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Springboard to Engineering

The Engineering Education Scheme

The Engineering Education Scheme (EES) forms part of The Academy's 'Best' programme which aims to attract, retain and develop outstanding young engineers through its student, undergraduate and graduate programmes. Other schemes within the 'Best' programme include Headstart, Year in Industry and the Engineering Leadership Awards.

At Birmingham University a student from Tile Hill Wood School in Coventry is investigating product material handling systems on an exhaust production cell with Unipart Eberspacher Exhaust Systems.

Introduction

The Engineering Education Scheme's mission is to encourage a commitment to a career in professional engineering by students of the highest ability. The Scheme is aimed at Year 12 students who have a proven track record at GCSE (90% achieve nine or more GCSEs – the national average is 44%) and are studying AS level maths, preferably with sciences and technology, and showing a genuine interest in engineering as a possible career. In addition students must be able to demonstrate, during their selection process, personal commitment and team skills.

A professional engineer from a link company liaises with and advises a team of four to five students and their teacher over a period of five months. They work as a team on a real engineering problem for which the company provides the brief.

The Scheme has been operating since 1985, and over 12,000 students have participated. This year, 1612 students took part throughout the UK. In addition to generous funding from the Gatsby Charitable Foundation (GCF), the Scheme is also directly sponsored by Ford Motor Company, the Royal Navy, GKN, the Department of Trade and Industry and the Department for Education and Skills. It also receives support from many other participating companies in the form of project links, accommodation and facilities for programme events and management support.

Programme

The Scheme provides a structured programme for participants over five months, including:

- A Scheme launch, and a company induction where the participants are introduced to the Scheme and their project (Figure 1).
- A regional residential university workshop (opening image) where the teams develop their project further at a local university.
- A celebration and assessment day, where the project work is formally assessed by a team of senior industry representatives (Figure 2).

At the end of their project, students are awarded a certificate which is added to their National Record of Achievement, to be presented at university and employment interviews. Project work can also contribute towards their curriculum work.

Figure 1: Students from Hazelwick School in Crawley are inducted by their link company, Thomson Training and Simulation, at the start of their project to design a replacement electrically actuated drawbridge.

Engineering Education Scheme in action

The Scheme offers many advantages to participating engineers, companies, teachers and students. Representatives from each of these groups share some of their enthusiasm and insights below.

The engineer

Balfour Beatty ran a project this year for four students from Tiffin School in Croydon. Their Senior Engineer, Grant Tolley, worked with the students on a project to investigate the effects of thermal heating on the temporary propping of excavations.

He says: 'As the engineering tutor, I have gained in many ways. It has been a great experience to watch inexperienced people initiate ideas, and rationalise them in a structured manner. They were receptive to all of my encouragement; however, there were some problems with some of the students not meeting as frequently as necessary – this may have been due to their heavy workload.'

'The organisation of the trip to the Channel Tunnel Rail Link 440 site was quite an undertaking (Figure 3), but I think that the team was grateful for the time and effort put in by the site staff. They had an overview of the high-speed rail link and got a real feel for a sheet pile cofferdam in the pouring rain!'

At the residential workshop at Southampton University, the students were able to develop their project further. The results of the project were presented for assessment at the awards day (Figure 4), where Balfour Beatty's Chief Engineer, Mike McConnell, provided feedback to the students about their contribution to the project.

Balfour Beatty has decided, based on its involvement this year, to provide another team of students with a project for the coming year.

Stuart Thompson, Design Engineer of May Gurney Technical Services in Norwich, was the engineering tutor for a team from Hewett School in Norwich. Following their project to devise a new safe system for removing debris from a rotating auger, Stuart told us: 'I have personally not only enjoyed the experience of being an engineer tutor, but have also been impressed with the level of teamwork and engineering appreciation which the students have brought to the project' (Figure 5).

The company

BNFL has been a long-time supporter of the Scheme – last year the company had eight project links in the North West and Cumbria. Professor David Horsley FREng, BNFL's Head of Advanced Engineering, says:

'BNFL has been an enthusiastic supporter of the Scheme for some years. There can be no question of the

Figure 2: A team of students from Jack Hunt School in Peterborough is assessed by a panel of judges on their project to determine flow patterns in a fondant beater, with local company APV Baker.

benefit to students who generally have had little prior experience of, for example, formal options evaluation, project planning or of working in project teams. The quality of the work that the students produce is always most impressive and it is always a refreshing joy to be associated with the Scheme. It is not always widely recognised that the Scheme is also of great value to the participating companies as it provides a very valuable development opportunity for the young engineers who mentor the students.

'It is unfortunate that the well-publicised pressures on schools to achieve league table scores and, more recently, to accommodate the AS level curriculum must have made it very difficult for schools to participate in EES. Clearly a great deal of personal commitment from hard-pressed teachers is necessary. In the North West there was a worrying decline last year in the number of participating schools and this should be a cause for concern. The Engineering Education Scheme is not only excellently conceived and managed but it is a vehicle for opening the eyes of students and teachers to the contribution and importance of the engineering profession, vital at a time when applications for engineering degree courses are continuing to fall.'

Figure 3: Students from Tiffin School, Croydon, and Balfour Beatty during their company site visit to the Channel Tunnel Rail Link

AstraZeneca recently sponsored three schools in very diverse areas of engineering as part of the Scheme. The projects challenged teams from the Kings School, Fallibroome and Poynton High School, Cheshire in disciplines of tablet packing, control valve monitoring and effective cleaning of pressure filters – all real issues with the potential for economic, innovative solutions that could have a tangible impact on the areas associated with the problems.

AstraZeneca's Macclesfield site has supported the Scheme since 1986, originally sponsoring one school; through the years this commitment has grown as the company has realised the benefit of supporting such a scheme.

AstraZeneca has a policy of using its new graduate recruits as representative engineers for the Scheme and this maximises the element of practical engineering experience that is such a valued part of it.

This investment in people, especially within the local community, is seen to be as important as the solution of the engineering problems themselves.

The teacher

Peter Crompton is a Design and Technology teacher and co-ordinator of learning resources at Fortismere School, a comprehensive in Mill Hill, which acquired technology status in 1997. He has been involved with the Scheme since 1994 and has supported 64 of his students with their project work. Peter emphasises that prolonged EES participation was of significant help in securing Technology College status, and helping retain it until 2003.

Figure 4: Grant Tolley of Balfour Beatty and the Tiffin School team at their Celebration and Assessment day

The quality of the work that the students produce is always most impressive and it is always a refreshing joy to be associated with the Scheme

Figure 5: Stuart Thompson (centre) of May Gurney Technical Services with his team of students from Hewett School, Norwich

'The EES gives the students a unique opportunity to sample a career in engineering, from the first visit to the company, through the residential workshop phase and on to celebration and assessment day.'

'Good team work, project management, communication and presentation skills are all essential ingredients to a successful project. The change in the students from the beginning to the end of the scheme is quite astonishing. They become more confident and articulate, better organised and perfectly prepared for the world of higher education and work. They become aware of engineering as a stimulating and challenging career. The scheme makes a real difference to the students and adds value in a multitude of ways.'

The EES gives the students a unique opportunity to sample a career in engineering

Peter has benefited from his involvement with the Scheme too:

'I have always taken my CPD seriously and the EES has given me the opportunity to become accredited with the College of Teachers. The whole experience has been really valuable, highlighting the Scheme and my input as contact teacher at senior management level and assisting my approach to the performance threshold process.'

Peter's involvement does not stop there – this year, two teams from Fortismere are participating, linked with Ove Arup and Astrium (Figure 6).

Dr Chris Hollis, Head of Physics at Kings School, Macclesfield, has been involved in the Scheme for four years, linking with AstraZeneca in the North West of England. He says: 'I believe the EES enables my students to work in a highly constructive way with a major industrial company and that each side gains significantly from the experience. Whilst it is a very steep learning curve for the students, by the end of the project they are more self confident and are capable of coping with situations that would have been beyond them six months earlier.'

Kings School is committed to providing opportunities in engineering – its students also take part in Headstart and Year in Industry.

And last but not least … the student!

More than 70% of students taking part in the Engineering Education Scheme go on to study engineering at university. Richard Astbury (Figure 7), who now works with BT Laboratories in East Anglia, was so impressed by the Engineering Education Scheme when he was at school that he

Figure 6: Peter Crompton (second from left) and team members from Fortismere School, Mill Hill

volunteered to be the company's engineer link with Farlingaye High School, Woodbridge, Suffolk. Richard is a confirmed enthusiast for the Scheme and says: 'I believe having taken part was extremely helpful in my application to university. I would not have followed a career path to engineering without the Scheme'. Paul Dixon (Figure 8), now of Perkins Engine Company Limited in Peterborough, says: 'I gained my first experience of an engineering project when I took part in the Engineering Education Scheme at Nether Stowe School, Lichfield. The project we did with GKN Sinter Metals proved to me that it was engineering that I wanted to concentrate upon after completing my A levels. After completing a Masters in Mechanical Engineering at Loughborough University I joined Perkins Engines Company in September 2000 as a Graduate Trainee. I now look forward to returning what I got out of the scheme when I take on the role of engineering tutor to an EES team from Deacon's School, Peterborough, this coming year.'

Figure 7: Richard Astbury of BT Laboratories, a former EES student and

Figure 8: Paul Dixon of Perkins Engines, Peterborough, previously a student with EES

And finally

The Engineering Education Scheme achieves its mission of encouraging a commitment to engineering by bright young students – more than 70% of participants go on to study for an engineering or engineering-related degree at university. Many of them, as we have heard, return to the Scheme as graduate engineers and use their experience to take part in a real hands-on engineering problem with young practitioners.

Participation in the Engineering Education Scheme provides companies with solutions to their engineering problems, and helps the Scheme achieve its mission. Company engineers gain early managerial experience whilst 'project managing' the team of students and can use their involvement as part of their IPD and CPD requirements.

Teachers' participation contributes towards accreditation with the College of Teachers, enabling their senior managers to understand the value to their professional development of involvement in the Scheme.

The Scheme is very grateful for the support of all its participants and looks forward to its continued success. ■

Alex Ritchie is National Director for the Engineering Education Scheme in England. She is a Chartered Civil Engineer and a Chartered Geologist, and prior to joining the Engineering Education Scheme in England in January 2001, she worked for ten years as a Geotechnical Engineer in the mining, quarrying, landfill and property development industries. In 1997 she was Chairman of the Institution of Civil Engineers Graduate and Student national committee.

The Engineering Education Scheme exists to encourage a commitment to professional engineering as a career by students of the highest ability.

All enquiries (which will be forwarded to the relevant area) should be addressed to: EES, Weltech Centre, Ridgeway, Welwyn Garden City, Herts AL7 2AA.
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