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**Engineering**

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## **Building relationships with other organisations**

### **Build partnerships with schools**

#### **Work with employers**

**Exploit the outreach resources of museum and educational centres**

### **Bring variety, interest and realism into your sessions**

#### **Introduction**

The contents of this download are designed to give you some ideas about how you might exploit resources outside the boundaries of your own institution and bring the outside world of engineering closer to your learners.

The suggestions cannot be exhaustive nor can they apply directly to every area of engineering. Instead, they offer a starting point for discussions and planning.

You might like to discuss some of the ideas with your colleagues and work out what you could do together.

#### **Schools**

Schools may not immediately come to mind as a 'partner' or even as a 'resource'. But if you think of them as your 'supplier', the nature of the relationship becomes clearer.

#### **Benefits**

Working with schools gives you the opportunity to raise the profile of engineering as a career. This, in turn, will help you attract talented young people onto your programmes.

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**Engineering**

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**What you might do**

Think about what you do already and check whether there is more that you could do. You might like to talk to your colleagues about the benefits of linking up with schools and to discuss what you might do together. Here are some suggestions:

- Visit schools to talk about engineering. Combine simple but intriguing hands-on activities with information giving.
- Offer continuing professional development (CPD) sessions to teachers\* so that they can speak knowledgeably and enthusiastically about engineering as a career choice.
- Invite successful graduates of your programmes to visit schools with you.
- Provide sessions for school pupils on a day release basis.
- Encourage schools to make use of resources such as Engineering Explained or outreach programmes provided by regional museums and other visitor attractions.
- Work with Women into science, engineering and construction (WISE) to attract girls into engineering.
- Help set up Young Engineers Clubs in schools.
- Be a Science and Engineering Ambassador (SEA) or work with SEAs to promote engineering activities in schools.

We use the terms 'teaching and learning' and 'teachers' as generic terms to include:

- teaching, training and learning
- teachers, tutors, trainers, lecturers and instructors in the FE system.

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**Engineering**

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**You might like to look into these examples**

**Science and Engineering Ambassadors (SEAs)**

SEAs are the flagship programme of STEMNET (Science, Technology, Engineering and Mathematics Network). Ambassadors are individuals from a wide variety of STEM disciplines and careers across the UK, who offer their time, enthusiasm and expertise to help schools inspire young people. Typical activities in which ambassadors may get involved are:

- supporting schools activities such as Science and Engineering clubs
- helping with schools' STEM competitions, events and awards
- assisting in extra-curricular STEM experiences
- offering mentoring, careers guidance and positive role models
- helping to provide work-based placements for teachers and learners.

The scheme is funded by the Department for Innovation, Universities and Skills (DIUS).

**Michelle Dow: Education and Diversity Manager for British Gas and SEA**

Michelle Dow began her career as an apprentice service engineer for British Gas at the age of 16, and now works as a Recruitment and Diversity Specialist for the British Gas Engineering Academy. As an SEA, she regularly supports GETSET events providing science and engineering challenges for up to 200 girls. Michelle normally mentors a team of about 10 girls and aims to show them that young women can be engineers too.

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**Engineering**

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**Tees Valley Engineering Partnership**

The Tees Valley Engineering Partnership (TVEP) has a bold vision. It wants the region to be able to compete with the best in the world. This means attracting talented people into engineering and equipping them with world class skill.

To make this a reality, employers, training and learning providers and support groups are collaborating to identify opportunities to raise the profile of engineering. Their strategies for doing this include:

- improving the links between industry, schools and the further and higher education systems so that more high potential young people are attracted to engineering as a career
- encouraging those already working in the sector to acquire new skills or broaden their existing ones
- being aware of and collaborating in activities initiated by other agencies.

A recent initiative has proved very successful. In 2006 and again in 2007, TVEP (in association with SETPOINT Durham and Tees Valley) arranged a series of lively multimedia shows with an engineering theme. The lectures were aimed at Year 9 pupils and the invitation was sent to all schools in the Tees Valley area. Over 1000 learners attended the two-day course and feedback has been extremely positive.

**Huw James, of Science Made Simple**, is taking the model successfully developed for talking to young people about science and turning it into 'Engineering Explained'. ([www.engineeringexplained.co.uk](http://www.engineeringexplained.co.uk))

His hour-long Engineering Explained show highlights a range of career options available in the engineering sector, including those in the medical area, civil engineering and aerospace. The live demonstrations, which include examples of how lasers are used to transfer information and how curved wings help a plane stay in the air, are mixed with video testimonies from young engineers who are currently thriving in the sector.

Huw is involved in training engineers to communicate their field to others just as the sister organisation does for science. He says:

"I can't wait for the project to get up and running! Engineers are really under represented in the communication game. I just hope I can get people as excited about engineering as I am."

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**Engineering**

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**Reflection**

**What has struck you about what you have read so far?**

**What might you explore further?**

**What might you do differently?**

**Employers**

Entering into partnership with employers is likely to be most successful when there are genuine benefits for both parties.

**Benefits**

When you are thinking about working with employers the outcomes you might seek for your learners could include:

- a realistic view of what workplaces look like and a feel for what it might be like to work in them
- access to certain machinery and equipment and other facilities
- use of materials and equipment that the employer no longer needs
- awareness of the practical applications of the theory you are teaching
- contact with people who may become role models for your learners
- insight into job opportunities
- appreciation of how exciting and challenging engineering can be.

The benefits for employers might be:

- involvement in recruitment
- input into the way the curriculum is delivered
- chance to get to know potential employees.

**What might you do?**

- Organise visits to the workplace.
- Negotiate access to software and equipment.
- Invite employers and/or their employees to talk to your learners about the work of engineers and to act as mentors to your learners.
- Discuss selection criteria with employers.
- Explore whether your curriculum delivery can accommodate some of the specific needs that employers have.

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## **Engineering**

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### **When you organise visits**

- Make the purpose of the visit and the intended outcomes very clear to your learners and the host company.
- Prepare your learners in advance so that they know what to look out for and what to direct their attention to.
- Build in some reflection points, pauses, time to make notes and so on during the visit.
- Ask the host company to include an activity that gives learners something to do (see the example of Hereford Group Training Association below). Learners quickly tire of walking around and listening.
- Review the visit afterwards. Give learners a framework for reflecting on their experiences.
- Invite learners to see themselves as ‘customers’ of the company they visited and reflect on their experience of customer care.

### **An example to think about**

**Hereford Group Training Association (HGTA)** organises an annual scheme whereby Year 10 learners from different schools visit a number of local employers over a period of time. The purpose of this ‘Manufacturing Compact’ is to:

- raise learners’ awareness of the manufacturing companies that operate in the region
- introduce them to the world of work
- invite them to consider working in the manufacturing industry.

Each visit is carefully planned to introduce learners to a particular aspect of manufacturing. At the end of the scheme, all the learners spend a day at HGTA’s premises to review their experiences.

The hands-on activity that one company arranged for them proved to be a highlight of the visit.

“We were given a most interesting tour of the design and production facility and were shown how using CAD/CAM.”

“We could design and produce the company initials from steel.”

“We were able to witness our design being manufactured having transferred it to a press on the shop floor.”

“It made the use of computers in industry come to life.”

The scheme benefits both the companies and the learners.

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**Engineering**

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Learners get a realistic taste of working life:

“I thought factories would be dirty and noisy but I was surprised how clean and orderly the premises were.”

The companies get the chance to present themselves as attractive career options:

“If we are to compete with overseas suppliers, we need to secure the services of better people and attract them to industry. Manufacturing Compact gives us an opportunity to highlight to the students the challenges offered and give them an idea of what they may aspire to.”

**A success story**

The final event is rounded off by a representative of one of the sites visited. On one occasion, this was the director of a local company. He had started his working life as an apprentice and worked his way up through various positions in the company. After 20 years or so, he led a management buy out for five million pounds. His success made him a powerful role model for those listening to him.

**Questions for you to ponder**

How might HGTA's example be adapted for your learners?

When you organise a visit, ask yourself whether:

- it should introduce learners to the business of running a company or be confined to aspects relating to engineering
- what the company wants to offer is compatible with the learning experience that you want for your learners.

**University departments**

When your mind is focused on introducing some fundamental principles of engineering to Level 2 learners, university departments may not be at the forefront of your mind. However, the Undergraduate Ambassadors Scheme (UAS) ([www.uas.ac.uk](http://www.uas.ac.uk)) may have something very useful to offer you.

The scheme provides the framework for a degree course module awarding academic credit to science, technology, engineering and maths undergraduates who volunteer to work in local schools and colleges. The scheme is attractive to learners because it becomes an integral part of their course. They become more focused and committed because they have learning goals that are clearly defined and they know that they will be assessed on their work.

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**Engineering**

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They work closely with the teacher on one day per week for a full 10 week term, providing teaching and practical assistance and conducting special projects.

Currently, the engineering departments at the universities of Brighton, Birmingham and Brunel are participating in the scheme. If they are too far away from you, you might like to persuade a more local university to consider it.

**Benefits**

- Interacting with an enthusiastic final year student for a whole term may raise your learners' aspirations and interest them in pursuing higher level qualifications.
- You have additional support in your classroom as well as the potential benefits of the student's special project.
- The scheme encourages a new generation of learners to consider joining the teaching profession, especially in shortage subjects.

**Reflection**

**How might this scheme benefit you?**

**Museums, educational centres and visitor attractions**

Around the country, there are numerous outreach programmes linked to museums, educational centres and visitor attractions. Depending on where you are you may have access to sites such as the Thames Barrier, the Eden Project or Sellafield.

However, more often than not, the educational programmes promoted by such attractions are designed to attract the attention of younger learners who have yet to decide whether or not to study engineering. The National Space Centre was one such example until 2006 when they decided to extend their offering. Leicester College, conveniently close and with wide experience in training engineers, was a natural partner. The collaboration is a story about mutual benefits.

**The partners**

The National Space Centre is the brainchild of the University of Leicester which has space science expertise of world renown. They opened to the public in June 2001 and have established themselves as a high quality visitor attraction and education and research facility on one site.

Initially their education programmes were aimed at the 8 to 14 age group. In 2006 they decided to broaden their educational remit to attract learners in the

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**Engineering**

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14 to19 age group. They secured a grant from the East Midlands Development Agency and invited Leicester College and a sixth form college to work with them on a project called Career Pathways and Workforce Development. It is about the development of programmes for Key Stages 4 and 5 and is a starting point for significant initiatives that are planned for the future.

**Leicester College** is one of the largest FE colleges in the UK. They have a total student population of around 27,600 and offer a broad range of subjects.

They have a long established tradition of excellence in training technicians and professionals in all aspects of the engineering industry including electrical, electronic, steel fabrication, welding and motor vehicle trades and offer the widest range of specialised engineering courses in Leicestershire.

When the National Space Centre wanted to extend their offerings to an older age group they chose the college as one of their first partners because of their geographical closeness and their expertise in designing engineering curricula.

Several of the college staff including the vice principal, became involved in developing a programme linking the National Space Centre's resources with the college's curriculum. They now have a representative on the steering group for the Career Pathways project.

**How the partnership works**

The National Space Centre offers four major benefits to the college.

- New engineering learners take part in the 'Challenger Mission'. This is a simulated space mission involving the launch of a probe to investigate a comet and gives them an exciting way of looking at team work and key skills.
- The National Space Centre sets a design brief for a project to be undertaken by BTEC learners. This requires them to build a 'Mars Rover' vehicle which is a steerable, battery driven model of a real piece of equipment to be used in space exploration.
- They put on an annual CareerFest as a way of interesting learners in careers in the space industry.
- They have a magnificent auditorium in which learners from the college practise their presentations for the Space Olympics.

Leicester College say that they want to motivate and inspire their learners by giving some vocational context to their learning and opening up a range of possible career paths.

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**Engineering**

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So in their induction week, all first year engineering learners from the college visit the National Space Centre which offers a new environment. After a college presentation, learners engage with the 'Challenger Mission' and can then explore the Space Centre on their own.

The Mars Rover idea stemmed from a project that a single BTEC learner completed in 2006. Teachers take this vehicle with them when they visit schools as a way of attracting young learners' attention and interest.

The CareerFest opens up possibilities that learners had not imagined. They say things like "I had no idea so many options were available".

The Space Olympics is an event that takes place in Russia and some learners are members of a team of especially talented learners drawn from local schools and colleges. As well as competing with international teams in mathematics and physics, they are required to make a presentation on a space related topic. This is what they practise at the National Space Centre.

**What the partners say about the benefits**

The National Space Centre says:

"Working with the college gives us immediate feedback on whether the content of our programmes match curriculum requirements. We benefit from the college staff's experience and knowledge of the engineering curriculum and of developments in the wider educational context.

"Overall, it enables us to provide what teachers want rather than what we think they want."

Leicester College says:

"We draw in expertise and advice from the space industry and from higher education. This broadens learners' horizons and raises their awareness of the opportunities available to them. It is a means of enriching and enlivening the curriculum.

"The National Space Centre has brought a new dimension to our BTEC National Diploma in Engineering. The partnership helps to engage more learners in engineering and offers them enriched learning, through the theme of space."

**Reflection**

**Do you have a significant resource that encompasses an important area of engineering?**

**How would you suggest it could extend its offering to be relevant to your learners?**

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**Engineering**

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**Competitions**

UK Skills describes itself as a not for profit organisation that champions skills and learning for work through competitions and awards. The organisation was established in 1990 with the primary purpose of raising skill levels in the UK through skills competitions, and managing the UK team which competes in the World Skills competition. In recent years it has widened the scope of its operations to include managing the National Training Awards and organising skills related events.

If you have watched the video World Skills, you will have seen two successful competitors from the UK who won their regional and national competitions and finally took medals in the 2007 World Skills competition.

**Benefits**

- Competitions at any level have the effect of concentrating learners' efforts and attention.
- Because they are likely to involve a lot of practice and intensive training, learners' skill levels rise more quickly than they might otherwise do.
- Learners gain confidence and develop the ability to perform under pressure.
- Employers and ultimately the public benefit too.

**Reflection**

**Where might competitions benefit your learners?**

**Have you ever considered the Schools-College Challenge – a scheme piloted by UK Skills in 2007? [www.ukskills.org.uk](http://www.ukskills.org.uk)**

**You might like to talk to colleagues about how such a scheme could motivate your learners and strengthen your links with local schools.**