YouTuber**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoella</td>
<td>Zoella</td>
<td>Zoella</td>
</tr>
<tr>
<td>Joe Sugg</td>
<td>Joe Sugg</td>
<td>Joe Sugg</td>
</tr>
<tr>
<td>Alfie Deyes</td>
<td>Alfie Deyes</td>
<td>Danisnotonfire</td>
</tr>
</tbody>
</table>

**Favourite Group**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taylor Swift</td>
<td>Taylor Swift</td>
<td>Justin Bieber</td>
</tr>
<tr>
<td>Little Mix</td>
<td>Little Mix</td>
<td>One Direction</td>
</tr>
<tr>
<td>One Direction</td>
<td>One Direction</td>
<td>Ed Sheeran</td>
</tr>
</tbody>
</table>

**Favourite Magazine**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marvel</td>
<td>Girl Talk</td>
<td>Marvel</td>
</tr>
<tr>
<td>OK!</td>
<td>Lego</td>
<td>OK!</td>
</tr>
<tr>
<td>Vogue</td>
<td>Jacqueline Wilson</td>
<td>Vogue</td>
</tr>
</tbody>
</table>

**Favourite Mobile / Tablet Game**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minecraft</td>
<td>Minecraft</td>
<td>Candy Crush</td>
</tr>
<tr>
<td>Candy Crush</td>
<td>MovieStarPlanet</td>
<td>1010</td>
</tr>
<tr>
<td>MovieStarPlanet</td>
<td>Crossy Road</td>
<td>Temple Run</td>
</tr>
</tbody>
</table>

**Favourite Console Game**

<table>
<thead>
<tr>
<th>Total</th>
<th>9-12s</th>
<th>13-18s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minecraft</td>
<td>Minecraft</td>
<td>Minecraft</td>
</tr>
<tr>
<td>Sims</td>
<td>Grand Theft Auto</td>
<td>Mario</td>
</tr>
<tr>
<td>Grand Theft Auto</td>
<td>Sims</td>
<td>Sims</td>
</tr>
</tbody>
</table>
How one college went from 10% female computer-science majors to 40%

Written by
Manoush Zomorodi
March 26, 2014

Yes, we know there aren’t enough women in tech. Yes, we know we need to change the ratio.

One college has found the answer.

With a three-step method, Harvey Mudd College in California quadrupled its female computer science majors. The experiment started in 2006 when Maria Klawe, a computer scientist and mathematician herself, was appointed college president. That year only 10% of Harvey Mudd’s CS majors were women. The department’s professors devised a plan.

They no longer wanted to weed out the weakest students during the first week of the semester. The new goal was to lure in female students and make sure they actually enjoyed their computer science initiation in the hopes of converting them to majors. This is what they did, in three steps.

1. Semantics count

They renamed the course previously called “Introduction to programming in Java” to “Creative approaches to problem solving in science and engineering using Python.” Using words like “creative” and “problem solving” just sounded more approachable. Plus, as Klawe describes it, the coding language Python is more forgiving and practical.

As part of this first step, the professors divided the class into groups—Gold for those with no coding experience and Black, for those with some coding experience. Then they implemented Operation Eliminate the Macho Effect: guys who showed-off in class were taken aside in class and told, “You’re so passionate about the material and you’re so well prepared. I’d love to continue our conversations but let’s just do it one on one.”

Literally overnight, Harvey Mudd’s introductory CS course went from being the most despised required course to the absolute favorite, says Klawe.

But that was just the beginning.

2. Visualize success

After successfully completing the introductory class, how to ensure female students voluntarily signed up for another CS class? The female professors packed up the students and took them to the annual Grace Hopper Conference, which bills itself as a celebration of women in technology. Klawe says the conference is a place for students to visualize women in technology; humans who happened
to be female who love computers. Not everyone looks like the dudes in the trailer for HBO’s Silicon Valley.

3. Make it matter

Finally, the college offered a summer of research between freshman and sophomore years so female students could apply their new skills and make something. “We had students working on things like educational games and a version of Dance Dance Revolution for the elderly. They could use computer technology to actually work on something that mattered,” says Klawe.

The three-step strategy resulted in a domino effect. Female students loved the CS introductory course. They loved going to the conference. So they took “just one more course” and they loved that.

Before they knew it, women were saying, “I could be a computer science major, I guess.’ And so they are!’ says Klawe.

By the time the first four-year experiment was over the college had gone from 10% female computer science majors to 40% female. UC Berkeley, Duke, Northwestern have had some success with similar tactics.

Click the following link to read this article in full:
6.6 Relevant information gathered during stage 2 interviews

- **CoSpace** - an educational platform providing a fun and engaging way for young people to develop their computational thinking skills and to get involved in programming and algorithm development - [http://www.cospacerobot.org/](http://www.cospacerobot.org/)

- **The Great British Make Off** - working either in teams or as individuals, students are asked to respond to a challenging design brief. Entrants can respond to the brief and use which ever materials and resources are most appropriate. These could be drawn from one or more of the D&T focus areas of textiles; product design; systems and control and food technology - [http://gbmakeoff.co.uk/](http://gbmakeoff.co.uk/)

- **Adafruit** - founded in 2005 by MIT engineer, Limor "Ladyada" Fried. Her goal was to create the best place online for learning electronics and making the best designed products for makers of all ages and skill levels. Adafruit has expanded offerings to include tools, equipment and electronics that Limor personally selects, tests and approves before going in to the Adafruit store. Limor was the first female engineer on the cover of WIRED magazine and was recently awarded Entrepreneur magazine's Entrepreneur of the year. Adafruit is a 100% woman owned company - [https://www.adafruit.com/](https://www.adafruit.com/)

- **Barclays Life Skills** – aims to inspire young people to get the skills they need for a better future. Not just online, but in class and through valuable real-world experiences. LifeSkills works with teachers, parents and businesses to help young people: Build a job-hunting toolbox, identify skills, gain experience and be inspired. Our YouTube Channel features real LifeSkills experiences from top UK vloggers and tips on presenting your best self online - [https://www.barclayslifeskills.com/](https://www.barclayslifeskills.com/)