Taking up the challenge to inspire female engineers

James Johns, Head of Physics, Dauntsey’s, explains why it is so important to ensure we close the gender gap in engineering.

Engineering is shaping the future all around us. From robotics and artificial intelligence, to enable phones, medical technology and advanced sports equipment, to determine care and space exploration. All existing and yet to be developed technologies would not be possible without the contributions of female engineers.

The number of jobs requiring STEM skills is expected to rise at twice the rate of other occupations over the coming years (UCES 2016, Working Futures Summit Report), so unless much greater numbers of technically trained individuals enter the workforce, the impact of the skills gap will widen. The scale of this skills shortage has been illustrated by the Social Market Foundation, which found that despite more women entering the workforce, there remains a shortfall of around 40,000 STEM graduates in the UK by 2023 (Social Market Foundation 2013). In the Balance: The STEM human capital crisis. Engineering UK estimates that this shortfall is likely to rise to 127,000 by 2022 (Engineering UK 2015, The state of engineering).

There continues to be a particular issue in attracting women and girls to this industry. The gender gap is surprisingly wide with the UK having the lowest percentage of female engineering professionals in Europe, at less than 10 percent. According to the Institute of Physics, between 2010 and 2016, the number of people studying A-Level Physics grew by 12 percent, however, the number of women doing so fell by 15 percent. In England, only one fifth of the candidates entering for A-Level Physics are girls, and this has changed little over the past three decades. Just 1.9% of girls chose A-Level Physics in 2016, compared to 6.9% of boys. If we could shift the perception and encourage equal numbers of female STEM participants, the skills shortage would all but disappear.

A European study by Microsoft (Microsoft 2017, Why Europe’s girls aren’t studying STEM) is of particular interest to us. It found that the majority of girls became interested in STEM at around the time of starting secondary education, but that their interest had begun to wane prior to making A-Level choices. This tells me that we have a key window where we as teachers can influence decisions that will set the trajectory of these students’ academic life in the long-term. When you look at GCSE, A-Level and university scores, girls tend to outperform boys in STEM subjects when they choose to do them. We must, therefore, increase their desire to pursue those options. Does a lack of role models in the wider media make STEM less attractive? Or, as Twitter’s 92% of the most followed scientists are male and if asked to think of the current faces of physics, I expect that Jim Al-Khalili, Brian Cox and perhaps even Morgan Freeman come to mind before the brilliant Dr Helen Czerski?

The key to inspiring future female engineers and scientists lies firmly in the everyday, formative experiences of students at school. Here at Dauntsey’s, we are lucky to have been able to appoint a second female physics specialist. Three of the four previous schools that I have worked at didn’t have any. Practical experience in lessons is vital and Physics at Dauntsey’s is taught in a way that engages with the current interests of our pupils, whether it is explicit or in specification or not. As a Head of Department, I would be alarmed if the reason a pupil gave was, ‘boy or girl, for me continuing with physics at a higher level, was because they found the subject boring.’

‘Attitudes are slowly beginning to change’

Our efforts appear to be paying off. Nationally, girls make up just over 20% of all A-Level Physics entries. Here, more than 30% of our Upper Sixth Physics classes are girls and an equal percentage of girls and girls have attended university offers for STEM subjects this year. Half of the Upper Sixth girls taking A-Level Physics here have applied for Physics degrees.

As a department, we work closely with the careers department to begin engagement with STEM during the critical pre-A-Level period. We help promote the EDT (Engineering Design Team) residential courses for GCSE pupils. We are particularly keen to promote the female-only DSGTRE course.

Research has found that girls are more likely to engage in STEM and that they feel more confident when in female-only environments. This is proving to be successful: one girl in the Lower Sixth attended the Cambridge University outreach on physical natural sciences and has been accepted on a summer placement for structural engineering in August. Another secured work experience with BP material science, chemistry and engineering school. She has also been accepted on a four-day engineering summer school in Swavesey in August. Finally, we have six Lower Sixth girls attending a three-day trip to CERN in Geneva next spring.

The causes department recently ran a trip to the National Grid STEM showcase for girls. This was designed specifically to inform girls about career opportunities in STEM. Companies including AECS, Avanti, Dyer, Jaguar Land Rover and Network Rail were there, talking about what it is that, in the career opportunities available, all our girls came back truly inspired by what they heard.

The message is starting to get through. We recently had a Sixth Form girl land a much sought-after degree apprenticeship in engineering: the competition was very tough, stronger than for many leading university places. She has recently come back to talk to our Sixth Form about the challenges facing women in engineering. She is an inspiration for girls pursuing a career in STEM-related fields. Increasingly, schools and pupils, are recognising that universities is not the only path to pursue. Degree apprenticeships provide a great opportunity to continue education whilst contributing to a workplace and gaining hands-on experience, which is particularly valuable in the engineering industry.

Attitudes are slowly beginning to change but Microsoft’s research found that 79% of British girls said they would feel more confident pursuing STEM careers if they knew men and women were equally employed in STEM disciplines. The lesson – for us all – starts at school.

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This page everyday school experiences are key to inspiring future female engineers and scientists.