

INSPIRING STUDENTS INTO STEM CAREERS



Dr Gordon Mizner
Chief Executive, EDT

Writing in the Autumn 2011 edition of Science in Parliament Andrew Miller MP, Chairman of the Parliamentary and Scientific Committee, highlighted the danger of future shortages of qualified scientists and noted the need for school students to get practical experience of science subjects if the UK is to supply the anticipated need. Dr Gordon Mizner, Chief Executive of education charity EDT backs up this thought by recommending that properly resourced education/business links is the solution to future shortages of scientists and engineers.

THE DEMOGRAPHIC PROBLEM

Andrew Miller highlighted the findings of the Science Council that there are 5.8 million people (20% of the UK workforce) employed in science based roles. To keep pace with the needs of industry this needs to rise to 7.1 million people by 2030. This means that we will need many more people with these skills and qualifications coming into the workforce, over and above those required to replace those leaving through retirement or changes in careers. There is a similar situation in the engineering industries. At the EDT we hold discussions with numerous companies and other organisations in the science and engineering industries. It is already clear that there are skills shortages in many disciplines.

The demographics of the UK make this even more of a challenge as the age profile of the population means that large numbers of skilled workers are nearing retirement age. At the same time the number of 18 year olds leaving school will decline over the next ten years. This means that we need a significant increase in the proportion of school leavers pursuing science and engineering careers to meet the needs of the UK's core industries.

THE PERCEPTION PROBLEM

EDT is deeply rooted in encouraging science, technology, engineering, and maths (STEM) subjects in schools. A large part of the problem in getting more young people interested in STEM subjects, and then following

through into STEM related jobs, relates to perceptions developed early. These perceptions may derive from parents, teachers, friends or exposure to media stereotypes. They are well established early in a school career. As a general rule, young people going into secondary education have poor perceptions about engineering and applied sciences as a job or career, and an even poorer understanding of the actual jobs and careers undertaken in modern business.

This lack of knowledge and associated adverse perceptions militates against the increases in uptake which are required to fill the vacancies in these sectors. This means that students are not being prepared to match the jobs that are going to be available. It also means that our core industries will not be able to source the talent they require in the UK so that there is a risk that these industries will be forced to base themselves elsewhere. A double negative for the UK economy.

EDT undertakes research into perceptions of pupils aged between 12 and 14, and their understanding of particular jobs is enlightening. When asked to nominate 5 attributes of a particular role the pupils' responses centred on ideas that

Engineers – have dirty hands (41%) repair cars (43%) and wear overalls (34%). Scientists – are clever (73%) wear white coats (42%) and wear glasses (19%). Students have a perception which fits into a stereotype of these jobs without any real idea of what the roles involve.

Our observations have recently been supported by the Education and Employers Task Force in research they have published into the career prospects and aspirations of children at school. The research concluded that there was "strong evidence that there is a misalignment between the career aspirations of many young people and real job prospects". The report pointed to research into the occupational preferences of Year 7 pupils mapped against actual jobs by sector in the UK which shows that "nearly one half of respondents aspired to occupations actually undertaken by one in twenty of the working population."

There is a serious problem with the perceptions and aspirations of pupils as they come into secondary education. Interventions need to be found which will guide pupils into viable careers. From the point of





view of the future health of our core science, technology and engineering industries it is important that these interventions guide a significant proportion into STEM careers.

CHANGING PERCEPTIONS

Fortunately there is evidence that the perception of students can be changed. EDT's perception research is taken before and after an experience of a business-related science or engineering project experience. The figures quoted above are 'before'. The 'after' figures show a much better understanding of the realities of the role.

The research by the Education and Employers Task Force shows "compelling evidence that young people are especially attentive and trusting of first-hand information about jobs and career pathways received from employers". They also note that "countries with greatest success in dealing with youth unemployment typically include extensive workplace exposure within education programmes".

All the evidence suggests that if caught at an early stage it is quite possible without too much resource to improve significantly a secondary school student's perceptions of science and engineering careers by engaging them with a real business problem or environment and giving them exposure to role

models who can inform them of the reality of STEM jobs and careers. It is important that such intervention comes early in their school careers because GCSE (or Scottish equivalent) choices are often the point at which many students wave goodbye to the option of a STEM career without even having considered it properly.

In order to achieve widened participation we have to do more to inspire and generate interest among those who would not naturally seek out information about STEM opportunities. This means providing events and activities that enable real experiences and contact with role models; 'seeing it in action', 'hands on'. Finding the time and resource within schools for this to take place is crucial, and encouragement to make this time and resource available will need to come from government.

PROVIDING EXPERIENCES

However, including enrichment activities in the



school curriculum is only one half of the problem. The other half is providing the experiences; provision of the projects that engage and the role models that inspire. Organisations like EDT can provide the infrastructure to co-ordinate the work, but the real contact can only be provided by the STEM industries themselves, committing resources of manpower and finance to inspire the next generation of scientists and engineers which will be their workforce.

We have found that enlightened companies are willing to put resource into partnering with EDT to deliver enrichment experiences that inform and inspire school students into a STEM career. We work with industry leaders such as Rolls Royce, Eon, BP, and Astra Zeneca and many others in delivering such experiences.

We tailor a partnership to the needs of the companies. Typical is our relationship with SELEX Galileo, a leader in defence electronics. SELEX Galileo recognises the importance of an outreach programme to assist in recruitment. It works with EDT to take a dynamic approach to engaging with the schools in its local areas. As well as the benefits to the schools and students outlined above, SELEX Galileo has found that providing mentoring activity for the students is important to staff development. The EDT schemes provide the opportunity for new graduate recruits and apprentices

to mentor the school teams, giving them excellent CPD experiences and developing their confidence.

SELEX Galileo is one of many committed companies and EDT is currently providing STEM enrichment experiences for upwards of 25,000 students each year. However, there is much more to do. We are making progress on increasing the proportion of girls on the programmes but there is a wider task in engaging the 'harder to reach' schools. This is a resource challenge because sustaining relationships with such schools is difficult, but there is enormous scope to include many more schools.

THE CHALLENGE AND THE SOLUTION

The challenge we face is stark. Unless significant effort is made to inform and inspire students into STEM careers early in their secondary school careers, we will not have sufficient qualified people to supply the jobs in STEM industries which the UK can provide. The flip side of this is that, if we don't inform and inspire students into STEM jobs, a proportion are likely to end up with qualifications which don't fit the available job market, leaving them unemployed and disillusioned.

The good news is that we know the solution to this challenge. Exposing students to real work problems and environments and enabling them to engage with appropriate role models will modify their false perceptions and inspire them to engage in STEM careers with jobs that are needed and well rewarded.

We can see the challenge, we know the solution – what is needed is for government and industry to work out how best to implement that solution. There is little time for procrastination.