Evaluation of Pre-16 Students' Work Experience Placements in Science, Technology, Engineering and Maths (STEM)

Final Report

June 2011

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Executive Summary

This report presents the findings of a research project investigating the value and impact of STEM-related work experience for pre-A Level students. Previously, gaps and weaknesses have been reported in STEM-related work experience, and the aims of this research were to identify these and to explore how these might be addressed by the HE sector in order to help motivate and encourage students to consider studying STEM subjects in higher education. The project's aims were to:

i) carry out a short literature review of STEM-related work-related learning
ii) identify impacts of STEM-related work experience as perceived by pupils, teachers and placement organisations
iii) explore how the HE sector could assist in addressing shortcomings to encourage students to consider STEM-related subjects at university
iv) provide specific guidelines for HEI STEM Departments on how to set up effective work experience placements for school students.

Below, an overview of the research and its main findings and recommendations is presented.

Methods

The project started at the end of September 2010 with an invitation of schools in and near Southampton to participate in the project. Later on, schools and colleges across Hampshire, Berkshire and Surrey were also invited to participate. The whole process of recruiting schools took place throughout the Autumn term in 2010.

In five schools, student focus group meetings and interviews with work experience coordinators, STEM teachers, and/or Careers Advisers were carried out and 76 students participated in the student questionnaire. Pupils from two of these schools were post-16 students. The students had either experienced or had shown an interest in a STEM-related placement.

The student focus group meetings were approximately 30 minutes in duration. They were held over students' lunch breaks and students were offered a full lunch as part of these meetings.

The interviews were with a person in charge of work experience from six companies, four schools and three university STEM departments, and with a science teacher from two of the four schools. Interviews were approximately 35-40 minutes in length and took place in their work environments.

Main findings

Student Questionnaire

Of the 76 students taking part in the questionnaire almost all (94.7%) felt they had a say in their choice of placement, but one out of five had not deliberately chosen a STEM area for their placement. Almost a quarter of the students were unable to secure the placement they wanted, mostly for reasons of health and safety and a lack of placements (they either missed out or the company no longer offered placements, sometimes due to the recession).

More than half of students had found their placement through family and almost 20% through contacting a company they were especially interested in. Parents/family members were also most often the ones who helped the students with their applications. 13.2% of students felt that they had received too little information about work placements, and 17.1% felt they had not received enough support in choosing and applying for the placement.

Most (86.8%) students were 'quite interested' or 'very interested' in going on a placement. Similar percentages of participating students were pleased (quite or very) with their placement once they knew where they would be going, and found their placements useful and interesting.

However, 14.5% reported that their placement was 'not very' or 'not at all' relevant, and 10.5% found their placement 'not very' or 'not at all' enjoyable. Significantly, more than a third of students (35.6%) indicated that their placement was 'not at all' or 'not very' challenging.

19.7% of pupils felt their placement had 'not very much' or 'nothing at all' to do with STEM and only 15.5% of students said that their placement had 'completely' met their interests in STEM. 28.9% said it met these interests 'somewhat'.

On a positive note, 42.1% of students said their interest in a STEM career has increased since their placement. Many students in the sample had engineering placements, and the STEM subjects that were most often named by students when asked which of these subjects their placement most related to were in the decreasing order of: engineering > science > technology > maths.

The skills that students most often indicated that they had learnt were the general skills of communication skills, learning about responsibility, and team working skills (in other words, the so-called 'soft skills').

What the students were hoping to learn was centred around finding out more about what working in that specific place of work and company would be like, for future careers; generally finding out about what it is like to work; how a business runs; 'soft' skills.

19 (25%) of the 76 students said that their placement did not link very much to their STEM subjects at school. This might not necessarily be a negative finding as they sometimes indicated that the placements were much more advanced than what was done at school.

Student Focus Group Meetings

Overall, the views and feelings expressed about STEM work experience during the focus group meetings were very positive. Students seemed to have found it very worthwhile and learning in many areas was reported, both general and personal skills (relating to colleagues, team work, being in a work setting, working 9 to 5, learning about business) as well as specific STEM-related learning. There was great enthusiasm expressed about the placements, and disappointment sometimes that they had had to go back to school. Many students reported they had been given more responsibilities than expected, although for some, Health & Safety was felt to have been a hindrance as to the activities they could do in their placements.

The links with STEM areas were often very clear, but it was not always easy to link the learning at the placement back to STEM subjects in school; sometimes because what happened at placements was much more advanced and sometimes it was very different from the STEM curriculum at school. Quite often however, students said that they came back to school with a much stronger sense of what they needed to do know in terms of work focus, motivation, and options. They felt more motivated than before to go into a STEM area later on and more informed/aware of which specific area within STEM they wanted (or didn't want) to go into.

Students who had one week placements were not very pleased about this and felt they lost out on many opportunities because of this, in terms of the placements they could get and the learning they could take with them from their placements.

Generally students had felt supported with applying and finding their placements, and during the placements.

Disappointment was mostly expressed in terms of the activities they could not do, and the reality not completely matching their expectations in that sense: some would have liked more science-related work, some more hands on activities; some felt Health & Safety was taking up too much time; some had not been properly informed about necessary equipment/clothing required, and so were unable to take part in certain activities; some had not got the placement they wanted, etc. Suggested improvements related to Health & Safety preparation beforehand, and the placement being more prepared for the students' arrival.

Interviews with Work Experience Coordinators in schools, companies, and University STEM Departments, and with science teachers in schools

Relationships between schools and companies appear to be hardly existent when it comes to work experience, and some companies expressed great regret about this, and a need for this. Within schools, there is reportedly not much collaboration between the STEM departments and the work experience coordinators about STEM work placements, and time constraints were given as a possible reason for this.

All of the company work experience coordinators interviewed reported that no formal advice on what constitutes a good placement was taken, but that they were flexible in activities they could offer to the student on the spot to ensure students had an interesting and challenging placement; also it was felt they had a good sense about whether the placement had been good or not through their feedback procedures. Some felt it would be helpful to have guidelines and criteria. In one University STEM department, the suggestions sent through by Solent EBP were used as guidelines, together with the interests of the students.

In companies, students appear to be are given subject-specific jobs where possible, but also some mundane jobs such as data entry or photocopying, as these are also part of many of the jobs in the company and it is felt that it is beneficial for the students to get as realistic expectations of the job as possible. In one company, mundane jobs were specifically not given to the students as they wanted to inspire the students. Most companies also give the students projects to do with deadlines or end presentations. A range of activities is usually offered.

The placements at the University STEM departments appear to be very much bespoke, depending on what the students are interested in and good at and so they can help out and relieve the staff, to give them a good sense of what the undergraduate course is about and what the work is like. Links with the GCSE STEM curriculum are reportedly not explicitly made, but links with the undergraduate curriculum are, as one of the aims for the departments is that the student comes away with a realistic idea of what studying and a career in the subject is about.

Specific procedures seem to be in place in all of the schools interviewed, although sometimes more formal than others. In all schools, students are asked to keep diaries or complete a booklet that they have been given. All students are visited during their placements, but these visits are reported to be short due to time constraints. Some schools have tasks for students when they get back, but not necessarily in STEM subjects.

Some companies evaluate informally, others sit down with the student and someone from school, depending on the school. The evaluation within the department is usually done on an informal level. In some companies the students are asked to keep diaries, or forms are filled in, whilst informal evaluation is happening throughout the duration of the placement. There seems to be scope for

more formalised evaluation processes in any improvement of STEM work placements for Year 10 students.

Evaluation at the University STEM departments tends to happen more informally afterwards with a chat, but one interviewee mentioned that procedures will be more formalised across the University in the near future and that hence she has also started to formalise processes, such as the evaluation of the placement experiences.

What works well and doesn't work well in placements

- It can sometimes be hard for schools to track down students on placements, as some links with companies are reported to be quite weak; conversely, some companies find it hard to get hold of the relevant person at school in the case of issues with a student during their placement.
- The age of the students is becoming more of an issue due to increased health and safety checks; it is therefore becoming more difficult for 15 year olds to go out and do work experience.
- Sometimes students don't organize a placement until the last minute and then they end up with something that is not very useful. Some teachers reported time constraints as an issue in helping all students find appropriate placements.
- Generally, STEM students are seen to be particularly motivated and keen to go on a placement.
- Companies feel that it is important to keep students busy and to give them a variety of activities, things which challenge them and which take a reasonable amount of time; giving students a project with a deadline and some form of presentation at the end of the placement seems to work well.
- Honest communication from the side of the company about what is and isn't possible during the placement is important, as is honest communication from the student, for example about special needs, so that the right kind of activities can be arranged.
- University STEM departments feel that students with strong interest, and good grades and a knowledge of science are needed for their placements.
- Students need to be kept busy with a variety of things during their placements at the University STEM departments, and the placement needs to be flexible for unexpected things that might crop up.
- In the future, work experience at the University will be more formal than it is now; and there is an increasing amount of paperwork which makes offering work experience more difficult.

Student learning

- Placement experiences represented crucial learning about the world of work. Students grow up a little; they come back more focused as to what they need (to do) for their future career of choice. Even if the placement wasn't very interesting for the student, this can be a positive experience as they come back into school knowing what they don't want to do.
- Student learning at companies is seen to take place in the areas of: the basics in the world of work; time keeping and being on time; taking initiative; interacting with employers, colleagues and customers (rather than only peers), meeting new people; developing social and communication skills; learning respect for others; learning how to write in proper English; seeing people enthusiastic about their working environment; developing realistic views about STEM work, especially in the case of engineering where there exist many misconceptions amongst students about the types of work involved.

- The University STEM departments' work experience coordinators reported the following student learning: seeing the value of science as a subject to study; a better understanding of the university, of the STEM subject involved; enthusiasm about the subject, excitement of what is out there at the moment, awareness of what is done in the department; some experience with research projects; 'soft skills' such as team work, social/communication skills, working to deadlines, confidence with communicating with adults, awareness of different levels of initiative so that they are useful to employers in whatever job they do; basic office skills

Links with STEM subjects in school

Companies did not report any special effort to make sure the placements are STEM related. Sometimes this is because any activity would naturally be STEM-related due to the nature of the work place. There might a be a case for letting schools write recommendations as to the kinds of activities that would be useful for students in STEM-related placements, as some companies feel they can and would like to improve in this aspect.

Suggestions for improvements

- More links for schools with local companies offering STEM placements, especially engineering
- More communication and interest from the schools towards the companies, and more links between schools and companies about/around:
    - the placement and the student on the placement
    - involvement from the school and parents in the STEM activities
    - structure and timing
    - links made with the curriculum (closing the gap between what the student does at school and the STEM content of activities organised on the placement)
    - selection criteria for students as to what subjects they need to be studying.
- Companies meeting work experience coordinators/careers advisors at school, talking with them face-to-face about integrating activities with the curriculum.
- Making use within the curriculum of what the company can offer in terms of ideas, activities and resources, making the curriculum learning more linked to the real world
- Payment for companies for doing work experience, as it takes time to organise.
- In one of the university departments, it is felt that money was needed to offer work experience and make sure less academic students also get the opportunity to be inspired by and involved in STEM.
- Schools also report that funding for placements is an issue

Are STEM related placements worthwhile experiences?

Almost all work experience coordinators felt that work experience was very worthwhile and important:

- It helps raise student aspirations
- It makes students more self-confident as they experience what things are like in the wide world
- There were questions about whether students have to be taken out of school for their work experience or whether it could also be done in the school holidays? Supervision from

teachers is very limited anyway. Is it a waste of a fortnight of school, as the curriculum is already very tight?

- There were questions about whether Year 10 is the right age to do work experience.
- In universities, students gain more knowledge on what they need for a STEM career, a better idea of whether this is the area and career they want to go into. It is felt to be especially important for STEM subjects, so that students realise what they need and become inspired.
- Work experience was seen as more important than ever by one outreach officer, because of the variety of opportunities available nowadays and the difficulty of finding information about them.

Ways in which Higher Education could be involved in the Year 10 STEM placements

- Universities could help track back what is needed academically to do certain degrees and jobs, so that students are not oblivious to what they need at GCSE level for their further education.
- Universities can provide information to students about the earning potential of certain jobs and careers, so that tuition fees might be less of an issue.
- Universities could help by communicating to students what they are looking for, for a student to visit and experience.
- Universities could help schools and colleges find placements with the right kind of activities in terms of what they would be looking for in a student; perhaps by laying down a list of criteria which placements should fulfil, so that companies/University STEM departments know what that student should be experiencing in different activities they undertake during their placement.
- Universities could inspire the pupils more, and work experience in their labs could be valuable.
- One company work experience coordinator saw great opportunities in working together with the University to help them teach students more of the skills they will later on need in the jobs; helping to teach the subject area their company works in in a more holistic way, as many subject areas are integrated into it.
- Some company representatives felt that even though work experience in STEM areas is very important for young people, it is the University STEM outreach departments' role to work with schools about what studying STEM subjects at University is all about.
- More dialogue between universities and school is needed because the schools might have misconceptions about what goes on in the university. The schools would have to ask questions and then make suggestions about placement activities.

Conclusion and Recommendations

The main purposes of this research were:

1. To identify positive and negative impacts of STEM-related work experience as perceived by pupils, teachers and placement organisations.
2. To explore how the HE sector could assist in addressing shortcomings to encourage students to consider STEM-related subjects at university.

Below, the most important findings of the research with regard to these main point are summarised.

Positive aspects of STEM-related work experience

Almost all work experience coordinators felt that work experience is very worthwhile and important:

- It helps raise aspirations in the students
- It makes students more self-confident as they experience what things are like in the wide world
- In universities: students gain more knowledge on what they need for a STEM career, a better idea of whether this is the area and career they want to go into. It is felt to be especially important for STEM subjects, so that students realise what they need and become inspired.
- Work experience is seen as more important than ever because of the variety of opportunities available and the difficulty of finding information about them.

Most students valued work experience placements highly as well, and found their placements useful and interesting. Often students said that they came back to school with a much stronger sense of what they needed to do know in terms of work focus, motivation, and options. Around 40% of students surveyed said that their interest in STEM had increased as a result of their placement. The skills that students most often indicate that they have learnt are the general skills of communication skills, learning about responsibility, and team working skills (the so-called 'soft skills'). Many students in the focus group meeting reported they had been given more responsibilities than expected, although for some, Health & Safety was felt to have been a hindrance as to the activities they could do in their placements.

Negative aspects of STEM-related work experience

About 1 in 7 students surveyed did not find their placement very relevant and 1 out of 10 did not enjoy their placement. Importantly, more than a third of students did not find their placements very interesting.

Only a little more than half of the students felt their placement had matched their interest in STEM and 1 out of 4 students said that their placement did not link very much to their STEM subjects at school. It was not always easy for students to link the learning at the placement back to STEM subjects in school.

In the student focus group meetings, some students expressed disappointments with regard to Health & Safety measures limiting time and activities during their placement, or otherwise not being able to do things they had hoped they could do. Some students also felt the company of placement had not been sufficiently prepared for their arrival.

The age of the students is becoming more of an issue due to increased health and safety checks; it is therefore becoming more difficult for 15 year olds to go out and do work experience.

Relationships between schools and companies appeared to be lacking with regard to work experience and especially some companies expressed great regret about, and need for this. Within

schools, there seemed to be little collaboration between the STEM departments and the work experience coordinators about STEM work placements, and time constraints were given as a possible reason for this.

Schools sometimes found it hard to track down students as sometimes the links with companies are quite weak; conversely, some companies find it hard to get hold of the relevant person at school in the case of issues with a student during their placement

Time constraints for teachers are reported as an issue in helping all students find appropriate placements. Generally however, students interested in STEM careers are seen to be particularly motivated and keen to go on a placement.

In the future, work experience at the University will be more formal than it is now; and there is an increasing amount of paperwork which makes offering work experience more difficult.

Ways in which Higher Education could be involved in the Year 10 STEM placements

Universities could help track back what is needed academically to do certain degrees and jobs, so that students are not oblivious to what they need at GCSE level for their further education. Universities can also provide information to students about the earning potential of certain jobs and careers, so that tuition fees might be less of an issue.

Universities could help schools and colleges find placements with the right kind of activities in terms of what they would be looking for in a student; perhaps by laying down a list of criteria which placements should fulfil, so that companies/University STEM departments know what that student should be experiencing in different activities they undertake during their placement.

One company work experience coordinator saw great opportunities in working together with the University to help them teach students more of the skills they will later on need in the jobs; helping schools to teach the STEM subject area in which the company works in a more holistic way.

In other companies the role for HE could not be seen clearly as it was felt that students at this stage need to see more about academic and undergraduate student life in order to find out whether it suits them, and that work experience comes second to this in deciding about a career path, as they are still only Year 10 students. It is felt that it is more for the University STEM outreach departments to work with schools about what studying STEM subjects at University is all about.

More dialogue between universities and school is needed because the schools might have misconceptions about what goes on in the university. The schools would have to ask questions and then make suggestions, rather than coming in and saying, this is what we want.

Recommendations

Improving links between the parties involved in offering STEM work experience to Year 10 students appears to be the main point when it comes to recommendations for Year 10 STEM work experience placements:

- Improving links between Universities, schools and companies about:
    - The kind of student required for particular placements;
    - The kind of activities companies and STEM departments (can) offer, and the kinds of environments they are, so that schools can make more suitable/appropriate

requests towards activities they think would be useful during the placement, and send the right students, but also inspire students about the world of STEM work
    - What is happening with the student during the placement
    - More formalised evaluation processes with all parties involved
    - Better links between University STEM departments and schools/students about what Universities require from students at undergraduate level, and helping students backtrack what they therefore need at GCSE level
- Links between the STEM content and learning at the placement and the STEM curriculum content at school – making these more explicit to students
- Involving companies in how to teach STEM subjects more 'holistically' at school and in a way that is more connected to the real world.

Furthermore, a closer look needs to be taken at how students can be appropriately challenged at their STEM placements, as students reported this as an issue.

It also seems that funding is an issue for all parties involved, which needs to be addressed if STEM work experience placements are to be improved or even to be remained at the same level.

The right balance needs to be found in the level some formalities that need to be taken care of with regard to work placements – the amount of paperwork that needs to be dealt with by the work experience coordinators in companies before the placement is sometimes seen as too extensive and unnecessary; on the other hand the evaluation of the placement could become more formalised, and companies could take more advice from guidelines on what constitutes a good placement.

It would be valuable to carry out further research into what would be a suitably "challenging" STEM placement for students, as it was only a quantitative finding from the survey used in this research that more than a third of students did not find their placement sufficiently challenging.

Furthermore, it would be very useful to bring together the people involved in STEM work experience in schools, companies and University STEM departments to explore useful ways for collaboration in order to improve STEM placements. This process could be investigated via qualitative research methods so that recommendations can then be made for other University catchment areas.

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Introduction

The vast majority of 14-16 year olds undertake work experience (QCA, 2007), but an Ofsted (2007) survey found that some work experience placements did not lead to effective learning, about 10% of students did not enjoy their experience, and some schools did not acknowledge that work-related learning applied to all students. A CBI report (2007) found that work experience lacked learning objectives, and employers did not fully understand their role in work-related learning.

Schools have a statutory requirement to incorporate work-related learning for all their pupils on the basis that it has a 'wide and long-term positive social and economic impact' (DCSF, 2007:10). By far the most common form of work related learning is work experience. The vast majority (95%) of 14-16 year olds undertake work experience for one or two weeks, constituting around 550,000 placements a year (QCA, 2007). However, a DCSF report highlighted variations in the quality of work related learning among schools (DCSF, 2007), and an Ofsted (2007) survey found that i) a proportion of work experience placements did not lead to effective learning, ii) about one in ten students did not enjoy their experience, and iii) some schools had not acknowledged that work related learning applied to all students. A CBI report (CBI, 2007), drawing on the views of learners themselves, also found that work experience lacked formal learning objectives, and that employers did not fully understand their role in work related learning.

As a result of such findings, a new QCA framework: Economic Wellbeing 11-19: career, work-related learning and enterprise was introduced in 2008 and included reference to transfer of students to higher education: "For high-ability learners, provision should be aimed at preparing them for success in a complex and increasingly competitive higher education and labour market." (QCA, 2008:6). The framework has three strands: i) learning *through* work by providing opportunities for young people to learn from direct experiences of work, ii) learning *about* work by providing opportunities to develop knowledge and understanding of work and enterprise, and iii) learning *for* work by developing skills for enterprise and employability.

Although there are so far some anecdotal accounts of change resulting from the new framework, there is still no specific research being carried out focusing on the value and impact of STEM-related work experience. Such research would be extremely useful in identifying gaps and weaknesses in STEM-related work experience, and exploring how these might be addressed by the HE sector in order to help motivate and encourage students to consider study STEM subjects in higher education.

The aims of this study are to:

i) carry out a short literature review of STEM-related work- related learning
ii) identify impacts of STEM-related work experience as perceived by pupils, teachers and placement organisations
iii) explore how the HE sector could assist in addressing shortcomings to encourage students to consider STEM-related subjects at university
iv) provide specific guidelines for HEI STEM Departments in how to set up effective work experience placements for school students.

Background

Literature Review

DSCF (2009) defined work-related learning as "Planned activity that uses the context of work to develop knowledge, skills and understanding useful in work, including learning through the experience of work, learning about work and working practices, and learning the skills for work". The activity of work experience they describe as: "…a placement with an employer in which a young person carries out a range of tasks in much the same way as an employee, with the emphasis on learning from the experience". They describe learning about the skills, behaviours, careers, roles and structures that exist within a workplace or organisation as learning opportunities work experience provides.

The following Thesaurus search terms were used for this literature review: workplace-learning; work-experience-programmes; job-placement; student-placement; work-experience-programs; work-experience; science-education; maths-education; technology-education; engineering-education; secondary-education; vocational-education. To increase the return of articles, some of these terms were also used as non-Thesaurus search-terms. However, only a few articles specifically dealing with pre-16 or even pre-HE experiences with STEM work experience placements could be found. Most of the literature on work experience in education was found to focus on University or Higher Education (HE) students, and on Young Apprenticeships. Work placements in HE are of course long-term and much more specialised, focused on developing more specialised knowledge and experience in a chosen field of work within one's chosen specialism. They are not meant as an initial taster of the world of work in general, as part of work-related learning within the broad secondary curriculum.

Within Higher Education, the research found on work experience mostly dealt with Engineering education, and some of it with the Social Sciences (for example, Smith et al., 2007). The articles found in these two subject specialisms often focus on assessment of placement learning, reflection skills for students, and impact on performance and therefore less on the placement experience itself. Rompelman and De Vries (2002) for example, looked at educational objectives and assessment of practical training and internships in university engineering education programmes, especially internationalisation within the curriculum. Gomez et al. (2004) looked into how graduate internships in bioscience undergraduate courses impacted on performance and found a significant positive result. Lock et al (2009) explore the attitudes of undergraduate engineers towards work placements in industry, and assesses the placement experience in terms of student learning outcomes and future employment aspirations.

Powell (2001) writes more generally about how work experience programmes in the further and Higher Engineering Education sector are coping with pressures relating to policy reforms in the education system and to the demands of the workplace. Coll et al. (2002) carried out research into *access* to experiential learning offered in the form of work-based learning, including work placements, in a science and technology degree programme, and found that access to work placements was enhanced by improving student performance in pre-placement interviews.

Studies about *secondary school* students work experience placements usually have a specific research focus such as *social equality* (Hatcher and Le Gallais, 2009), *gender equality* (e.g. Hamilton, 2003, Francis et al., 2005, Osgood et al., 2006) or issues of students with *special educational needs* in finding a work placement. These studies seem to show that the distribution of work experience placements tends to exhibit patterns of both social and gender inequality. Other studies found deal with young people's experiences with employment in general (i.e. young people employing part-time jobs next to their secondary education and the impacts of this), e.g. Percy (2009).

Several government and government-outsourced surveys have been carried out into the effectiveness and quality of student work experience placements in general in the last decade, in which students, schools and employers have been included. An overview of the outcomes of these studies, ordered by the different aspects of pre-16 work experience placements, is presented below. As these surveys have dealt with young people's work experience placements generally, none of the findings applies specifically to STEM placements.

Aims of work experience placements

DCSF (2009) lists many underlying aims and benefits of work-related learning for young people, such as the opportunity to 'learn by doing' and to learn from experts; the development of employability skills, such as teamwork, problem-solving, numeracy, literacy and ICT skills; the development of career awareness; raising standards of achievement of young people; improving their understanding of the economy, enterprise, and finance; encourage positive attitudes to lifelong learning; the enrichment of their education; increasing the possibility of being recruited in the future by employers they come into contact with.

Huddleston and Oh (2004) make reference to DfES (2002b) purposes of work-related learning, but claim they are wide-ranging and challenging targets for a curriculum area "about which there is often a lack of clarity concerning its precise nature, content and function" (p.?). They quote Jamieson (1986) who said that the schools-industry movement is a complex, constantly moving one, without a clear focus of attention except that it wants to change the education system in one way or another, and they argue that this is still the case. They are also concerned whether the increase in work-related learning schemes will compromise the quality of the learning experience, and how are such learning gains to be measured, as a large part of the work-experience placements take place in small- and medium size businesses.

Planning of and preparation for work experience placements

Ofsted (2007) found that in most cases work experience was well planned, and that students also regarded the preparation for work experience as thorough. Hillage et al. (2001) found the latter as well, reporting a high level of satisfaction with pre-placement preparation. School and area co-ordinators think that the quality of preparation in the school is good, according to them.

According to Ofsted (2007), preparation included essential information such as what to wear and introductions, and helped with time management, customer care and relationships with others. Hillage et al. (2001) found that most preparation time is devoted to health and safety. Students generally completed a record of their work experience and employers were normally involved in this, although to varying degrees (Ofsted, 2007). Placements were mostly visited and monitored by school staff and were followed up, to some extent, when the students returned. In around half of the schools, Ofsted felt that the de-brief on students' return was too short and therefore valuable opportunities to focus on learning were lost.

The main methods of organising work experience were either a joint approach, whereby schools and external agencies work together on finding, health and safety checking, and matching placements, or a more centralised approach whereby a central agency is mainly responsible for these services (Hillage et al., 2001). Since 1996, there has been an increase in the proportion of schools relying on a central agency to provide a health and safety checking service and also

maintaining a database of employers. They found the most common co-ordinating agency for work experience to be the local Education Business Partnership.

In one-fifth of their researched cases, work experience was managed by a teacher with no or just one responsibility point, while at the other end of the scale in a further fifth it is the responsibility of a senior teacher (Hillage et al., 2001). In most cases responsibility for work experience preparation lies jointly with careers and PSHE departments within schools, or is an integral part of PSHE.

Learning benefits of work experience placements and how these can be maximised and assessed

Hillage et al. (2001) found that one in six schools does not discuss learning objectives with students prior to placements, and that employers are rarely involved in placement preparation. Two-thirds of students visit the workplace prior to their placement, and more where the placements are organised centrally.

Ofsted (2005) stated about Young Apprenticeship placements that: "Work experience is most successful when guidance and support help to create a sense of purpose for students. This enables them to identify and then reflect on the outcomes of the tasks they have carried out and what they learned." (p. 19). This is supported by Smith et al. (2007), in their article about work experience in HE Social Sciences courses, in which they argue that "the pedagogical benefits of work-based experiences depend largely on the extent to which students reflect on them (....)".

Huddleston and Oh (2004) however, argue that because of the three strands which work-related learning is sometimes referred to as comprising (i.e. learning *about* work; learning *for* work; learning *through* work; see earlier), the range of possible learning outcomes is broad and it is this which makes the issue of assessment particularly challenging, since there is a lack of consensus about what precisely constitutes work-related learning.

Rolfe et al. (2008) who carried out research for *National Endowment for Science, Technology and the Arts* (NESTA) in order to examine how employers engage in work-related learning for 14-19 year olds in three innovative areas of the economy, feel that the learning experience needs to be supported by structured programmes, close supervision and mentoring, follow-up and development of learning outcomes in the classroom, and feedback to employers by the young people of the learning outcomes, and that schools need more support to deliver.

Ofsted (2007) found that the best practice placed work experience within a context of learning and linked it with work-related learning, citizenship and enterprise learning. Work experience was of less value to students and staff when it was 'bolted-on', with few links made to the rest of the curriculum.

CBI (2007) stated that "…the role of the employer is to create the right balance of briefing, tasks, activities and assessment. At the end of the placement, the employer should provide feedback, but assisting students to develop through reflection on their work experience falls primarily to schools…The objectives for the placement should incorporate explicitly the development of employability competencies, and tasks and activities should be set with this in mind. Work experience programmes should, if possible, provide students with an opportunity to review the activities they have completed and draw out what they have learnt. After the placement it is important for schools to reinforce the lessons from work experience and support students in addressing personal development needs".

Key Skills learning and applicability back in school

Hillage et al. (2001) report that English, Business Studies and Information Technology are the GCSE courses most likely to build on the placement experience, either in student discussion or coursework; while 60 per cent of students used numeracy on their placement, only 11 per cent referred to their experience in subsequent maths lessons. They have found that work experience has increased significantly as a vehicle for developing key skills. Information about this wasn't found in other sources, but it seems very important, and something to investigate in the area of STEM subjects as well, as it seems unexpected that these subjects are not mentioned by Hillage et al. as building on the numeracy skills learned in placements. In general, what effect the work placement learning has on STEM GCSE courses would be relevant to investigate.

Matching placements to students and choice of placements

Rolfe et al.'s research (2008) showed that good matching of young people to host organisations was essential; this involved obtaining clear briefing from employers about the type of work involved and the skills and interests of the young person. Matching worked best when there was thorough preparation for the placement and a pre-placement planning visit and meeting.

Ofsted (2007) found that students who organised their own work experience had mixed responses; some found the choice and independence beneficial but others did not extend their understanding beyond the family business. Own find placements are also often thought to be of better quality and better tailored to individual needs (Hillage et al., 2001).

A number of issues were raised in relation to finding placements, in particular: limited range of placements available, lack of good quality or challenging placements for high ability students, schools being in competition with each other for placements at peak times, and the increased demands on employers for placements (Hillage et al., 2001).

The majority of students are given a choice of placements, but in many cases this is a restricted choice, e.g. students select the type or occupation of the placement, rather than a specific placement, or choice is restricted by availability. On average, 70 per cent of students get their first choice of placements, but where a central agency is involved, a lower proportion of students get their first choice. Overall, schools and co-ordinators are satisfied with the range of choice students have (Hillage et al., 2001).

Activities in placements

According to Hillage et al. (2001), the most common activity for students on placement (50 per cent of cases) was to help someone else do their job, while 43 per cent said they did an actual job, 27 per cent moved around departments and 13 per cent said they did a specially created job. Most students felt that they were given opportunities to show what they could do and take responsibilities on their placement. Students who did an actual job were found to be more likely to be given responsibility and say that their placement was interesting and were significantly more satisfied with their placement.

Rolfe et al. (2008) state that "…young people can best learn to develop their skills in work placements by engaging in real activities with tangible results. They benefit greatly from opportunities to address real business challenges where they can research and generate ideas".

Placement sectors

Hillage et al. (2001) have done some research into the sector pattern of placements, which they say appears to have changed little since 1996. While there has been a decline in the proportion of placements taken in some sectors (e.g. banks and offices and in health) and rises in others (notably production and retail and leisure), the general distribution is similar between the two years. Higher ability students tended to be clustered in professional, legal and media and office environments, while students of lower academic abilities are more likely to be found in education and production sectors.

Schools with intakes from higher socio-economic groups tend to get higher proportions of their students on placements (Hillage et al., 2001).

Gender stereotypical placements

Large gender gaps exist in education and health, where placements are predominantly taken by girls, according to Hillage et al. (2001). They report that just over half of area co-ordinators have taken positive measures to avoid students taking gender stereotypical placements. Further, over half of area co-ordinators report that most or all schools in their area took such measures. Despite this effort, 69 per cent of schools reported no change in the number of students taking non-gender stereotypical placements.

Students' feelings about placements

Hillage et al. (2001) found that most students found their placement interesting and liked their work colleagues; most students felt they were given responsibility and opportunities to show what they were capable of doing; whilst one-third thought their placement was challenging, one-third did not and only 14 per cent thought the work they were asked to do was difficult.

Percy (2010) studied impacts of work experience placements in year 10 and of part-time employment of young people, exploiting a pre-existing longitudinal dataset (the Longitudinal Study of Young People in England, or LSYPE), which had resulted from tracking the opinions, activities and outcomes of initially around 15,500 of the same young people each year over 5 years, all of whom turned 14 during academic year 2003/04 and who were followed until the age of 18 or 19. Percy found that work experience varies in quality and its aggregate impact on attainment and participation in 2005/06 was statistically negligible, but he does not have information about whether young people found the work experience placement useful, nor about its quality or length. Instead, he mentions the Education and Employers Taskforce, whose research base emphasises an Institute for Education Business Excellence (IEBE) survey of 15,025 learners who had recently completed work experience. After work experience, 90% of these learners felt it helped them understand why it is important to do well in school and 89% reported they would work harder as a

result. These positive findings were broadly replicated in the 2007 CBI survey of 1,034 young people aged 14-16 who had recently a completed work placements.

CBI (2007) reports that the great majority of students who had recently completed work experience enjoyed their placement and felt it had given them a good insight into the world of work. Almost 90% of respondents thought that work experience helped to improve their skills needed for work at least to some extent. Over 70% of respondents said they had discussions about the skills needed for a particular task at least to some extent, but many had little or no discussion of the more general competencies needed for work.

Students also thought that work experience had an effect, particularly in terms of giving them a good idea of what work was like in their placement and, to a lesser extent, helping them decide about their career. Just over half (52 per cent) said that after their placement they felt more interested in doing well at school. Only one-fifth felt their placement was relevant to their school work (Hillage et al., 2001).

Work experience co-ordinators in schools see placements as an opportunity to encourage students to think on their feet, use their initiative and act responsibly in a completely new environment. The aspiration is that they come back motivated to achieve their best in school (CBI, 2007?).

Most schools attach a high priority to work experience and think the process worthwhile (Hillage et al., 2001). Around 70 per cent of schools had evaluated their work experience programmes, commonly involving an assessment of staff and students' views. Schools generally felt that work experience promoted students personal and social development, enhanced their maturity and helped them develop an understanding of the world of work. Fewer saw impacts in terms of broadening students' career horizons or helping their GCSE coursework.

According to Hillage et al. (2001), the employers they talked to were generally happy with the process, although they were a small and probably unrepresentative sample. The key elements of a good placement from an employer's perspective included an interested and willing student and a student who had done some preparation and had an idea of what they wanted to learn (and was willing to ask questions).

Methodology

The project started end September 2010 with the invitation of schools in and near Southampton to participate in the project. Only a few schools responded, after sending reminders, and schools that showed an interest not always followed up on their interest and some even withdrew shortly after having responded positively to participating. It was unclear what the reasons for this were but the impression of the researchers was that pressures at school played a role in this. The invitation letters where then sent out to schools in a wider geographical circle around Southampton. When the response was still very low, it was decided to amend the invitation letter to make it more 'catchy' and send it to schools across Hampshire, Berkshire and Surrey. It was decided to also include colleges, as students there would have completed their Year 10 work experience placements and they might be available for focus group meetings and the completion of our student questionnaire. STEM PGCE course tutors at the School of Education were also asked to promote the research in the STEM department at schools they thought might be keen on taking part; also, the science Heads of Department and/or the science PGCE mentors in schools were informed about the project in a PGCE Heads of Department meeting at the University and given packs of student questionnaires when interested in participating. Lastly, the STEM outreach people at the University of Southampton were asked if they knew of, or had special contacts with any schools they thought might be interested in participating whether they could forward our invitation

letter to them as an email. The whole process of recruiting schools, because of the difficulties encountered, took place throughout the Autumn term in 2010.

Despite all the recruitment efforts described above the target of 5 schools for student focus group meetings and interviews with work experience coordinators, STEM teachers, and/or Careers Advisers was only just reached. The aim to have 200 pupils from 10 different schools participate in the pupil questionnaire was not reached; the final respondent number is 76 pupils across 7 different schools. Pupils from two of these schools are post-16 students. The students had either experienced or had shown an interest in a STEM-related placement.

One issue in schools seemed to be that last years' Year 10 students were now Year 11 exam students whom the Senior School Management felt should not undertake any extra-curricular activities. Some schools offered to participate with their current Year 10 students who would undertake their work experience later on in the academic year, but this then turned out to be outside the time scope of our project.

A couple of schools felt they could only take part in the student questionnaire and not in the other research activities they were invited to participate in. However, the number of students returning questionnaires per school was much lower than was expected; sometimes the number of students having completed placements in STEM within the school was limited and sometimes only a few students had returned the questionnaires to the person in school who had distributed the questionnaires to the students and who returned the completed questionnaires.

From late November to the end of January, the pupil focus group meetings took place. In one school, despite the Work Experience Coordinator arranging the focus group meeting with 5 students, none showed up. Therefore only four student focus group meetings were conducted. In one of these schools, interviews with school staff/teachers involved in organising Year 10 work experience placements were not possible. In another school where the work experience coordinator was also a science teacher, it turned out that due to this person's high pressure load that day that there would not be time for an interview. An informal short talk was held instead and the comments are included in the findings section of the report.

The careers officers in schools appeared difficult to reach and often did not respond to invitations for interviews. As it seemed clear early on through interviews that the work experience coordinators were the central people in the school dealing with Year 10 work experience, the emphasis was put on arranging interviews with them where possible.

The student focus group meetings were approximately 30 minutes. They were held over students' lunch breaks and students were offered a full lunch as an impetus and reward for them to take part. Parent consent was gained to involve students in these meetings.

The interviews with all adults were approximately 35-40 minutes in length.

In November, the Solent Skills Quest Festival was attended by the researchers to establish contacts with companies offering work experience, and to gauge a first sense of the experiences with students. These contacts were used later in approaching companies for interviews with the work experience coordinators, and many were very helpful in offering their time for these interviews, which took place from December 2010 until end March 2011.

In February, the University of Southampton STEM Departments were approached again, this time for interviews with the staff coordinating Year 10 work experience placements. The outreach coordinators in three of these departments responded positively and were interviewed in March and April 2011.

Table 1. Overview of research activities and respondent numbers

Time phase within project	Research activity	Number of Respondents
Sept – January 2010	Inviting Schools	13 interested, but only 5 committed fully to engagement in the research (3 could not take part as their students' placements took part after the end of the project
November 2010 – January 2011	Student Questionnaires	76 (7 schools)
November 2010 – January 2011	Student Focus Group Meetings	4 groups (22 students in total)
November 2010 – January 2011	School Work Experience Coordinator Interviews	3 (+ one informal talk)
November 2010 – January 2011	School STEM Teacher Interviews	1 (+ one informal talk)
November 2010 – March 2011	Company Work Experience Coordinator Interviews	6
March - April 2011	University STEM Department Work Experience Coordinator Interviews	3

Findings

Student Questionnaire

Completed questionnaires from 76 students were received. 70% of these students were male. 62% were 15 years old; 33% were 16 years old and 5% were 17 or 18. A third (62.7%) had had a two week placement, 34.7% a one week placement and a small number of students had done 2 one week placements.

The subjects these students were taken were mostly the GCSEs in STEM subjects.

46.1% said they were very interested in career in STEM, and 30.3% were quite interested in this. Almost all (94.7%) said they had a say in their choice of placement, and 4 out of 5 (80.3%) said they had deliberately chosen a STEM area for their placement.

However, almost a quarter of students (23.7%) wanted a placement they couldn't get. Reasons for this, where given, were:

- H&S/confidentiality; no spaces left; problems with WEXOnline website; recession (placements no longer offered in company); company wanted different number of weeks than school

Placements were most often found through:

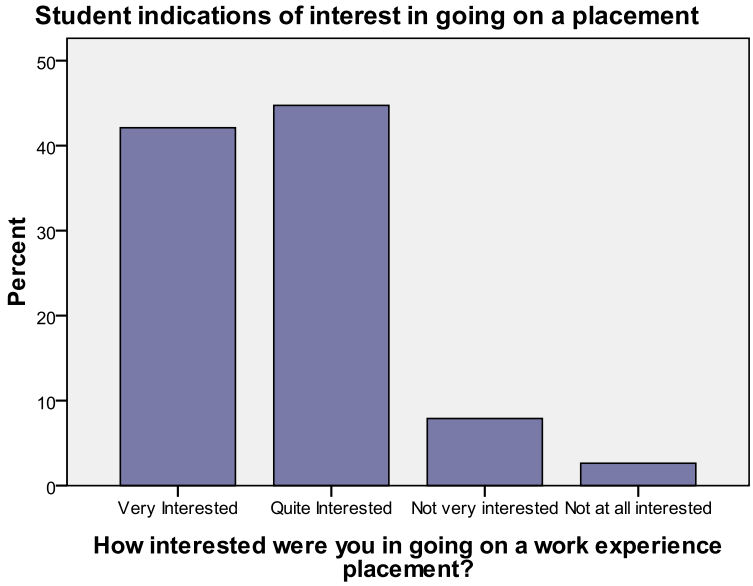
- Family (56.6%)
- Making contact with a company students were especially interested in (18.4%)
- School (17.1%)
- Website i.e. WEXOnline, SolentEBP (10.5%)

Help with applications was most often received by:

- Parent/family member (68.4%)
- Work experience coordinator (19.7%)
- Careers person (9.2%)
- Form tutor (7.9%)
- Teacher (5.3%)
- 4% of students said they applied without help

However, 13.2% of students felt that they had received too little information about work placements and 17.1% felt they had not received enough support in choosing and applying for the placement. The large majority of other pupils felt the amount of information and support received was 'about right'.

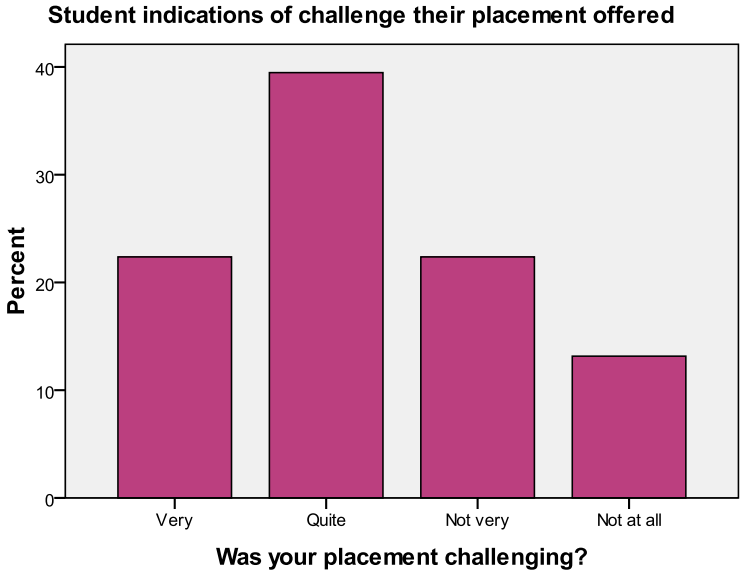
Many students were interested in going on a work experience placement: 42.1% were 'very interested' and 44.7% 'quite interested'; 8% were 'not very interested', and 2.6% were 'not at all interested'.



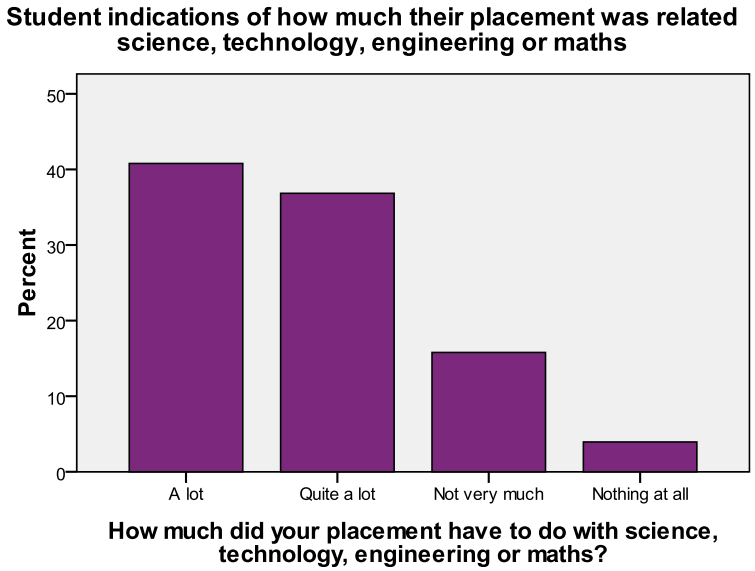
Once they knew where they would be going, 55.3% of pupils said they were 'very pleased' with the placement they were going to go on beforehand; 36.8% were 'quite pleased' and 3.9% were 'not very pleased'.

Placement experiences: most students found their placements useful (52.6% found them 'very useful'; 36.8% found them 'quite useful'; but 6.6% found their placement 'not very useful') and interesting (46.1% found them 'very interesting', 42.1% found them quite interesting); but 10% didn't find placement very, or at all interesting. 14.5% did not find their placement very, or at all relevant; and 10.5% did not find their placement very, or at all enjoyable, but 39.5% found it 'very enjoyable' and 47.4% found it 'quite enjoyable'. Significantly, more than a third of students (35.6%)

did ‘not at all’ or ‘not very’ find their placements challenging. 22.4% found them ‘very challenging’ and 39.5% found them ‘quite challenging’.

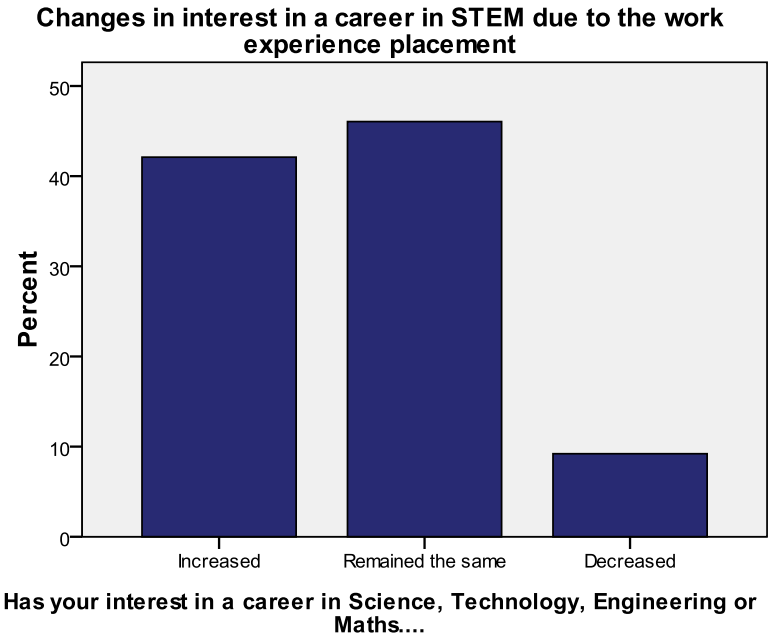


A fifth (19.7%, which is 15 pupils) felt their placement had ‘not very much’ or ‘nothing at all’ to do with STEM (and in 4 cases the students’ placements were actually not in STEM-related areas).



Importantly, only 15.5% of students said that their placement had ‘completely’ met their interests in STEM. 28.9% said it met these interests ‘somewhat’; 14.4% felt their placement did ‘not at all’ or ‘not very much’ meet their interests in STEM.

On a positive note, 42.1% say their interest in a STEM career has increased since their placement, while 9.2% say it has decreased.



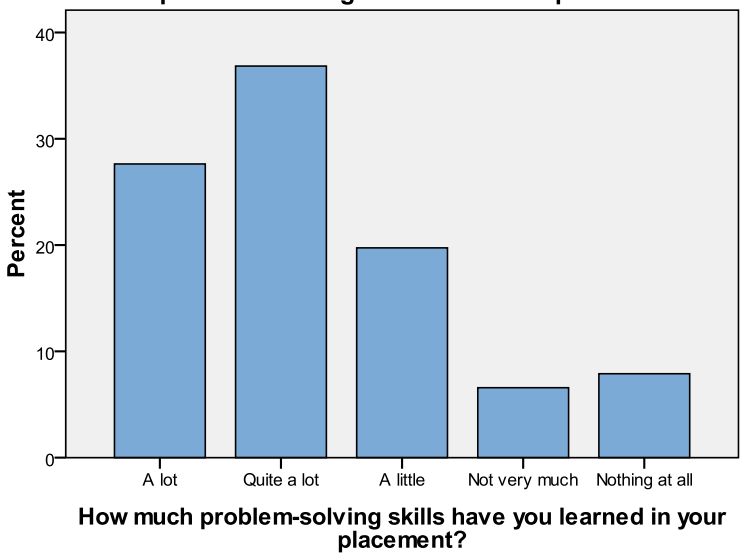
The skills that students most often indicate that they have learnt are the general skills of communication skills, learning about responsibility, and team working skills.

- Communication skills: 35.5% 'a lot'; 38.2% 'quite a lot'
- Responsibility: 31.6% 'a lot'; 40.8% 'quite a lot'
- Team working skills: 30.3% 'a lot'; 36.8% 'quite a lot'
- IT skills: 34.2% 'a lot'; 21.1% 'quite a lot' (25% 'not very much' or 'nothing at all')
- Problem solving: 27.6% 'a lot', 36.8% 'quite a lot'
- Business and customer awareness skills: 26.3% 'a lot'; 22.4% 'quite a lot'
- Application of numeracy skills: 18% 'a lot', 24% 'quite a lot'

How much communication skills learned in placement by students

Amount of team working skills learnt in placements

Amount of problem-solving skills learned in placements



It is interesting that students mention communication skills as the skills learnt most, as we will see later on in the report that work experience coordinators in companies often reported that they felt young people don't seem to have these skills very much these days and that this often represents the biggest challenge for them in their placement.

Answers to open questions in the student questionnaire

Placement activities described by students

This is a wide variety of activities which can be viewed in Appendix 3. Most activities are STEM related, but photocopying, making tea and coffee for example, are also mentioned.

STEM subjects students are most interested in

Below are the subjects mentioned in order of the number of times students indicated them.

Engineering (26)
Technology (13)
Maths (12)
Science (12)
Biology (4)
Chemistry (4)
Medicine (2)
Physics (2)
Psychology (2)
BTEC first in engineering
Product design
Geology/physics

What the students were hoping to learn

This is centred around finding out more about what working in that specific place of work and company would be like, for future careers; generally finding out about what it is like to work; how a business runs; 'soft' skills. All the answers can be found in Appendix 3.

- I was hoping to learn more about chemistry (which I did), about university life and about office conditions
- How a small business runs
- What oceanography is and any other jobs associated with the sciences/maths
- About the company, what work they do, what it is like to do that form of work.
- I was willing to learn any and everything. It was the experience that I was looking forward to.
- How air traffic works and what it looks like
- People skills as well as experiencing the 'workplace' environment
- Work life and till 5
- Not a lot because I didn't know what to expect as it had no relevance to my future career.
- wasn't hoping to learn anything just experience work

- I was hoping to experience the area of work to help me decide on potential career options for the future
- If I would want to work in a hospital environment in the future
- Whether I would enjoy teaching if a career in law didn't work out...

STEM subjects the placements were felt to be most related to

Since many students had engineering placements, the list below is not surprising:

Engineering (26)
Science (16)
Technology (14)
Maths (13)
Chemistry (5)
Biology (4)
Physics (2)
IT
None at all

What links did your placement have with science/maths/engineering/technology topics at school?

19 out of the 76 students said that their placement did not link very much to their STEM subjects at school, which is 25%. This seems a significant finding, but it might not necessarily be a negative one as it might not have an impact on student enjoyment of their placements, and it might also be important that the placement offers them something else within STEM than what they do at school. Sometimes it is indicated that the placements were much more advanced than what was done at school, for example. Since in the question above, the links to STEM are generally clearly existent in the placements, the result here might not be a concern.
The full range of answers can be found in Appendix 3.

Any other things you feel you have learnt during your placement?

Many 'soft skills' are mentioned here by students, as well as some specific job-related skills. Sometimes more cynical answers are given about how student learnt to make good cups of coffee and tea or how to handle a mop.

- A little of banking jargon and how to apply maths in the workplace
- better at making things less complicated
- confidence boost
- follow complicated instructions
- How to deal with the public and how to handle animals. I've learnt how to work under pressure and in a hectic environment. And I'm now pretty good with a mop!
- how to turn planes off and lock them
- I feel I have learned more in the 4 subjects mentioned and how they were applied throughout the refinery. It taught me problem solving greatly.
- I feel I have learned more on problem solving and team work

- I have become more confident in myself, asking questions and working with others.
- I learnt quite a lot about time management/efficiency
- research skills
- social skills
- The ability to see harder trends in chemicals. That team competition is better than competition in a team.
- the awareness of confidentiality.
- The use of time.
- using phonetic alphabet
- working in an office environment

Any other comments

These are very mixed, from expressing enjoyment (many comments) to giving advice on doing certain placements. The full range can be found in Appendix 3.

- A very good placement, friendly, helpful, educational and involving.
- Brilliant experience. I really want to become a vet.
- I enjoy science and my work experience really showed me how it can be applied in the real world/work place, though some of the time, the university forgot about me, I really enjoyed my time there.
- It was an amazing experience. On the first day a huge Newfoundland had a caesarean - and came out with 11 healthy puppies! I got to hold and rub one as soon as it came out of the womb. I really want to be a vet now.
- It was brilliant!
- It was great fun and a good experience was gained. There was a lot of chips.
- it was the best thing I have done with school
- It was very interesting and it opened my eyes to a work placement in engineering.
- People are very moody if you don't do something right or if you get it wrong.
- That it is not a good idea to work with family.
- They have offered me a work placement for when I leave school.
- When applying for w/e at a hospital, check the age restrictions for working in each area. If wanting to work at a hospital I recommend immunology where someone worked at the same time as me - they got to do a lot more lab work.

Student Focus Group Meetings

Overall, the tone in the focus group meetings about STEM work experience was very positive. Students clearly found it worthwhile; learning in many areas was reported, both general and personal skills (relating to colleagues, team work, being in a work setting, working 9 to 5, learning about business) as well as specific STEM-related learning. There was great enthusiasm about the placements, and disappointment sometimes to have to go back to school. Many students reported they had been given more responsibilities than expected, although for some, Health & Safety was felt to have been a hindrance as to the activities they could do in their placements.

The links with STEM areas were often very clear, but it was not always easy to link the learning at the placement back to STEM subjects in school; sometimes because what happened at placements was much more advanced and sometimes it was very different from the STEM curriculum at school. Quite often however, students said that they came back to school with a much stronger sense of

what they needed to do know in terms of work focus, motivation, and options. They felt more motivated than before to go into a STEM area later on and more informed/aware of which specific area within STEM they wanted (not) to go into.

Students who had one week placements were not very pleased about this and felt they lost out on many opportunities because of this, in terms of the placements they could get and the learning they could take with them from their placements.

Generally students had felt supported with applying and finding their placements, and during the placements. Some disappointments were also expressed, mostly in terms of the activities they could (not) do and reality not completely matching their expectations in that sense (would have liked more science-related, more hands on, Health & Safety taking up too much time, not prepared enough bringing gear so certain activities could not be done, not getting the placement they wanted etc.) Suggested improvements are related to Health & Safety preparation beforehand, and the placement being more prepared for the students' arrival.

How long were your placements?

In one school the placements were one week, in the other three schools they lasted two weeks.

How did you find your placement?

One school had their own database with companies which students could use and many students often reported to make use of this. Many students mentioned parents or other family members, or contacts of the family as ways into their placement company. Some students reported they had applied all by themselves, from the initial phone contact with the company. In one school, students had used the online databases such as WEXOnline and Solent EBP.

> *I wanted to do oceanography because I have always been kind of interested in that and my dad knew some people through work that worked there, so he like introduced me to them and they helped me get the placement.*
>
> *My friend's dad offered me a placement because he works there, so I did it by myself.*
>
> *My neighbour was in charge of the company I was working for.*
>
> *I went to my parents' surgery and a friend of my parents is a paediatrician.*
>
> *My mum works there.*

Did you get a placement that you didn't want?

A few students had wanted a different placement:

> *School basically organised mine because I wanted to find something to do with aviation and I found a company, at [an] airport, but they'd moved to [a city further away] so I couldn't do the placement. So school had to organise me to go to [another company], which turned out to be quite good. (..) It was still engineering, so I was quite interested in it.*

I was interested in [my placement] but it was more for practicality, really, because I could go to the same place as my dad would and not have to go round some other places and then come back every day.

Originally I wanted to do it in law but science and maths is the next best option.

It was quite difficult to get what we did want then, because we only had one week, so loads of them didn't come up on the website.

Support with finding placement and applying

During the focus group meetings there were no students who reported a lack of support in these areas. It was felt the support was there when needed.

Yes there was [the support at school], it was there and when I actually got into it there was one lady who helped me all the way through it to get everything done. So it was, all the support was good.

(...) all the support was there if you need it and like through the second week a teacher came in to see you and see how you were getting on which I thought that was really good.

You can discuss how things are going and whether you're happy, if anything needs to be changed.

It's also that people are actually taking notice of what you're doing, you weren't, you haven't just been sent off and just ignored, which is good to know.

I think they also always stress that throughout all your work experience that if there was ever any problems you could just phone the school and they would help you sort it out. You were not left alone there.

Experiences with websites

Not many students in the focus groups had used website databases to find placements, but some who did reported negative experiences:

The website was crap. It took forever for anything to actually come through.

Yeah, and you would like say I want to send off for this one, and put in a thing, and it would take forever to reply; and by that time you thought they hadn't got back to you, so I like went off somewhere else.

And there were like a thousand things as well; you couldn't like make it small or anything like that. You couldn't put it down to what you actually wanted.

What expectations did you have before going on your placement?

A number of students reported that they expected less interesting activities than they were actually given to do, and less responsibility than they were trusted with:

I can't really remember what I expected. I expected when I went there sort of initially that I'd just be sort of behind the counter and things, but they actually let me go out and sort of do the,

do the prescriptions and things which I found actually really interesting. (…) I was given more responsibility than I expected. (Student who went to a pharmacy)

I was similar to that, I thought I would just be doing, like making tea and coffee and things like that, but they actually allowed me to do some of the kind of more basic accountancy work that was like supervised by people. So I found it very interesting because it was actually what they did there, sort of thing.

I didn't really have any expectations or any high expectations of what I was doing because it had been organised at the very last minute and in such a rush I wouldn't have thought they would have been able to find me anything interesting to do. But actually they just slotted me into their usual work and it was all quite good.

Yes I thought it would be like, kind of about work like oceanographers would do and some of it was but we also, a lot of it was like an experience of, because the oceanography centre is quite near Southampton University a lot of it was like kind of about what it would be like to go to university. So I thought that was interesting because it wasn't just about careers or something, it was about university.

I was quite interested to find out what I was doing. I knew I was going to be working with the apprentices and as an apprentice, so it kind of gave me a look at what an apprenticeship would be like if I decided to go down that route.

I kind of expected to be doing a lot more like basic office stuff but I found I was, they were putting me up to more, to stuff that actually related to engineering and what they were doing. So like I went out one day to a site where they were doing a window sampler bore hole and then they asked me to write a report on that afterwards, so I found that like, quite, more interesting than I thought it would be.

How interested were you in going on a work experience placement?

Most students expressed a genuine interest to go on a placement.

I was quite looking forward to it, interesting to go into the world of work.

It was quite exciting to look at something I wanted to do in the future to like help with plans of what I wanted to do, really.

It's looking into an insight for later life, yes, I want to go into engineering so I want to see what it is like.

Mine wasn't anything in particular, really, just finding out what it was like working there.

Yes, I think it was just experience, really, because it's a job I wanted to do to see what it's like.

I was hoping it would maybe help me with science at school. To understand it better, or see more links maybe, as well, as what, to what you can do with science or…?

For some, getting out of school was part of the motivation to go:

I was looking forward to it because it's like a good thing to do, get out of school.

That's what I was going to say, a week off school.

I don't think that was the main reason for us wanting to go on work experience.

I was quite interested to see whether it was the career that I would like to pursue or not, if I wanted to do it or not.

I had a look round there before, so I just found it really interesting to just actually seeing how everything works.

I found it very interesting, because it gave me different ideas on engineering, what kind of engineering they actually do.

What students were hoping to learn during their placement before going

Some students had quite specific ideas about what they wanted to learn:

I was more interested in the… like the control bit of it, than the main instruments at X at that time, so I wanted to see how it worked; what they did after they got feedback; how they controlled it, in the room that I was at, or in one of them, there was like a control room and then you got feedback, and then they… I don't know what they did really, a bit complicated.

I was thinking about learning more about the four trades of network, chemical, instrumentation, and electrical [unclear]. So I knew I wanted to get into like a job of engineering, but I didn't really know much about those four, and I'd go in there and it helped me a bit knowing what I wanted to do in the future and all this stuff.

I was looking to learn more CAD skills like with 3D CAD and stuff, which I did.

Activities during placements

Students reported a variety of activities:

Well, I had one week at the control room where I specified I'd like to go. And then the week after that I had one day at each bit, each different: mechanical, electronic, and instrumental, and then did a final report and presented it to the station manager at the end.

I was with the process technical people in the first week; that was like doing loads of stuff on the distillation towers, learning about how distillation works, what they did to sort that out, spent some days with CAD cracking [?] unit, and I did some stuff with the utility guys, and basically it was just kind of seeing what they all did and how much they were out on the site and so it was quite varied in what I was doing. So I was out on the site quite a lot, but I was also inside learning about what they did and stuff. The second week I was with the drawing office, and they had me on the computers, so I went and did my little plant thing. And in the end I had to do a presentation.

I had a… what do you call it… a timetable where I did like in different sections of the factory. And on free days I was in the programming unit, and then for the two days I was in the testing area, and then for a week, the last week, I was with the engineers, making sure that the testing was done correctly.

Level of responsibility students were given in placements

This was not discussed in every meeting but came up sometimes. Some students felt they were given quite a lot of responsibility during their placements:

Well, by the end of our work experience we were given like administrative responsibilities kind of, my friend and I, because she did it as well from this school. We did most of the actual running of the kennels and cattery business and the person that was employing us that would have done it was just doing other stuff like cleaning up and just trusting us to do everything concerned with the cats and dogs and things, so she could get on with other stuff, whereas at the beginning it was not quite as much responsibility, because she went through it all with us.

I had quite a lot of responsibility throughout because I was just left to draw up floor plans for the stores and then make fire plans with them, so it was quite a lot of responsibility and that but no one was checking over them until they actually got finalised.

Yes, I got given a lot of responsibility [several unclear words] I had to go and [unclear] I had to greet customers [several unclear words] and like basically if I needed help I just had to just go and find someone. I was just given a task and I went off and did it, came back and then got another task and carried on - that's basically how it worked.

My responsibility range sort of changed; sometimes it was I had tasks that were fairly simple and sometimes a lot more complex.

Science-related activities during placement and general links with STEM subjects

For me [the links were] in science because what I was doing was maybe sort of drugs and things it wasn't, we haven't really studied that in any detail. But there were things I recognised we'd learnt about before, so I mean I wasn't entirely in the dark but we hadn't... having looked at the A Level course I think that is more sort of in that sort of field.

I was quite happy with what I learnt. They taught me the brickwork and stuff when we went to visit sites, like different materials they'd use when building houses and what they'd... that sort of science, physics.

It wasn't very obvious with my placement [which STEM subjects it linked to]. It was quite obvious where the sort of science and engineering was, it just didn't seem to be in the particular activities I was doing, so that was a bit strange. (...) I built pumps - that was about it. (...) it was just, basically just simple construction, so it wasn't anything sophisticated at all.

Rather than maths I would say like actually link more to business and economics, but that's how it was.

I found that my placement linked quite a lot to maths and to physics as well, because I was working a lot on the structural engineering when I was there. So it was looking at how like weight and load on a building is going to affect it so I thought, so I found that was a lot of physics and maths. (...) I was looking at some calculations especially and (...) precise distances.

Mine was like, because the oceanography centre is so big there was like so much stuff going on. And there was so much science, like there would be like kind of geology stuff like rocks in the ocean and things like that and then there's biology, like different animals and organisms in the ocean. And I knew that there was going to be a lot of science but I was also surprised because there was like a lot of engineering, like the research equipment and then, and quite a lot of computer work, so like I found it linked to like business and communications and stuff, ICT.

Were your STEM lessons after your placements linked to the STEM-related activities in your placements? Did your learning help you with STEM subjects at school?

I think there was in maths a lot because of all the stuff that I was doing, like, and then a lot of, a lot of it was just like shape measure stuff, so like distances and areas and perimeters and stuff. But a lot of it was kind of linked to my tech, as well, with the positioning of everything and where everything's got to go to make what you're doing functional and useful.

Everything, I mean it did link but we had already covered all the stuff that, I tried to when we got back to school but we didn't really do much with the stuff I did in my placement.

Yes, there was a lot about engineering that… where I was asking a lot about working there in the future, they were like yes, you have to have a practical mind, so obviously get stuck in with practicals, keeping sort of like using them.

No, I didn't really have anything that I could bring back to school that could help me here, apart from the experience of working in a group. Nothing really. It was different stuff to what I was doing in school.

(…) mine was a lot more advanced. We'd covered a few basics in, like, biology and things but most of it was like new terminology and everything; I hadn't seen most of it before, so that was all pretty new.

My one had a lot to do with engineering but we don't really do engineering at school so, and I didn't have a lot of scientific tasks. A lot of them were practical and assisting other people, but the ones that were very scientific they helped, school helped, else I wouldn't have known what they were talking about.

Match between hopes/expectations and reality; disappointments

Many students, although generally positive about their placements, report some disappointments, some things they had hoped they would be doing but which did not happen or were not possible. Health & Safety is sometimes mentioned as a hindrance to getting started with the really interesting parts of the placement.

I was kind of, like when I came in for the interview they told me that I might be able to go out on like a research vessel and like kind of just see what it would be like to be on a boat getting research. And so I was looking forward to that but when, the week that I was actually doing the work experience there were really busy, they had like a boat show and some other stuff going on so I couldn't do that, so that was disappointing.

I wasn't kind of disappointed in the placement itself other than the fact that I couldn't go to a doctor's surgery or something which was what I really wanted to do, because that's what I want to do in the end, be a doctor. But yes, the placement was okay once it started, doing it, really.

Yes, I had a great time. It was, they gave me more responsibility than I thought I would, but I would have liked to have learned a little bit more science behind it, but the actual work itself I was surprised at how nice it was. It was really good.

I sort of hoped that mine would be a bit more hands on. It was more to do with like computing, because that's what… I was with my dad on the thing, because there wasn't actually a WEX placement because they didn't have one, because it was only for two weeks. So, I was doing very much computer based stuff, which I didn't expect. Like his company builds parts for aeroplanes, and I was expecting to actually be like there and putting them together, or looking at, watching someone do it; which I did for part of it. But I was mainly writing manuals on how to put them together; which interested me, but it wasn't really what I thought it was going to be. (…) I was still happy with it.

I was really happy with mine! [Laughs] But there were some like… we could have done some of the activities that the trainees do, but we didn't know that we were allowed to do them. So, if we were told that we were allowed to do them everyone would have brought their stuff, because you had to take your swimming stuff. We did the navy swimming tests and stuff; but we could have done like the part where they fill up a boat and you've got to like try and block the water in. It's a long story. But we could have done that, but we didn't.

The first day of my whole thing I was practically shown health and safety, and I had to sit there and read the… before they let me do anything I had to like… And they took me round like all the fire route and stuff like that before they even started like teaching me. And

where it was only like five days it took the majority of the first day before I could actually get on with doing stuff, because they had to explain it all to me.

Also on mine, because you have to be over 16 to be able to use some of the machines, but where I was still 15 I wasn't allowed to use part of the machines because of the health and safety; you have to be a certain age.

Interest in STEM careers beforehand, and after placement

Many students report that the placement confirmed or further specified their interest, and also helped them find out which aspects of the work they were less interested in.

It probably made me a bit more interested because I wasn't really sure what they did before and now I do and it, like, encouraged me further to do it.

I think if someone said to me now, if you don't make it into medicine do you want to become a pharmacist, I'd probably say no because I didn't… I do… I think it was interesting but I wouldn't enjoy it to do every day, I think. It was just, it was a good experience to have but it wouldn't be something I'd really be interested in.

[I know now] exactly which area I want to be, if, you know, they turn round and say, have you considered this, I can say no to that.

I think that pretty much works the same with me. I was aware that in engineering there was a lot of like different areas, but I think when I was on my placement it helped me like work out kind of what I wanted to do more. So I mean that quite, that helped me.

(…) they quickly made me more interested because they told me like useful things that could help when I'm thinking about where I want to go to university or if I want to have an apprenticeship or work for them.

I'm still really undecided about what I want to do but I'm like, I found out, with my second week of work experience I found out that I really don't want to do archaeology! But, so it was good because like it gave me a better understanding of like what to expect with different jobs. I kind of have, like, more information that I can make a better choice about.

Yes, I think the same for my one because I wanted to be a vet which is [unclear] and I think I actually really want to be one more because I just saw that he had such, like a good kind of work going on there. So it made me really want to be one more after this.

I think mine just confirmed what I want to do, I've always wanted to do medicine but I wasn't sure. I'd never really seen it first hand, so this just made me sure that I do want to do that, so it was good.

No, I found it really helpful because every time I said I wanted to be a doctor to people they said, well are you sure, because you've got to deal with all these different people. But a lot of the people who come into the pharmacy are usually, have just come straight from the doctor's so they're usually, they're usually the same people and it was quite interesting to sort of see that, because I don't really mind.

Learning during placements

The learning that is reported is both in general areas such as relating to people and on a skill-specific level.

I would say it's just probably skills that I picked up like either problem solving skills or kind of developing confidence, as well, when you're like either applying for jobs if it's like an

open application process it does help with… and then talking to kind of senior members of staff in the workplace, yes that (…).

It kind of, in a way the most, the most useful part of my work experience for me was actually the fact that I learnt how useful work experience can be. So I would be more inclined, if I did it like in the summer between college and school maybe I'd find something in a care home or something to just get that experience, because it's really valuable. I mean I didn't, I can't say I learnt lots from that placement but I think I could in the future and it's, I just found it quite useful.

I think my placement just gave me a better idea of sort of simple engineering practices and more of what to expect in sort of the world of engineering, and how it all sort of functions.

I found that I, one important thing that I learned was how people like worked together at, in the workplace. There was like, there was a lot of independent stuff like getting, when I was there me and the other kids that were doing work experience, we would like gather the information and we would kind of do independent research but then we'd work together and like present our information to each other and get ideas off each other. And you kind of get something out of that, so I think that was a pretty cool experience.

The most important thing I probably learnt was that that's definitely what I really want to do in the long term so I know where I've now got to go from now to be able to get there.

I learned what it was like to (…) what it was like during a working day and I was maybe doing a couple more hours than what I was doing [at school]. But it basically just showed me what [the company] was actually like, and what it was like inside working.

More about how to use CAD software and also working with, in a team and generating your own ideas, as well as listening to others.

I think it was very specific the stuff I learnt. It was very medicine based, obviously, and about illnesses and things, but I think also like how to talk to strangers and things, like social skills.

Basically I think the main thing I got from it is just confidence and things when working with the animals. And also practicality, because the vet that was there was very kind of practical rather than… thinking what would be the most practical situation though with the animals rather than just what the owners want, that kind of thing. Like they might want to keep the animal alive even if it's suffering and that kind of thing; you've got to be practical about it.

I learnt how to act around employers and kind of working with other employers quite a lot.

I just learnt how like the business ran.

Like how responsibility you need to be, and it gives you a feel of what it's like when you go to college and get a job placement and everything. Even if it's not the same job, it just gets you, you know… makes you more prepared and a bit more eager about it.

Was your placement challenging enough?

It was quite challenging, but then I was quite limited as to what I could do at the power station, because like I hadn't been trained in health and safety.

I would like to have done more, but yes, it was still very challenging what I did there.

It was just the amount they gave me to do, then by the end of the two weeks you had to have finished it, that's your challenge and it was quite, it was quite a lot.

General evaluations of placements – are they worthwhile?

Impressions from the students are that they find work experience placements very worthwhile on a variety of levels.

> *Yes, it's definitely worth it.*
>
> *I think it's important and it helps with what you want to do in the future.*
>
> *I was just going to say, it kind of shows you how like a full two weeks of work would be, sort of seeing what work life is like.*
>
> *Yes, it definitely opens your eyes to how different things are going to be after school when you actually start work, so that's good.*
>
> *I just wanted to keep doing what I was doing, it was great fun.*
>
> *It's worthwhile if you research it beforehand and find out one that you want to do. But if you leave till the last minute, you end up in a shop or something that you might not necessarily what to do, but it won't really help.*
>
> *You've got to try and get something you want to do; otherwise you're not going to enjoy it as much as [unclear].*

Improvements suggested by students

Some suggestions for improvements came up during the focus group meetings.

> *I think the schools should give us more information on health and safety and what we're allowed to do at that age, because I didn't but someone I know, they went somewhere but, and the school hadn't told them that what they were doing wasn't actually legal so they were just*
>
> *Also the school based company, the enterprise kind of company that has to do all the health and safety checks, that took months and months and months to do so you're never quite sure whether you're going to get that placement or not so you don't know whether you should apply to somewhere else, so…*
>
> *I think the school should check up on, before you go into work experience as to whether the placement has got things for you to do in advance. Because when I arrived they weren't quite sure where I was going at first, so I think maybe a bit more thought as to when I was coming and what I should do.*
>
> *You don't get all the things you need to know in one week; like you don't have enough time. Like they teach you to do stuff that I saw in the building, but you don't actually get to apply it.*

The students who were given one week for their placement expressed dissatisfaction with this:

> *Some people asked to have another week and they got it, got to do two; which is quite annoying really. I think they should just generally have given everyone two weeks.*
>
> *Like they used to have it and now they don't.*

Interviews with school Work Experience Coordinators

Role descriptions

Role descriptions varied slightly (work-related learning coordinator, careers/work experience coordinator). Three also had major teaching responsibilities; the careers/work experience coordinator had these as her sole responsibilities (25% careers and 75% work experience).

Responsibilities described by one work-related learning coordinator are: delivering an assembly at the beginning of September, at the beginning of the new term, to the Year Ten pupils, explaining the process of work experience (five stages), and ensuring that the pupils are following those five stages and by the end of February, have a two week work experience, the following September, when they come back and they begin Year 11. She was supported by an admin person, but still does a lot of admin herself, making quite a lot of phone calls and helping pupils write letters and sending emails, working through the process with them. Furthermore, there is a lot of one-to-one contact with pupils involved. The Head of Year is crucial in the process to deliver reminders during assembly, and also the tutors who help to encourage in the process.

In another school this is fairly similar:

> *We do a parents' meeting in July, which is an evening, and that is followed by a letter to those who don't go, and then we have an assembly for the year 10 students as well and you know, I think that is part of them being a bit more independent, to hopefully find their own, so they are left with it a little bit. They then get time then in tutor time to help them with the WEX website, or if they find their own they can do that as well.*

Comments about duration and timing

Many schools run work experience in July, which means many students are competing for the same placements. One school interviewed has therefore scheduled the placements at the beginning of September, which means not many others schools have their placements at the same time, but companies might also no longer take on students as they have already had them. Two weeks is felt to give students a good experience. February was suggested as a better time by one school because it gives the best choice of placements.

How do you help students find placements in STEM areas?

> *There aren't many companies out there that offer them. I luckily inherited a database of companies that were offering sort of STEM opportunities, and it's a case of picking up the phone, and doing a bit of a Google search of companies in the area, and then tracking them down. And following it up, going out and visiting with a company and saying that this is what we are asking for. We're not necessarily asking for a traditional one-week block or a two-week block, it could be an afternoon a week, it could be just a day, it could be a weekend, or it could be a whole summer placement, depending on what the students are coming in and asking for, really.*

Some of the schools have, over the years, built their own databases with companies which offer suitable (STEM) work experience placements, which most students take their placements from.

Links with Careers officers in schools or Connexions services

Sometimes it is reported that students also have individual appointments with careers officers about placements or placement preparation (mock interviews etc), and generally the work-related learning coordinator and careers officer work together quite closely, but the careers officers being involved in the work experience process is not something that is mentioned.

Use of websites

Most of the four schools in which the work experience coordinator was interviewed say they prefer to have students find placements themselves, as part of the learning process: contacting a company, writing letters etc. Two schools use Solent EBP for Health & Safety checks; one of them is a 6th form college and works with Solent EBP as well.

> *We thought we did have to use the online process, and I think it's very much a school kind of, policy, and it kind of, follows the school ethos really, that the pupils are to find their own placements here, and they're encouraged to do that. And there are very few schools I think, that do that, so it has its kind of, advantages and disadvantages I think, because of that but yes. We don't subscribe to the online sort of, directory of placements, but we do have the health and safety bit from them, yes.*

> *[Often] a student will come in, we'll have a one-to-one discussion on what they're looking for, and then it's a bit of a trawl, and just, right, let's see what companies there are in the area that may offer it. And then it's cold calling, and, this is who I am, apologies to ring you today but can you give me five minutes, and how do you look at work experience, and what can students do if they're looking for work experience in that area? And generally, I mean we don't very often get the phone just slammed down and people saying, no, definitely not, but it's one of those, you never quite know what the answer is going to be when you ring up, on the other end of the phone, really.*

Helping students prepare for their placements

Preparations described are generally about time and directions, planning the journey so that the student will be on time, what to wear, health and safety, addressing worries and concerns. Some schools use a booklet to guide students throughout their placements and they start filling this in before they go.

Links with companies

The work-related learning coordinators have built databases with suitable companies and maintain links with these, but this seems to be mostly the occasional phone call when a student is interested

in going there, and the evaluation afterwards; apart from a few local companies with which stronger links are maintained. However, school visits by the companies are not mentioned.

Making sure students have sufficiently interesting and challenging placements

Placements are seen to be good learning experiences for students on many levels:

> *I mean, there's loads of different ways you can look at work experience as being useful, because just them becoming independent and actually going out and working from nine to five, is quite a big change from school in itself. And working with adults and just being in that different environment, so there's lots of things, and then obviously there is also the fact that if they can find something subject-related, or subject-relevant I suppose, to what they want to do potentially, beyond school and into kind of, college and career-wise, then that's all to the good, and that is encouraged.*

Also, finding students *a* placement is seen as a top priority by one school. To also make sure it is sufficiently challenging and interesting is seen as a difficult task as the work-related learning coordinator does not have STEM subjects as her specialism. Phoning or visiting the employers to find out what students are doing is seen as important to ensure this.

> *I think my... the top priority in my job is just to make sure that they all have a placement, wherever it may be, you know, because if it's not something that they necessarily want to do beyond school, they're still going to get something out of it, so it's difficult. It's... I try where I can, but the time is the pressure, the number of pupils is the pressure. The number of placements is a pressure and so probably... I mean, for science for example, it's not an area that I know at all. I'm not a scientist, and it's not... I don't have that sort of, contact. I have this list which I know pupils have sort of, been to in the past, but it is quite a short list in science.*
>
> *I think you get a feel. I mean I've been in this job role now, sort of, well, in this particular role for six [?] years, but I've been working within college for a while now and you do get a feel for employers, and you get a feel for what they're saying to you. So you can go into a company, and they can say lots of things on the phone and when you get there you think, well, actually, you said this, but I can't see how that's going to work, and I think once the employer is aware of the student's capabilities.*
>
> *And a lot of our students are very high-flying, so they're quite capable of actually having a project given to them and the project being a real, worthwhile project for that company, as well. So it's through talking, really, and communication with the employer that you actually get a best fit for the student and the employer, in the workplace. (...)*

Student motivation

Students who are looking for STEM placements are generally seen to be more motivated and to know better what they want than students going on work experience generally.

> *I think the stem group are more motivated because they're move... have more idea of what they want to do.*
>
> *They tend to be… I suppose I shouldn't generalise, really, but they do, the STEMs tend to be the students that are more organised, more on the ball, more proactive in what they're doing. And they'll find out things in a more analytical way, I suppose, and they'll come in and they'll say, look, I'm thinking about doing this*

placement, and what do I have to do? Is there any paperwork I need to do, or do I have to let you know?

Parent motivation is also seen to play quite an important role as mentioned in one school; as example it is mentioned that sometimes parents are not willing to let students go a further distance to travel for their work experience (one that they do travel for shopping).

Definitely, I mean, some parents have worked much harder than their children to find a suitable placement these last two weeks, and they really have, they've done lots of calling around. But, again, you know, we try and encourage it to be the child to do the phoning, even year ten, they're still old enough to do it.

Sometimes it is seen as useful in the end that a student ends up with a less interesting placement because they have left it too late:

Exactly, and, I think, sometimes if they've picked a job that's quite boring, perhaps working in a shop where there's not going to be promotion, then they actually think, that's what I don't want to do, and therefore I need to work hard so that I can do something a bit different and actually have a career.

Specific issues with Year 10 Students

Confidence and social skills issues are reported by one company work experience coordinator to be specific for Year 10 students as opposed to older students:

(...) I guess for year ten it's difficult as well, because they are still at the age where some of them aren't going to give you eye contact. They haven't got their confidence, so they are going to be in a workplace and if it's not something they're expecting or they like, they're not going to verbalise that because they are not confident enough to do that, are they?

Links with STEM Departments in the school

(…) it's really funny here. Our science department is really good, as is the technology and maths department, but there's not really a two-way conversation. We tend to do our own little bit, and then suddenly they'll say, oh, this student wants work experience, and they tend to send the student to me. (…) And some departments are quite good at sharing information, and I think it's because they've got the time to do that, in the big scheme of things, but sometimes teaching obviously takes priority, so… And again, some areas are sometimes difficult to get students into, so we try and work together, but perhaps not always [inaudible]. And we work with the departments, so sort of, the subject teachers then have to attach references to those applications, so we work with them in those areas, if you like, but as to anything else, not really. It tends to be a bit more, sort of, individual, and a bit more isolated, yes.

Working with STEM Ambassadors

Links with STEM Ambassadors with regard to Year 10 (or any) student work experience are reported to be non-existent.

Evaluating student work placements

Procedures seem to be in place in all of the schools interviewed, although sometimes more formal than others. In all schools, students are asked to keep diaries or complete a booklet that they have been given.

> *Yes, we evaluate a placement with the student, but also with the employer. So we will send out an evaluation form to the employer about how they think our initial process was, how our initial contact with them was. Did they get enough information from us in the college, and then is there anything they'd like to change about the initial process? And then about the student, did they turn up on time, were they polite, how did they get on with their colleagues? All those sorts of information, and then general comments, really, if they've got anything they specifically want to pass on to us about the student.*

> *And that again seems to work, and the students then do their own evaluations, which we ask if they are happy or not to pass on to the employer. If a student says they are happy for that to be passed on we will then fax that across to the employer, so the employer has then got a student point of view. And I know a lot of employers will do a debrief session on the last day, so they get an idea of how the student got on, and what happened, and whether they liked it, and whether they got what they thought they were going to get in their week. And again, that again seems to work quite well, really, but I think that's quite important that they do evaluate what they've done.*

All students are visited during their placements, but these visits are reported to be short due to time constraints. In one school, all Year 10 teachers are involved in visiting the students at their placements in order to distribute the workload.

Some schools have tasks for students when they get back, but not necessarily in STEM subjects.

Links with the STEM curriculum at school

One work-related learning coordinator feels that the STEM content in placements is more advanced than at school.

> *I can only really talk for technology, because I only really know the technology curriculum, but certainly the work that they're doing out in industry, at a sort of, architects office, using kind of, packages, it's obviously beyond what we do in school, but it... and also like, the graphic design pupils that went out, have obviously had the opportunity to work on software that we don't yet have in the school. But they're able to kind of bring back the schools, and to use it in course work, so from that point of view, it's directly related, yes I think it's useful. And I would imagine that sort of, any kind of, science-based experience is only going to sort of, strengthen the science curriculum, I imagine.*

Follow up of the learning by the STEM departments

> *I don't know whether they would. Again, because the STEM department don't attach the work experience to any particular unit that they're studying, it's not something that they would then necessarily follow up with them. I mean it may be that a student then goes back in and says, oh, I did this while I was on work experience, and debrief to a whole class, which then they sort of, take it out and then*

they explore the options about what they did and why they did it, but we don't really get involved in the teaching side of it here, so I don't quite know. They are all working to their own targets, up in the STEM department here.

What works well and doesn't work well in placements

Some links with companies are reported to be quite weak – it is then hard to track down students.

The age of the students – health and safety issues; it is becoming harder and harder for 15 year olds to go out and do work experience.

When pupils go to the hospital to do sort of, you know, any kind of work within Medicine, you know? These guys are the people that probably are thinking about becoming sort of, doctors and nurses, and surgeons and things, and you know, actually unless they're 16 in September, they have to have an admin-based role, which is a real shame, because they know that they're obviously not going to be down in surgery or anything. But it is a bit of a restriction, which is a shame.

Student learning

They grow up a bit, they come back more focused, more aware of they need to do in the next year to get themselves where they want to be for a future career. If students have a boring placement, it can also be positive as they come back into school knowing what they don't want to do.

They learn about the basics in the world of work, time keeping, being on time, communicating with people outside their own age group, respect for others; learning how to write in proper English rather than text speech.

Impact on students' futures

I think it helps them... I think they stand a better chance of getting into apprenticeships and training. I mean, Rob was there talking about flying to Esso; I think, just the mere fact that he can put down... he's done a two week placement there, if there's sifting out numbers, and they get huge numbers of applicants for these jobs, I would think the ones that they're going to delete are possibly the ones who haven't done work experience.

For example, the work we do with the hospital, they're now telling us that universities are checking with them the amount of work experience that students applying for nursing and medical degrees have got. They're saying they don't want to train somebody who doesn't know what a hospital's like, what it smells like, what the patients are like, all that sort of thing.

Yes, I think there are so many applicants, they're up to like, I think, nearly 350 applicants for 13 apprenticeships this year.

What could be improved?

On the whole, students that go out into those areas really have a really good time, because those companies have thought it all through and have got all the procedures in place. So I don't end up sitting here, thinking, oh, I wish I could get more into IT, or I wish there was more science available, because the opportunities are out there. We've just got to hunt for them a little bit, really, and I guess it would be great if there was a website that said, right, these are where you can go to get STEM opportunities, that perhaps all schools and colleges could have available to them, but I think that's like a wish list in the real world.

Health and Safety issues are mentioned here as well. Companies which have full-time HR people who look after work experience are seen to offer better placements by one work-related learning coordinator. A wish for more links with local companies for STEM placements, especially engineering, is expressed.

So, like I said, I do think some of the students are picking a placement because it's just convenient; not with any view to thinking about what the future job would be. And, I think, because there aren't any jobs in that area, people lack the skill; and I want something that would make our students work harder because I don't think they work... a lot of them aren't working to their potential. They almost seem to see that to do this job that's going to be interesting, then this is what you need, and therefore... I mean, they sort of think, oh, yes, I'll go around... I'll get this. They'll look at their predictor grades and think, oh, it's okay, I'm predicted five Cs, I'm going to be all right. But they don't know that they've actually got to work to get those five Cs, they're not just going to happen just because you predicted it.

Do you feel the STEM related placements are worthwhile experiences?

Yes, because I think the pupils that do go to that kind of placement, that do make the effort to secure those sorts of placements, because they are in the minority, the sorts of pupils that are going to get a lot out of it, and use it, you know, beyond school. So I think that is useful, yes, and they're the ones that will go first, sort of, anything kind of, space-related, science, technology, engineering, definitely architecture, they are the ones that go. In fact, I have pupils sometimes, because of the nature of the pupils at this school, not all, but some, that, you know, are asking me before this is even printed, can you give me names and numbers? So yes, I do think it's useful.

Definitely, I mean, I think all work experience should... I think it does help raise aspirations certainly, I think; even if they've had a bit of experience, because it may... like I said, it may make them want to do something a bit different.

It does make a lot of them a lot more self-confident because they're going out into the big wide world, and some of them, they are very young, at that age, to go out; I mean, some of them are only just... almost... just 14 when they go out, depending when their birthday is. But, I think it is what it says, you know, it's the experience to see what it's like in the big wide world; and I think it's quite a lot more sympathetic to the parents as well that they realise what it's like to have to work and then come home and do other things.

I think it would be a shame [if it were abolished]. I think the pupils would miss out. I think it is useful, but I think it is going to be... going to become more and more difficult for companies to offer. I mean, I've actually spoken to companies this year for the first time, that have mentioned Criminal Records Bureau checks for all their staff, which some schools are insisting on, which I haven't heard, and I don't... I can't see how you could insist on every employee in an architect's office for example, having a CRB check and I was talking to an architect on Friday evening last week.

Should Higher Education be involved in any way in the Year 10 STEM placements?

I think, a role universities could play is to almost track back what you need to get academically to do certain degrees and certain jobs. Because, for example, if you want to do certain things in electronic and engineering you need Physics A Level. Physics A Level is easier if you've done the GCSE, and we get students making course choices here completely oblivious to what they need further on in their education.

And when you've got the media throwing up all the time all the tuition fees and, oh, it's going to cost you an absolute fortune. Another thing the universities could get over to students is their earning potential, particularly as they're doing certain subjects. And if a student goes to university and does the right subjects and gets a good degree in the right thing, they'll pay the tuition fees or earn the tuition fees many times over.

I think they probably could, because they obviously know as a university what they're looking for, for a student to come in and have experience in. I mean obviously their admission tutors are saying, right, okay, in an ideal world we'd like our students to have done some work experience. So if they know what work experience they're looking for, if they could help colleges and schools find placements in those areas by saying, look, okay, these are companies that could offer valid placements, I think that would be absolutely brilliant, because obviously universities know exactly what they are looking for in a student.

[Laying down a list of criteria which placements should fulfil?] Exactly, yes. I mean that would be really helpful, so if you've got a student who is going off into a laboratory, well, then that student should be possibly experiencing the following. You know, that sort of breakdown would be really useful.

Gender issues / barriers for girls to do STEM Placements

Definitely, it's encouraged in school. I've never heard of any restrictions, no and... but then again, I've only been doing this for two years, but I know for a fact that we have a Year 11 girl now, who went to an engineering company and, you know, she knew that she wanted to be an engineer from sort of, Year Seven onwards, and she does systems and control, which is normally a technology that is more kind of, male-orientated, just for no reason other than just the way that the kind of, options are chosen. They loved her and she loved them and it was a really good, useful, successful work experience placement. I think it just consolidated what she wanted to do, but it doesn't happen often, it could be encouraged more maybe.

I think that's also because we don't perhaps really focus in on the pupils having to necessarily do something for work experience that they're thinking about career-wise. It's a bigger picture than that. It's work experience; it's experiencing the world of work as well as, you know, finding out information for future career choices. So maybe that's part of the reason too, we don't insist and we don't really check that they're necessarily finding placements that are sort of, suitable for what they're doing at school, option-wise. (...) So if we had more of [those kinds of placements ready] then it could be more useful, and I think it would be easier to get sort of, more girls involved in that kind of area.

Funding issues

(...) it's still debatable to say whether they're going to go out because of cutting funding. (...) So we've got to decide what's going to happen next year because we

can't fund every student, we don't have the money. (…) I want them to go, but we're going to probably see if we can get parent contributions, but I don't know if it's going to be possible, or whether or not we're going to get enough to fund the rest. At the moment the school pays some and the government pays some.

Interviews with Science Teachers at Schools

Two science teachers were interviewed for this purpose. Their comments have been summarised.

How do make students interested in STEM subjects aware of STEM placements that might be of interest for them?

Occasionally, occasionally somebody will ask something. But usually actually our students have a fairly good idea of what they want to do themselves, even when they don't know what career they want, they've usually thought about a placement and what they're going to have. (…) I think they're thinking more short term than [a career when organizing their placement]. I think they're thinking what will be an interesting placement. I don't think they're thinking, it's so much vocation testing, if you could say it that way.

Do you have any contacts with STEM companies that you make use of or recommend?

Not particularly, it tends to be done through the school. It's part… if I knew of particular people offering placements then I would push it, but partly it is a work load thing, you know, that potentially people have got contacts. I've got the place where I used to work before I worked as a teacher, which is a science lab, potentially people would go to. But I'm also thinking from the other side. I remember people coming to do work experience there and it wasn't that great for them. People were finding things for them to do and there's a lot of red-tape and a lot of work involved as well from the company's point of view.

Do you generally feel that it's useful for students to do work experience?

One science teacher felt it was very variable as it depended on the kinds of activities students were given. He felt it does help students in terms of the skills they learn and seeing people working in that environment who are enthusiastic about it, especially in the case of engineering where there are seen to be many misconceptions amongst students. Students come back positive and motivated.

The other science teacher interviewed indicated that he felt these placement experiences represented crucial learning about the world of work.

On the positive side, it can re-focus them and make them almost grow up a bit. Some of them need the maturity and they need to see the importance of doing well in their exams, and the other reason is that at that time it doesn't clash with other schools. So some local schools do it at the end of year ten, the disadvantage there is that they then all end up competing for a limited number of places. (..) very little change there.

What works well and doesn't work well with the Year 10 STEM placements

Yes, I think the difficulty is that the placements are not all equally useful and because the children have to go and find it themselves, some will go through their path of least resistance. They will go and find a placement that will not be that useful. They won't be given many tasks to do or it's not really what they want. Ideally you'd have them testing out whether they really want to do that kind of work or, you know, at least have something that really engages them. So I think the negative aspects really is that there's not… that they not all able to get good placements.

I suspect we could predict in advance a lot of what the good placements would be. But the difficulty is for the teachers, that we just don't have time to go around and organise it for the students. In an ideal world we'd actually go out and canvass more support and I think we could probably get it as well. There's organisations that are in the area that would take students I think, if persuaded, but we don't have the time, and in a way we're putting our own credibility on the line in that, if you want to use a personal contact, you want to be sure that this student who goes is going to be good. You don't want them to find that there's a student who's uncooperative or just not interested who goes along.

Now, fortunately we don't have too many like that. But all the same it really comes down to timing and ideally we'd have more time and then we'd be able to get better placements for the students. Having said that, some of the experience for themselves of going out and finding the placement is useful. And if they decide that working in a shop they find boring, well, they still did find out something useful.

Who deals with work experience mostly in the school

These are the work experience coordinator and the careers advisor in one school, and the tutors are also said to be very involved in following up with the students where they are in the process, chasing them. In the other school the science teacher is the work experience coordinator, which makes him involved in three roles (including the tutor role).

Role of Higher Education

Some comments about the role HE could play in improving work experience for Year 10 students are made:

Yes, they could be [involved]. I think that one of the things that they are doing, is they are doing lots of outreach at the moment. So I know that I've taken groups of students to the university to hear talks and to meet some of the people studying degrees in stem subjects. So I think in the sense of inspiring the pupils more, I suspect that's probably more important than organising the work experience, but work experience in their labs could actually be a valuable thing as well.

Gender issues

One science teacher had an interesting view on gender issues coming into the choice of placements at Year 10:

> *The girls tend to be much more organised with the placements and they know what they want and if they get them they want to be on that placement. I think that just in the teaching, especially physics, that so many of the girls convince themselves they can't do it. And that's a big problem that we try to overcome but is very difficult, because they, they suddenly find some difficulty with the concept and they give up straight away or get horribly stressed. So, that's a real issue. In terms of the stem subjects… I'm just trying to think back, I'm not aware of too many having done this sort of engineering side of things. I think there's more the biological sciences and the maths aspect that they've gone into. So, it would be nice to get some of the girls involved in the more traditionally male areas, but I think that it's like a societal problem. (...) there's a tendency as well to, especially in a relatively affluent area, for the parents have ideas about what they want their children to do, and usually the more lucrative careers. So, I think, there's actually quite a lot of barriers to the girls doing engineering. (...)*

Interviews with Company Work Experience Coordinators

Role descriptions

Education Manager – a small part of this is work experience

Work Experience Coordinator – dealing with applications, scheduling placements in, doing risk assessments, putting together induction process, control all the admin and paper work, act as contact and support for the schools.

Access and Outreach Officer, which encompasses organizing and coordinating work placements for everybody from initial contact to evaluation afterwards; also managing colleagues, although they are well versed at working with minors.

Learning development manager - overall responsibility for the training and development within the business, including technical and engineering training; overseeing traineeships as part of that.

General Manager – dealing with everything from HR to facilities management, and there is a large apprenticeship programme which is coordinated in this role; there is no set role for it. Working with the schools and colleges is also part of it.

Associate director responsible for the infrastructure. Making sure work experience students are busy and active, developed an activity schedule, and making sure they are working with a nice variety of people.

How many Year 10 work experience students do you have on an annual basis?

Generally the companies interviewed take between 4-10 students for work experience each year, for 2 week placements, sometimes more than 1 student at the time. By some companies this is

preferred as it helps the students, for other companies it is difficult to organize a range of activities for more than 1 student at the time. The companies receive many more applications but report that this is the number they can deal with. One company started last year with receiving work experience students and they have had 2 so far, each for a week.

Timing issues

> *(…) one of our challenges I think is we feel it's a little bit ad hoc. I know that schools would say, well we do it at different times because we don't want all the school kids going at the same time because there are only limited places. We would probably say, well actually, you know, if we had all the schools at the same time in [town] we might say we'll take more because we'll put a very structured programme around it.*

How do you normally get the students?

Four ways are reported here:

- Students' initiative
- Via parents or contacts
- Solent EBP or WEXOnline (but according to one interviewee it costs schools £30-£40 to go through Solent EBP or WEXOnline)
- Via links with schools

> *Most of them come direct to us. They either do a Google search for work placements, that kind of stuff. They do come through sometimes WEX Online and those kind of systems as well as... a couple of them have come via recommendations from other students or via connections with either a friend of the trust. But then they all are directed to our website to then download the registration and the application form.*

> *We have good links with schools; I do their careers events anyway and I also do talks and presentations; I have just been asked to do presentations to their BTEC students who are leaving. And then the students contact me, and I set up a mock interview with them so that they get an idea of what it is actually like to sit in front of an employer as well. And we go from there really.*

Student selection

The companies indicated they preferred students with an interest in STEM subjects, or with a specific interest in their branch. One work experience coordinator said she preferred the bright, self motivated students, whereas another said that whilst it is attractive to pick the brightest students, they wanted to give the students who might need more help, and who might be able to do the kind of work involved the chance. Often though, the companies said they are not really in a position to select as they don't receive all the applications at once. Interviews are often done but not used as a basis for selection, but as a way to discuss dress-code and expectations, or so that the student get the learning opportunity of doing an interview. Only one company indicated that they select via interviews and have very specific criteria as to what they look for in the student (enthusiasm, interest, communication skills). Selection therefore tends to based largely on a first come, first serve basis. Lack of information about students from the online databases is also mentioned as a

reason for not being able to select. Sometimes students are turned down but more usually this is because of difficulty to accommodate the student during the requested dates of the placement (if certain staff would be overloaded for example, or there are not many interesting activities on offer during a particular period) or is a student is clearly not specifically interested in the area that the placement would be in. In one company, most applications were through family, and then that family member would be responsible for the student and selection criteria would not really apply.

> *I prefer the bright, self-motivated students, but I have been pleasantly surprised by some that I thought... I took more or less as a favour (...) actually, she wasn't particularly science-y [sic] but she had such a good personality in terms of her organisational ability that she was actually very, very good as an extra pair of hands. Normally I take the ones who are keen on science and have shown some reason for wanting to come.*
>
> *[They are accepted if they apply and want to come] It's kind of giving them all a chance. Like some sort of… I think it's almost like the ones who… they really… I could pick the best out of a bunch for work experience, but that might not necessarily be the one that needs the… might need the extra help and can actually come and do this sort of work. Yes, if that makes sense.*
>
> *You get absolutely nothing from [the online application forms] really. It doesn't, it doesn't say anything. It just says who they are, what school they're from. It doesn't give you an indication as to who they are. But it's obviously then… I think it's down to the student then… if I ask them to get the student to send me in a CV, I could do, but that's not… it's something I don't particularly do at the moment, but if they choose to send a CV, then obviously I do have a chance to have a read and have a look through it, but I don't get that sort of information from this form. No.*
>
> *Yes, [we select via interviews], very much so. So, the first, as it were, gateway is the e-application. Last year we turned down three on application; and then the interview process, of which we turned down one from the interview. So, again, we are looking again for good communication skills, interested in the topic, enthusiasm to learn, wanting to do something. The placements that are, sort of, well, I need the placement... no. Go find something else! So that's the general process it goes through. And then usually I confer with my colleagues, direct colleagues, etc; just sort of talk it through with them etc, make sure that we can actually accommodate the student, is the final gateway so they may pass the interview.*
>
> *Where people come in through family or friends we say, okay we're happy to help them... happy to help them. You've clearly got to meet all the health and safety requirements and if you're the parent or you're the uncle or something like that, member of the family we expect you to organise their rota. Yes, and to look after them. So we push it back to those. So that's the... that's our process really. We have declined, you know, two in the last few weeks just purely on the basis of we've already got students in and we can't take anymore at a certain time.*
>
> *It is done by the interview process. At that stage you look at what they have an interest in doing. See I will look through their CV, see what they say about hobbies, if it would be sailing, or I help my dad with my car, or something, if they like to work with their hands. And then you go from there, but those are usually pretty good.*
>
> *They need to be maths and science oriented, but also practically oriented, because we actually build all of the designs. They need to be able to look at things logically. And personal skills... it is difficult at that age. A working environment is difficult for them. An ability to be able to talk and take initiative in an open manner. They also need to know when they need to go and ask someone for further instructions.*

Do you work with the STEM departments in schools or the careers advisers/work experience coordinators?

Contacts with schools seem to mostly take place when the school has a student who is interested in coming to the company for their work experience placement, for a follow-up from the school during the placement as to finding out how the student is doing, or when there are issues or difficulties with the student. In two companies, great disappointment was expressed with the lack of initiative of, or response from schools, even though the companies had offered several activities to the schools (sessions coming in to the schools to inform students about the company or to do activities with students for example) and had made known their wish to collaborate more. It was also reported by the company work experience coordinators sometimes that the schools seem not particularly interested in the programme of the student and the details of what they are doing. Any contacts are usually with the work experience coordinators in schools, not with the STEM departments. One company has a lot of contacts with schools for education purposes, but the contacts are not about work experience. Another company was asked by Solent EBP to work with one specific school.

> *No, not really. The work experience coordinators usually either give us a ring or come and visit them during the placement, but they don't particularly ask what we're going to do with the students before they come or what their programme is. There's always a form to fill in at the end, you know, were they on time, were they tidy, you know, could they work on their own, could they work in a group - those sorts of questions and any comments. But there's no request from the school to come beforehand or anything like that. (…) But we have a lot of contact anyway [about the activities offered for students].*
>
> *It's normally the work experience coordinator. Yes. I… for example, one college (...) they sort of phoned me up and said, we've got somebody who would like to come and see you, who is doing such and such a course. (...) Normally, it comes through me, through EBP or direct from the students, and then I sort of send it back that way, but I don't tend to go through STEM at all.*
>
> *[collaboration takes place] more if, it's more if there's an issue, if there's a problem. I have absolutely probably no contact with the schools at all, apart from… for example, I had a student who… it was this… I think it was the summer holidays and… because we're here 52 weeks of the year, the students weren't at school and he was due to be coming in the first two weeks of September and I had no way of getting hold of him to say… (...) I had to give him some information.*
>
> *[Is there any discussion about the content of the placements with the schools?] Not with the schools. No. Schools have never taken an interest. It's almost like we asked you…yes. Brilliant. Go. [Do you work together with the Science, Technology, Engineering, Maths departments in schools or with the careers advisor in order to maximise the placement experience for students?] No.*
>
> *In two and a half years of doing this we've had one school visit us. [No interest]. I'm very disappointed and very discouraged by the general interest from the schools and those kinds of things. (...) And even when we've tried to make contact with some schools, nothing, when we've had potentially a difficult situation with a student; yes, it took about a week and a half by which time we sort of worked out what to do because it's only a two-week placement; so, yes, quite disappointed with the general involvement. No, nothing [from STEM departments either].*
>
> *(...) the only interaction we have with the school, apart from sort of a… and quite often, like I say, it's not even with the work experience coordinator from the schools or the careers. Obviously the teacher comes in and sits one to one with the student for about ten minutes at the latter part of the two weeks when they've been here, and that's the only contact we'll have with the schools at all, so… I talk to the teacher, because the teacher normally wants five minutes with me and five minutes with the student before they dash off to the next one, but it's more they're asking me*

questions on how the student's been, their attendance, their appearance, what they've learnt, what they've been up to, how they've been behaving, what their attitude and sort of their cooperation has been.

I work with the Engineering Department at X College, but with the schools, no, it's all done through the work experience coordinator. So I suppose it is minimum contact from them, from schools. I would of course like to see more of that. Schools are rubbish at promoting skills-based careers, which is why we spend a lot of time going into schools and colleges. We are also running an apprenticeship expansion programme for the government, so it is not just us, we have got a consortium of 16 companies and we got a lot of funding from the government to run this scheme. Between the companies we have taken an extra 60 apprentices into the marina industry over the last 2 years. So we are doing as much as we can, but the schools are not promoting. Most of our candidates are 17+. (...) The schools tell their students 'if you are a low achiever, you are no good for college, go and do an apprenticeship' but it is so wide off the mark, it is untrue. We need the high achievers, we need really good academic skills and the ability to work with your hands as well, especially with the advances in electronics etc. But the schools are very slow on the uptake with that. As to the year 10s, I vet the students before anyway. I get the students from the local schools and the students tend to have a bit of an interest in it.

Preparing the student

Student preparations are in the areas of Health and Safety (usually on the 1st day of the placement), a tour of the site, information about dress code, timings, and housekeeping. Often, students are sent their programmes for the two weeks in advance, and take away induction or resource packs. Sometimes they are informed about or discuss particular activities or projects taking place during the two weeks of their work experience or they are asked to do some reading or web searches about the company as preparation. In one company, the parents are also invited so that they can see where their son/daughter is going to spend a week.

Have you taken advice on what constitutes a good placement?

All of the companies interviewed reported that no formal advice on what constitutes a good placement was taken. Some said that they felt they had a good sense because of the feedback procedures that the placement they offered was good, and many were somewhat flexible in the kind of activities they offered so things could be amended to accommodate the particular wishes of the student during his/her placement. Some work experience coordinators referred to their own experiences of their Year 10 placements and felt that therefore they had a good sense of what a good placement was. In a couple of companies it was felt that it would be helpful to have guidelines and criteria. In one business, the work experience was about to become a more formalised process from the higher levels within the company and therefore it was assumed that any guidance available on what constitutes a good placement was being consulted.

We haven't taken advice, no; I don't think so. We have pulled together a sort of programme that it's only a five day programme and I know most of them are here for a fortnight, but it just sort of goes through and it doesn't happen to happen over the five days, it just happens while they're here, but different members of the team will spend 10 minutes or so with them just talking about what they do and gives the student to find out, you know, what's happening in all the different departments (...).

Probably not. No. (...) I think I've got booklets and I've got manuals that were given to me by one of the other work... one of the other groups that used to work with...

what was it now… yes, WEXOnline used to have… I've spoken to them and they've come in and gone through some bits with me and given me some information on how we can improve, but to be honest, it's not something I've taken any further, as it… at present.

I did my work experience here when I was 14, so I'm very much more proactive and I do… I want to keep it going as something… and I think students do appreciate it in the areas. A lot of them come and use our facilities. We're local, but…

No, I don't know they existed! Who give that? We have not been made aware of that and we know our business better than anyone else, so we know what's relevant and what is fit for the students to learn.

How do you make sure that the placements are sufficiently interesting and challenging for students?

Most interviewees indicated that students are given subject-specific jobs where possible, but also some mundane jobs such as data entry or photocopying, as these are also part of many of the jobs in the company and it is felt that it's beneficial for the students to get as realistic expectations of the job as possible (whilst at the same time, it is useful for the company that these jobs get done). Most companies also give the students projects to do with deadlines or end presentations. Often the work can be adjusted in case the student finishes quickly with something or is interested in something else – but sometimes it can be hard to keep finding new jobs if things go differently than expected. A range of activities is usually offered. In one company, mundane jobs were specifically not given to the students as they wanted to inspire the students.

Most of the time we just... it's potluck and we do say, you know, there will be times when, sorry, we're too busy to actually give you anything, particularly if you give them something to do and they do it in two hours and you think, that was supposed to keep you occupied all day and we do give them some mundane jobs, you know - photocopying or envelope-stuffing, because part of our job is doing some of the mundane jobs and they've got to learn that it's not just, you know, the nice exciting projects that you do; there are times when it's just a slog. (...) We do have a slot on our network so that if anybody's got a little project that needs doing - you know, it could be producing posters for something or something like that - that needs doing (...).

(...) the actual projects they get involved with; firstly, if they've followed the advice, as it were, they hopefully would've picked maybe some topics that actually particularly interest them, from the website or the material that we've given them as well as then potentially talking through specific jobs, many little projects that we need doing, etc; and, again, trying to find things that interest and stimulate the student individually and how that can then work, so it's very much a two-way thing. There is also the potential requirement; they have two weeks to produce something, a deliverable; and we sort of expect that to be done. (...)And then, of course, within that they may be, you know, some might get called that there's a site to go out and, sort of, do you want to come out for the day? So they've lost the day on their project work because they're out on site visit which may, of course, incur more work.

Well, by getting them on the best jobs. We don't know what we'll be getting through the door obviously, but we are building a life boat at the end of the yard, so even if we can't get them to work on there, they'll get to look round and we'll explain to them the processes of building that boat. On the electronics side, the girl we have from the college spoke to the electrical foreman, found out who is doing an electrical installation, and she is going to that person for a day or a couple of days as part of that. So they are getting the cream jobs, they are not just stuck with someone cleaning an engine room, because then they are not going to be engaged obviously if you get them the rubbish jobs or the more mundane jobs. I don't need to have them

come in for that when the idea is to promote what we do and promote apprenticeships.

I always check if they are happy, or they might have seen something else that's going on and they want to give that a try, so we are quite flexible.

Do you make sure that the learning is linked to students' STEM subjects in school? If so, how?

There don't seem to be specific efforts made to make sure the placements are STEM related. Sometimes this is not necessary as STEM will come into everything:

We don't isolate the subjects in that way; in our job we don't do that. Our job is everything; it's science, its maths, it's everything. This morning I've been doing maths, science, chemistry, geography, geology, biology, and lots of other things. So we don't really say, this is a math bit, this is so-and-so. But we say for example with the dendrochronology that this is a scientific method. Why is it a scientific method? Well, it's repeatable, time and time and time again. And it's questionable, and it's... you know, we can go through a process. Is archaeology science? No, because it cannot be repeated once it's been done but we use the scientific method. If the student says, I'm particularly into math and that kind of stuff, then we may try and find them something that's a bit more sort of maths or a science-y activity (...) more significantly, we do a lot of hidden learning, is what we call it. So we may be doing, you know, algebra, but they don't realise it.

Some companies feel they haven't specifically looked into linking the placement with STEM subjects:

Not that I've looked into. I mean, if the schools wanted to come and recommend or suggest aspects of, like, what they're probably doing within their school curriculum that we could probably integrate into work experience, I'd be quite happy to have a chat to somebody, you know? (…) It would probably be quite nice to give us a bit more of a guide.

Sometimes practical confinements prevent the work experience coordinator from making sure the placement is linked with STEM subjects all of the time:

Well I would say to be honest we don't, yes. It's because I think we will run around, for want of a better expression to say, right, can we fill up the two weeks with a variety of activities in departments that are not in the same place? If somebody says, look we've got a piece of work on and we could do with someone for two days to help us input data or to take some measurements or do like that, then we would put them there for two weeks... two days or two weeks ultimately as part of that area. But more than likely what we're going to find is that somebody's going to go, right okay in the projects team yes we'll have them for a morning and we'll talk to them about what we do but actually they won't be able to actually do a lot, yes, so it will be very much a presentational input from somebody and I think we tend to find that. So we don't link to the curriculum here. We don't say, right, okay, well this is what you're studying in the curriculum for GCSE so let's look at the bits that we use here because obviously this is about, you know, radio waves and so forth, satellite signals etc. So we don't link to that in any shape or form and again that's something that we... you know, we could do clearly more effectively.

There might a be a case for letting schools write recommendations as to the kinds of activities that would be useful for students in STEM-related placements, as some companies feel they can and would like to improve in this aspect.

Really, all our day-to-day work is related to those core things so... We try to make at as interesting as we can. As far as the students and schools saying: 'I want this to be a STEM related placement', that question has never been asked, but they would

come from that perspective usually. It is not discussed during the placement, what they do at school and how it links with their activities here, unless they ask.

How do you prepare or train the employees, your colleagues, in receiving the students?

Generally it is commented that colleagues are not specifically trained, but that they have a lot of experience with young people and are therefore trusted to do the job well.

It's all very informal; because we're such a small organisation it has to be informal.

(…) I've been in this job for five years, so, yes, and most people have been here for well over a year, so they have [a lot of experience with it] too.

[Managing my colleagues] is, again, fairly informal. It depends on, you know, what's happening, which particular member of staff has them under their wing. It would be only the educational team, none of the other departments take anybody, so it would be something the educational team and I will introduce them to them and talk to them about it.

No, I don't. No, I don't. I mean, we'd like to think… we've had so many students over the years now, and really, it's shadowing the staff that are there, because obviously the work experience students can only do so much, you know? (...) So ideally, I just want them to see that, you know, this is what the job is and this is what the guys actually have to do.

We use experienced guys that are used to having them, as their mentors, so we have a core of experienced guys who are used to having either the work experience students or the apprentices, and those are the guys that we use.

What are your views or experiences with students' motivation to go on and their attitudes during their placements?

Often, students' motivations and attitudes are seen to be good, with some exceptions:

Usually they're very good; there are one or two exceptions, but usually they're very good.

Generally very positive. Yes, very positive and I think we've only had one student that we felt sort of... I mean it was completely not a STEM sort of thing. Wasn't interested in any shape or form. I think we find that because many of the pupils now are very very IT literate, yes, and much of the technology is converging towards IT and networks and stuff like that they are able to understand and grasp a lot of, you know, the sort of... some of the functions of our business. But this one individual wasn't so absolutely, you know, probably nine out of ten are very, very positive.

(...) but I think again because most are coming in through family and friends, that's why we get the positive experience because clearly it's very helpful if you're coming in on the tailcoat of your father or your uncle or a family member because at the end of the day you're probably going to be a bit more focused and pay attention because you're going to want to make a good impression because you don't want to embarrass your... the person that's brought you in sort of thing do you? And I think, you know, most people wouldn't... you know, if their offspring or, you know... or their child or their nephew or whatever wasn't interested I don't think they'd bring them in sort of thing. So I think we get the advantage.

Sometimes the experiences are more varied:

[Motivations are] very varied. It can be a complete… I had a student before who I accepted without actually seeing a CV or anything, and he was more interested in his music and his maths, but a very intelligent young lad, but had very few social skills, unfortunately, so it means very hard work to kind of get going and that made it challenging and then it's hard trying to get him to do something, but we've had really good ones that have been on reception, using the touch screens, taking the money, working with answering the phones, so yes, real extremes.

(...) we've had some fantastic students that we've said to, when you're 16, please come back and see us; when you're 18, we will… you know, we'll probably actually have a job for you. We've had some other students that we couldn't wait to see the back of, to be honest, because they did absolutely nothing when they were here. They didn't like to interact with students; they didn't with staff; they didn't get involved; they didn't want to learn, whereas there's other students who I think are absolutely fantastic and ask loads of questions

Attitudes vary. We have very high standards so usually the majority of our students are very motivated, very much wanting to get on with stuff. We have, last year and the year before, purposefully taken on a student that we would... we expected them to need more work, more time being spent with them because, you know, we felt with those two individuals that they had the interest but maybe not all the abilities etc.

[It's new for them, being in the workplace, relating to adults] Normally within a couple of days this will settle down and getting on with people and communicating and that kind of stuff; so in most cases, I think, that's because, like I said, we have high standards for our placements.

(...) they are perfectly all fine [unclear] but just think, well, we could do with better communication, which we try and encourage here, and that kind of stuff. And most of them once they have settled in a bit more they're a bit better but there's still a bit of sort of... (...) I think that's one thing we all have commonly noticed is that it's all communication and I think, is that because of e-mails? You know, I don't know.

They tend to be fine, because they are local and they tend to have an interest in boats, which we require. The rare occasion that you get someone that is troublesome, we haven't got time to hold their hand for two weeks, so we send them straight back to school if they are not interested. At the end of the day we are a business. But that is very rare. The students who just want to get out of school don't last.

The lack of social skills was reported by two?? work experience coordinators, and they felt this can be particularly seen in today's young people, perhaps, they said, as a result of email, Facebook, internet etc.

What do students take from their placements?

A variety of learning experiences is reported for students:

- Learning about the world of work, experience of working life, working from 9 to 5, dress code, be there on time
- Taking initiative
- Interacting with employers, adults, meeting new people, developing social and communication skills
- Dealing with customers
- Finding out what they don't want to do and becoming more focused at school as a result

Some interviewees said it is mostly personal learning that takes place:

I think they learn the discipline of having to meet people, a new set of people, working in a team away from their friends, a new environment. I think they get... Also, just, you know, not going to school every day where somebody says, do this, do this; sometimes they have to make their own... you know, take the initiative occasionally, that sort of thing. So, I think it's personal skills they learn rather than any sort of academic or experiential skills in terms of the actual topic and because so rarely it's not particularly relevant to what they're going to do. So, yes, I think it's personal skills they learn and experience.

(…) Having contact with employers, yes, and taking them into companies and factories and things like that, yes, I think it's valuable experience or having opportunities like the event we're having where we have lots of employers coming and students have the opportunity to go round and meet them, so, a bit like a Careers' Fair - but actually meeting the scientists and doing activities that the companies the companies bring (...)

A lot of youngsters are not used to communicating with adults in the adult world – great amongst their peer group, but the communication skills, and whether that is down to their I-pods I don't know, but communication skills are quite low amongst that age group, and so it improves that and gives them confidence. So a positive impact.

One interviewee described a student with a disability who came away more empowered:

(...) You know, there's all these opportunities and there are strengths in a number of these conditions that you should, you know, not be shy about. You know, don't go shouting about it, don't use it as an excuse. Use everything you have do get the best out of the world. And I hope he... I think he left a bit more empowered, a bit less embarrassed about his condition. So, okay, I'm not going to be able to do that but I can do that ten times better than you. (...) I think it sort of ended with a positive for that particular case.

Do you evaluate the process in any way afterwards, after the students have completed their two weeks?

Some companies do this informally, others sit down with the student and someone from school, depending on the school. The evaluation within the department is usually done on an informal level. In some companies the students are asked to keep diaries, or forms are filled in, whilst informal evaluation is happening throughout the duration of the placement. There seems to be scope for more formalised evaluation processes in any improvement of STEM work placements for Year 10 students.

We give the students an evaluation for them to hand back into their schools. I don't think we do; probably we ought to, but we don't in terms of we sit down and say what worked well and what didn't. (...) So, you know, there is a very informal evaluation, but it's not a formal, we didn't say what worked well, what didn't work well with that student, but I think because we're such a small team, it's not as if we were a big formal large company or something that needs to have much more formal procedures.

Yes, the actual student gets the full evaluation and opportunity to give feedback; full-on frank feedback, you know, I hated so-and-so, they really were mean to me or this kind of stuff as well as we ask the students to keep a diary, a public diary which is available for work students to be able to see, it's on our website which they update. As we then, after that, then review the placement; you know, what was produced as a deliverable, how far did we get?

Yes, it varies I think. Some tutors will come in and want to meet with the pupil, yes. Others want to meet with us and then the pupil so they get some feedback from us and then the pupil. So, yes, that probably varies a little bit.

What do you feel is the impact of the placement on students' futures, for example, their aspirations, motivations, realistic expectations of STEM-related careers?

Better information about the specific careers and requirements in the field, and more realistic expectations about what certain jobs entail are often mentioned.

I think it's positive. I think, I said, it gives them an idea of what's out there. You know, if they have an interest in archaeology; archaeology is beetles, trees, metal, root, pollen; it's endless. (...) And so they might have... be someone that's interested in beetles; and they are like, you can become a whole specialist and know everything about beetles and what they can tell us and that kind of stuff. So it really does... oh, I didn't know I could do that! You know, that kind of thing.

[Hopefully they can more realistic expectations of the job as well] And then also clearer about, you know, career paths, you know; you're never going to be a rich archaeologist, you're not going to be famous. But if you want a job that gets you out of bed in the morning; I love it so, you know, it's that kind of thing. Or the other side of that is, you know, maybe you should get a job as some financial person, get loads of money and the archaeology is a hobby at the weekend because you'll get more out of it; that kind of thing. So, yes, get to sort of trying to plant feet on ground but eyes wide open, you know, that kind of thing.

Very positive, it opens the eyes of the students, it makes them consider the marina industry, see it is a good option, they write than you letters.

One work experience coordinator felt less sure about this type of impact of the placement at her company:

I don't know. I think because we are such a tiny establishment, if they went... I don't know. It's different because obviously we need to have a mix of people working here and the people who end up working here tend not to be the high flying STEM graduates where a lot of the kids who come here on work placement might well end up. They're all bright students; they're all going to get A stars, so I think they will end up doing something that pays them a lot more than working here. There are one or two who have a desire to become a science communicator which is basically what coming to [this company] would tell them about.

What is the benefit for your company or branch?

Showing that the company is assisting the community is one aspect that is mentioned. Some companies also see it as a good feeder for future staff, either via apprenticeships or directly when students finish with school. Two companies said that there was no real benefit for the business.

(...) we are council supported. The building's owned by the local council, so we have to meet certain requirements of their needs. So obviously it's good for us that we are showing that we are assisting the community and putting something back into the community.

From our perspective really we would not expect to be, you know, taking on lots of 16 year olds. You know, we've run one apprenticeship programme. We're going to run another in the near future but it won't be till next year. But more likely it would be sort of 18 years plus with high qualifications would be a requirement to come and

work in our business as opposed to GCSE. So we don't do it because we want to be known amongst that target group for employees. We do it to support our employees and our staff and their children and to build relationships in the local community and support the local community recognising that we are one of the largest employers in the area. Also I think from our company name, we're not a consumer brand. You know, all our business is done with other businesses so it's not something that we're doing again to promote our company to customers as such.

Yes, I think… I don't think we gain anything from a business aspect, you know? It's… they are another pair of hands around sometimes when you really need them – for example, if you have a massive pile of filing that needs to be done. In that sense, they are… it's useful to have them around. I don't think we personally gain a great deal from it. Obviously it's certainly not time-consuming, but it's just another thing that's always got to be kept on top of. (...) I think it's more from our point of view, it's what we're putting back into the community, than what we actually personally gain as a business from it (...) they're easy to look after, to be honest, and it doesn't take a lot of effort to run a folder's worth of paper, to be honest. So yes, not from a business point of view, but it ticks some boxes as well, which is… but it's not the reason we do it though.

There is a huge skills gap in all engineering industries and an aging workforce and we need to bring those young people on. Apprenticeships are of great worth. And some Year 10 students come back later on, after college.

For us, we would like to bring young people early in the company and help them grow through the company. That is beneficial for us. The reason we do it because we want to grow our office from the bottom up and bring them in there and train them in the way we want them to work and then move them up through the business and develop the size of the office that way. We want to become the third biggest in the world and we want to get the youngsters in and train them. Hopefully they like the way we work and then come back when they have done their degrees.

What are your views on what works well and doesn't work well with Year 10 STEM placements?

- It is important to keep students busy and to give them a variety of activities, something that challenges them and that takes a reasonable amount of time; to get them engaged in a way that doesn't make them feel it is like homework, because then they will rush it
- Giving them a project works
- A lot of it is off the cuff
- Health & Safety knocks a lot of jobs on the head
- Honest communication from our side about what is and isn't possible, but also from the side of the student, for example about special needs, so that we can arrange for the right kind of activities
- Sometimes the contact with the schools doesn't work well, if there is an issue, it might be after the placement when the school returns a phone call

It all depends on what's going on at the time, like when we're here. The things that don't work well… it's… I think poolside's one of the hardest places to put them, because it is… it's a very mundane job, but obviously it's one of our most important, highly trained jobs in the building, because there's nothing to actually physically do. You're just watching the pool. But unfortunately, it's what we're here… we're obviously a leisure, a leisure facility, so we… it's one of our biggest departments staff wise. (...) there's not anything that doesn't really work… that doesn't work well. I think more so because I've taken those out of the equation and we… if it doesn't work, we just don't put them somewhere else.

And it's a lot… a lot of the time, it's off the cuff and just, ooh, that needs doing.

[preventing the success of the placement] It's the health and safety aspect of things, isn't it? It just puts a real… it knocks a lot of the jobs on the head that we would probably get them to do normally – things like glass cleaning. Real silly little thing, but we can't… I just can't get them to do it, because obviously the risk of them [unclear], so we take out the aspect of chemicals completely. Things we can get them to do is scrub scum lines in the pool, which doesn't sound very nice, but it's a [unclear] and you're in the water swimming, and literally our staff just stand there, which… and there's no reason why they can't do it, because it's nothing, you know?

Good communication, frank and honesty, you know, from our side; you know, this is what we can offer you in a placement. If this is what you want to do, brilliant, if not, say now!

What do you feel could be improved with the placements? What would be an ideal set up of the Year 10 STEM work experience placements?

Communication from and links with the schools are mentioned by most company work experience coordinators:

- Communication from the teachers about the placement or the student on the placement
- More interest and involvement from the school and parents in the STEM activities
- Structure and timing; link more with the curriculum, close the gap between what the student does at school and the STEM content of activities organised at the placement; selecting criteria for students as to what subjects they need to be studying
- Getting a group of students at the same time so we can organise it more formally, select the right students, and set-up appropriate STEM activities for them

In one company it was suggested they would get paid for doing work experience, as it takes time to organise.

And I said, the only other improvement about is communication from the teachers, either about placements or just about the student on the placement would be a start. And that's one of the... that's where you get frustrated over the last couple of years; it's just the lack of interest from the school. But (...) a lot of it sometimes is parents.

There is the structure and timing, yes, because I think particularly in stem placements because it's a bit more specialist, we have to think very carefully about what a year ten student is going to get out of the activity we expose them to because whilst they might be studying physics, clearly what we do is a much higher level then GCSE. So we want to close that gap a little bit I think. So in terms of timing and right let's get a group together I think we can link much more clearly into the curriculum and okay, so let's understand what you know so far and what you want to learn about here.

Are there any particular learning objectives that they want to come about. (...) There could be something around like some learning objectives and they have to do some form of presentation at the end of it, either to us or to their school. (...) and then links with schools I think, you know, those closer links and I think from our perspective actually just checking some selection criteria. So for students to be accepted, you know, they need to have the following. They need to be doing sciences, maths, yes, ICT related subjects, ...

It'd be nice to be paid for doing them. It's just it takes time to do. If we tried harder we could do more, but it's a case of what you get back, so perhaps if there was a reward for doing it - I can't think of anything at the moment.

Are [the schools] interested in promoting those STEM activities? I don't think so. They don't seem to be interested in promoting engineering and technology, they are only

interested in promoting college, if you have got a brain in your head you will be pushed down the FE route. From the schools' perspective, they should be doing far more, because even if we get very good students, we don't get that many apply. I don't get 30 applications, I get 6 applications and I can take 3 or 4, so I take the first 3 or 4. So it is not as if we are inundated with applications to come. It is the awareness isn't it.

Is work experience a worthwhile thing to do for Year 10 students in your opinion?

Almost all work experience coordinators feel that work experience is very worthwhile and important.

One work experience coordinator feels that it is not necessary to take students out of school for their work experience; it can be done in the school holidays, as supervision from teachers is very limited anyway. She also questioned the importance of work experience and felt it was a waste of a fortnight of school as the curriculum is already very tight.

I think work experience is vital and good work experience that really gives them an appreciation of what it's like to have a job; you know, what you're expected to be like at the office, etc., communication skills. Some students, you know, their communication... virtually always they'll be nervous as they start and they sort of come out of their shell later on. But generally, I would say, the majority of the students are not as confident in themselves as I think I was.

Definitely, because I think it's a real eye-opener for some of them when they have to come in. I mean, we only ask them to be here 10:00 'til 16:00. You can see by 16:00, they're kind of like, it's a long day. (...) But I think it's a real eye-opener, the fact that it's not an exciting thing to be out working. We don't just all go and have an hour's lunch and sit around. (...) You've got to do what you can and it's almost like bring them down to reality of actually this is how work… this is what work is. It's not exciting. It's quite a mundane thing to actually go into. I don't want to put them off sports and leisure, but it's obviously… if this is a job they were thinking to go into and working in the sport and leisure industry, just to say, this… well, this is what it's like. The money's not great. The hours aren't great, because the shifts that the guys work aren't 09:00 'til 17:00. They're 06:45 until anything up to 22:45 at night. Not the whole shift, but either end.

I don't see why they can't do it in the school holidays. They had so little supervision from teachers when they were here in terms of teachers might have rung up or come in and seen them for 10 minutes or half an hour. I don't think [it is worthwhile personally. (...) I personally think it's a waste of a fortnight of school, (...) the curriculum is so tight anyway, to take them out for a whole two weeks, it's... How many weeks a year do they have - 26, 30 weeks in a year? So, it's a 15th, isn't it, of their school year is spent fiddling around here. No, I don't think it'd be a great loss for the students [if it were abolished]; I didn't do it. A week, possibly, but not a fortnight. I think they could have gained that experience within a day of being out volunteering in the holidays or something and quite a lot of students do that.

I think it should be expanded upon, more companies should be encouraged to do work experience. But many companies are disengaged because of the lack of support from the schools. I think from the schools' point of view it is something that they have got to do, it is more like it is bit of a pain in the backside, something they have to get out of the way. I just think there needs to be a lot more interest in engineering. It is a fantastic career, and it is not pushed, there is a total lack of interest. The students are all being guided blindly in one direction - FE. It is funded for bums on seats. But we continue to work hard to get good people. There is a huge skills gap in all engineering industries, and with an aging workforce, you have got to bring these young people on.

Some question whether Year 10 is the right age to do work experience:

Yes, that is a very good question actually because when it comes down to the why are we doing year ten and I'm personally... well I'm not sure it is the right year to do it because I think that at that age... and I mean let's face it we have many graduates coming out of university that still aren't sure what they want to do or where they'll end up so I don't think your average year ten is necessarily clear. Having said that I think for stem they probably are a bit clearer that they've got that interest in maths and sciences and they're probably clearer that they will go on and do them at A level or they'll do some sort of vocational qualification related to them so that might be slightly different. But clearly the year 11s because it's exam year and final year is probably not a good year to do it so year ten then becomes the compromise year doesn't it sort of.

I think at that age it's difficult but... so I think later would be better. But clearly there are a lot of pupils that leave school after year 11 so when would they get work experience. But having said that, you know, what do they get out of the work experience? I don't know, I don't know.

Yes, it's an interesting one really. Well I never did work experience when I was a pupil so I'm not sure what I missed or what I didn't miss. I would think that there will be pupils that would get a very good work experience, understand how, you know, different the world of work is compared with the world of school and education. But equally there will be others that think, God is that all I've got to look forward to? So, I don't know, it's difficult. [The 18 year olds we worked with for apprenticeships] just had that additional two years of maturity. But now the 16 year olds, you know, they're now 18, 19 years old and they're all getting very positive feedback from their managers and mentors so they've now grown and matured through it. So, you know, it's difficult really I think that there has to be some bridge between school and work. (...) I think, you know, we can do more to actually try and bridge the gap.

What would be the most ideal set-up of Year 10 STEM placement and who should assist with this, inside or outside the school or company?

Suggestions made by company work experience coordinators are:

- Meeting work experience coordinators/careers advisors at school, talk with them face-to-face about integrating activities with the curriculum
- Making use within the curriculum of what the company can offer in terms of ideas, activities and resources, making the curriculum learning more linked to the real world
- One company expresses content with Solent EBP as intermediary, it makes the process manageable

It would be handy probably to actually go and meet the work experience coordinators at some point, just to have a chat to see if there's anything else we can involve… we can integrate. (...) the information we get from them would probably cover every other school, I'm assuming, based on the fact that they all run into pretty much the same curriculum. It would probably be nice just to go and meet them, just to at least see them face-to-face. I think working with the schools would be good. It would be much better to have a little bit more one to one.

It has got to be school-led, hasn't it, you have got to get the students engaged in technology, engineering, maths, it says it all really. They are not engaged with it because the schools are not promoting it. We can't do any more really. If I can nab the STEM teachers and say to them bring your students down, that would be great as well.

What role should Higher Education play?

One company work experience coordinator saw great opportunities in working together with the University to help them teach students more of the skills they will later on need in the jobs; helping to teach the subject of archaeology in a more holistic way, as so many subject areas are integrated into it.

In other companies the role for HE could not be seen clearly as it was felt on the one hand that students at this stage need to see more about academic and undergraduate student life in order to find out whether it suits them, and that work experience comes second to this in deciding about a career path, as they are still only Year 10 students. It is felt that it is more for the University STEM outreach departments to work with schools about what studying STEM subjects at University is all about.

> *I think sometimes... I think, with the higher education, again, with the segregation of the subject matters they may not consider, you know, an archaeological unit appropriate for someone doing a science degree or science at college or those kinds of things. I am now working or trying to communicate with local colleges and say, look, we've got this and... I went to one the other day, talking with their electronics group; you know, students doing electronics because electronics is a very big thing in our work, in subs, ROVs which are remotely operated vehicles. You know, they go down, and around etc, as well as the technology, computers and those kinds of things. And then through talking to them... "That sounds like it would be interesting for our tourism and heritage department". I think it's vital that everyone does work placements but I think, again, the segregation of subject matters does hinder.*

> *[STEM departments at the University don't liaise with us at all about what they would like to see in the placement in order to attract students later on at the University] We made contact with Southampton University's masters' section last year, and it took a bit of work but they agreed to that let's do a two-hour lecture because students in archaeology... in the profession of archaeology you don't learn about education and outreach; it's very rarely covered in entry level and it's definitely not covered in the masters' level; and so archaeologists are coming out into the real world to do a job and they're then told; right, go talk to those 70 people about what you have just been digging. I can't do that, I won't do that, I'm not here for doing that.'*

> *I don't know [whether higher education should be involved with setting up the placements or the content of it or maybe advising us on what kind of activities should be included, for example, if they know what kind of students they are looking for] I don't know at all because they're Year 10s aren't they. It's a long way before they're in university or into higher education. It might be better if the sixth form colleges, because most of the students that we see are going to sixth form colleges, so, it's a long time before they go to university and even further way before they do their careers.*

> *I don't think [inspiring them to go into STEM careers] is so much a work experience type activity; I think there is a huge place for that sort of thing to be happening, so it's higher education STEM departments working with schools. But, I don't know that and it's probably better that the students go into the higher education in terms of student experience rather than as a work experience because working in higher education is more - there's obviously some research - but it's more... probably half the employees have got nothing to do with the subject have they, in the university in terms of admin staff and, you know, a totally different side of the staff to STEM-related...*

> *Yes, I think [inspiring students to go into certain careers and then for students to be clear about what pathways they need to take [Q: is there a role for HE in this?]] is an important part, but I don't think it's needs to be done on a one-to-one basis as a work experience type activity. You know, lots of different activities do have them at the*

moment (...) Some of these - the BA Crest Award type projects, where they work with the university departments or they go and have a three day residential in the university doing things where, while they're doing it, the course and the activity on the project, they meet other researchers and academics can informally talk to them on a one-to-one basis but as part of it, you know, you find out about courses and living in universities and all the rest of it. So, I think that is probably a better way of doing it than a one-to-one work shadowing, or possibly a work shadowing for one day, but not for a fortnight.

If you get the right departments involved with the younger students, because that is the group that they aspire to be so if you have got people from colleges, the 18 year olds and from universities, in their early 20s saying the same thing, and everybody starts the ball rolling, they might start to consider it, but it is having that thought in the first place and at the moment none of them have got that because the seed is not planted. So more could happen there.

If we would all sit down together, we could all offer a work placement package that is linked to the academic criteria or to get them onto an ONC or HND, work together, rather than reinventing the wheel. It could all be linked, we could all be doing the same modules. If you had basic, Year 10 week long placement modules, you could probably come up with a generic package that companies could buy into. Students would gain the same level of help and also the same expectations. It would also have been helpful to have had this because we have had to invent it ourselves.

Funding issues

In many interviews, the cost of running placements was mentioned as an issue:

So, I don't think we get enough out of it to warrant putting, you know, that extra bit of time into it as far as we are concerned - I think the kids probably might get more if we spent more time on it - but, you know, we don't have any funding to do it because we're an independent educational charity; we're not funded by our local authority or anything else, so, there's nothing in it for us to do it.

The cost is one thing; we're a small organisation funded by grants etc; it's one of those things we very carefully weigh in how many students we can take on.

Cost is one of the big things which is why we're very clear with our students about... you know, we can't pay you, we can't reimburse the expenses and those kinds of things. It would come out of the central funds for the company, which are stretched enough as it is. So I think that that's one of the barriers and we're always keen with our students to make sure we have a deliverable or very close to a deliverable because then it's worthwhile, not only for us but also for a student; they see their work out there being used.

Interviews with University STEM Department Work Experience Coordinators

Roles in coordinating work experience in the department

All interviewees are Outreach Officers in STEM departments: roles are to work with local schools and students to try and encourage them to come and study STEM subjects. Responding to requests by schools/students for contact, running STEM related shows, teaching undergraduate students on the Ambassadors' Scheme. Plus receiving Year 10 and A level work experience students.

The number of Year 10 students offered work experience in each of the departments is 2-6 a year, sometimes simultaneously, which can be either good or difficult: two students working in a task together often means it will get done slower for example, but it can also make it easier to organise activities and it can help the students feel more comfortable.

> *I'm trying to keep a lid on it a little bit because it… I like to organise a bespoke programme for them and so I don't just shunt them around people. I talk to them about what they're interested in and… it's quite a demand on my time, but I think that's probably part of the reason why it turns out to be successful.*

How do you get the students?

The university departments' usually get the students on the basis on students' initiative to contact the departments themselves, or sometimes by parents:

> *We get emails sometimes from schools, but normally it's from the kids or from parents who've looked us up on the web. (...) it's them contacting me. I certainly don't advertise the fact that we do it, because I'd be inundated. You know, there's always some other body involved [WEXOnline, Solent EBP] but the contact has always come from the kids or the parents. And that's [because I get the motivated students, the ones who approach us themselves] why I'm always happy to do it, because I've had such a positive experience with them.*

> *We don't recruit them ourselves, just obviously because it's just me, in terms of organising, so we don't advertise or do a big publicity stunt for places. It's really schools that contact us, so careers advisors or science teachers, and individual students themselves contact me. We don't use any of [the online databases].*

The online databases are not used.

Length of the placements

The placements are normally 2 weeks in all departments.

> *But yes normally it's two weeks and we have obviously in June… there's a June, July, sort of, time when they do it and some of the schools do it in March. We've had kids in March and we've had kids in November. So, actually we can, kind of, stagger them over the year, which is why we've been able to accommodate them, because there's a limit obviously to how many. I don't think we could… we'd struggle to have two at the same time.*

Selection criteria

All departments indicate that they have not had to turn anyone down, as usually students are very keen to come to the department and have a keen interest in the STEM subject of the department and are clear on what they would like to do. There exceptions mentioned of students, for example who were actually interested in a different science, or an example of a girl who turned out to be pushed by their parents and was not motivated herself. Another issue reported would be low attainment in science, or learning difficulties or disabilities which would pose health & safety risks in labs (an example of a student with Asperger's syndrome was mentioned, who started touching

different things in labs). The basis for acceptance is first come, first serve, as students often apply a year in advance, but an interest in STEM, and good grades, criteria which the applying students usually fulfil.

> *I've not turned anyone down. I had an interesting one where a lad came in for a chat before I'd actually agreed to take him and I was very wary of him. He seemed, like, almost a bit… what's the word when they can't concentrate for very long? You know, Attention deficit disorder, or something like that. He just seemed really all over the place and I was very wary. But actually he did a fantastic job when he was here. He matured quite a lot, because he came and visited in… I guess it was before Christmas and then he didn't come till the following September. So, he had matured a lot in that time and actually he came back and worked for me last summer and is coming back this summer to do work again. So, he's been a really good one to have. So, that makes me think that I should always give them a chance and I suppose if there's something on paper that flags up a problem, I don't, but if they aren't very good at science then there's not really any point in coming to be honest. So, I always find out what their predicted grades are or how they've done, you know, previously. But generally the ones that want to do these sorts of placements are quite strong academically. If they are kids who aren't doing very well and they want to be a plumber or a mechanic or whatever, they get placements elsewhere.*

> *Normally, obviously because it's a thing of them contacting us, there's normally a strong reason why they want to come here. Either because their interested in engineering or want more information about what engineering is, or they're generally interested in STEM subjects. The only reason that we would turn someone down is obviously if we couldn't offer them either an interesting... anything interesting to do, or if it was a busy time of the year in the academic calendar, so.*

> *We normally invite everyone and then discuss what they want to do, and if it turns out they're perhaps more interested in chemistry, I would obviously forward them on to [outreach officer in other STEM department] or whoever.*

One outreach officer mentioned widening participation:

> *I think that (being less strict with selection criteria) will probably happen naturally. Obviously we do quite a lot of widening participation work currently so we do have existing links with targeted schools. Again it's waiting for the direction of higher university management to outline or list what the future targets are, and then amending programmes and things like work experience to suit those. So I think that will probably happen naturally over time. It's quite difficult to say exactly at the moment.*

Experiences with student motivations

Experiences with student motivations have been very good:

> *Again because it's almost, kind of, self-selecting, the students that we have are all really enthusiastic and want to get as much out of the placement as they can. And obviously I try and encourage them if perhaps there's something in the programme that they're not really that interested in. I encourage them to let me know so I can find something else for them to do. Yes, but really it's... again it's just trying to get them to think more about what they want to do when they finish school. And obviously that doesn't mean that we want them to come here, it's their own decision, but at least it gives them an insight to potentially what they could do.*

This was seen to be possibly linked with the students' strong interest in STEM subjects.

Making sure placements are sufficiently challenging and interesting and linked with STEM

The placements at the University STEM departments seem to be very much bespoke, depending on what the students are interested in, what they are good at so they can help out and release the staff from tasks that need doing; and to give them a good sense of what the undergraduate course is about and what the work is like, talks with many people in the department (students, researchers) are organised for them.

Links with the GCSE STEM curriculum are not explicitly made, but links with the undergraduate curriculum are, as one of the aims for the departments is that the student comes away with a realistic idea of what studying and a career in the subject is about. Offering placements would otherwise not be seen as useful by the management of the departments.

> *[We do a bespoke programme for them] Well if they say to me that they really like doing stuff on a computer I'll get them to write some reports, I'll get them to write an account of what they're doing. One, the guy who's been back a few times, he's made PowerPoint presentations for me, which have been good, you know. I've used stuff from his PowerPoints in my outreach talks and yes so I try and find something they can do. The one I had in November, she was… I noticed she was really good at paperwork, you know, so… because I'm not. And I had to make some card sorts for UCAS days and she just… I gave her these piles and said, can you chop these up and laminate them for me and get them in envelopes, thinking it would take her an afternoon. She did it all in an hour. So, I do try and find what they're good at and give them something they can do, and give them a broad experience. It's… you know, they spend some time in the lab as well, but also, you know, I'm a chemist but I don't do any Chemistry anymore. So you need to find out a bit about what my job's like and they shadow a post grad for a day normally. They'll go and help out in the teaching lab on one day. So they get a really broad, sort of, experience, work in the office, that sort of thing.*
>
> *[Also], just so they appreciate that, that actually, you know, that you can work in a lab and be a lab scientist all the time, but actually a very small proportion of our students actually go on to do that really. A bigger proportion of them will go on and use the skills they've got to do another type of job. So, I think it's good to get that point across.*
>
> *I encourage [a Masters student who gets involved with placement students] and the other students to always talk about, you know, what they enjoy about doing their degree, what was it like. Encouraging the work experience students to actually ask the questions. I mean, that's what I normally do on the first day is say, right I'm going to give you half an hour now, you'll have a chat with me, think about what questions do you want to be answered, and write them down and then ask these guys those questions, ask me those questions. So, yes I encourage them to try and find out what it's like to study here. Because I can only justify doing this to my, sort of, line manager if I say there's a chance of us recruiting these students.*
>
> *So things like [giving them something they need to finish by a deadline], which they probably know about from school, but maybe in a different context. You know, they're actually, kind of, oh yes, connecting the lines as to what they do in school, can mean something outside of school as well.*
>
> *I'm slightly in a different position because I used to teach in a secondary school and (...) I knew what my colleagues were doing and I knew the work experience process. So, I guess I've got an advantage there. So I know the sort of things they need to do and, you know, what boxes they need to tick and the first thing I ask them is so what paperwork have you got to fill in, because they always come in with different paperwork. And I look at it and say, all right we'll make sure you can do all that.*
>
> *[We don't link their activities with subjects they're studying at school] too much. Obviously we ask them what subjects they're studying. Obviously at Year 10 it would*

be sciences. So no, we don't really... We try not to link it too much with what they're actually doing at school, again just to give them... something different to look at but something they can relate to, if that makes sense?

I certainly will try to [link activities with undergraduate requirements]. But again, if they have a particular interest in a particular area, or there's something particularly going on at that point, that might just side-line what my ideas were anyway and they might just end up [doing something completely different if it takes their interest].

Relationships/contacts with schools

For their outreach work, the work experience coordinators have a lot of contact with schools and many teachers know them, but this tends not to be about the work experience. They report that they don't work with school work experience coordinators and careers advisers in getting the students and organising the work experience. More contact with schools, on the initiative of the schools, is reported though than with the company work experience coordinators, who were very disappointed with the lack of collaboration with schools, did. There are sometimes one or two schools they work closely with.

Obviously I do a lot of outreach work, so a lot of teachers know about me, but I've never been asked by a teacher to find a placement.

I don't directly [work with work experience coordinators or careers advisers in schools to maximise the students' placement experience]. I guess it's because of my knowledge of where they're coming from and where they're going to, that actually I know that the work experience visitors, the staff, the teachers that come in, they are always very, very pleased and so [how the placement is set up is] based on their feedback. I guess the first time round I was a little bit worried, but then my mind was put at rest because of the positive feedback.

Only when they phone me up to arrange a visit [I have contact with the schools about placements], and that's it. I've never had any particular reason to get in touch with the school because they've all been very good and, you know, I've not had any problems with any of the students. I guess that's the only reason why I would contact them because we just get on with it.

[About special relationships with schools] There's definitely the usual suspects who send us quite a lot of students.

Actually through other outreach activities that we've done with those students, those specific students, who've then registered interest and said, actually I found that project really interesting, can I come and do work experience to find out more? Which is actually really positive because it shows that we've sparked something somewhere. But in terms of formal contracts or anything like that, there isn't any, it's really whoever gets in contact and...

It doesn't happen as much as obviously the careers advisors, but we have had a couple this year [who contacted us] who have been science teachers. Again, because those science teachers I've been in correspondence with about workshops or talks, they've then suggested to their students to contact me for work experience.

I would like more contact. If they rang at the beginning of the year and said, you will get students at you, and I could say, I can take two of your students, do you want to work out which one you think would most benefit? That would help. I have seen the work experience coordinators or teachers turn up, usually at the end of the placement, to see if everything was okay. I don't know if that's because they know it will be okay, or a time factor. But it would be tricky for a student to say, it wasn't actually! (...) It would be helpful for the STEM coordinators to have a copy of the job description; it would be good to have better links with them.

Preparing students for their placements

Informal preparation is reported here, asking students to read information from the website, giving them tours of the department, informing them of health & safety, filling in forms with them. One department tries to get students involved over the summer, before the placement starts:

> *I send them, obviously, relevant information on health and safety, contact details, that type of thing. And if they're working with research groups I'd send them information about those research groups or web-links and things for them to have a look at to... Just so they've got a bit of a background idea of what they do. If it's during July, we normally try to get them involved in the Headstart courses, because that's really fun and interesting and it means that they can do hands-on engineering activities and work with engineering students as well. So I send them all of the information about what those courses are and what they'll be doing.*

> *I don't want them to be… if they come in with prejudices that might actually affect the value they get from being here. So, you know, I guess their expectations change over time as well, so, yes. But I think, yes, there's not much… no formal preparation. I think if they were going into industry that would be a bit different and if I was putting them straight into the lab, that would be different, but I don't put them into the lab till they've been here for a few days anyway and we've done risk assessments and stuff.*

In another department, students are called in for a mock interview even though they will be accepted on the placement.

Training colleagues in receiving the student

This does not seem to happen formally and the interviewees report that their colleagues who are involved with the placements do outreach work as well so they interact with young people as part of that anyway and they are trained in child protection. Also, making sure exactly what students are doing and whether it is suitable.

> *It's quite informal and actually the guys who interact with the students are all people that do outreach work anyway. So… and obviously they're all CRB'd so that saves us one problem. But they know how to deal with kids that are younger and less capable than the sort of kids we've had on work experience. So, there's no training required really, which we're very lucky because, you know, kids are coming in this place all the time one way or another and if you think for UCAS days they're only a couple of years ahead. So, we're used to dealing with kids that age.*

> *Everyone who's involved in taking a work experience student is involved in other outreach activities. So they're already trained on... obviously the most important thing is child protection and issues like that. But also the, kind of, soft skills of how to communicate with a younger student rather than a PhD student who knows what you're talking about.*

> *It's really, obviously, the academic or research student or student who have offered to help with the work experience student. It's their responsibility to let me know what they're planning on doing, and from that information I then possibly suggest ways to improve it or other areas that they could think about. And again, remind them of health and safety implications and all of that type of thing.*

> *I try and get it in advance as much as possible. Obviously there's been times where they've been supposed to be with an academic and unfortunately that academic's*

been ill, so we've had to try and get something last minute. But again because they're all past... people who've helped out with outreach, there's normally a risk assessment somewhere or an activity with a risk assessment that we can just reuse again, so.

Have you informed yourself about what constitutes a good year 10 STEM placement?

In one department, the suggestions sent through by Solent EBP are used as guidelines, together with the interests of the students.

There's the... Any requests that we get, and the students have to do it as part of the Solent EBP. They normally send through, kind of, a pack of any suggestions and things like health and safety, that type of thing. When I started this role in 2008, work experience was done, basically academics taking people, but I've now changed it so that I'm the lead contact. Just to make sure, in terms of child protection and health safety, that we're covered basically, and in terms of insurance as well. So in terms of finding a right placement for them, from the initial email or telephone call that I get from careers advisors, I then ask what specifically the student is interested in, whether it's planes, boats, spacecraft, anything like that. So I can contact the relevant students or academics that I work with to make sure that we try and find something relevant for them to do. I try as much as possible to get, yes, to get as much interactive stuff as possible. Obviously because of lab equipment and everything like that, it's not always possible for them to get hands-on, but we try as much as possible. So, it's really just talking through what the student wants to get out of their time here, what their interests are and if they've got any ideas of what they want to do when they leave school. So we can try and work out a programme for them out of that.

Another outreach coordinator indicated how he tried to be clear with the student about what they would and would not learn about during the placement. The organisation of the placement was based around giving them realistic course information and expectations.

Well, I guess in a way, I mean, it's cheating isn't it, because what I am trying to do is convince these kids that a scientific career is the best thing for them, which is a bit different from what work experience is meant to be about. But we're talking about kids who are going to be going to university and they've got to choose a course, so in a way we are showing them what the world of work is like, but we're also giving them information. They might come away from here and think actually you know what, I don't want to do Chemistry, and that's a good thing because it's going to save them all the pain of coming here and actually not liking it.

I do make sure that [it] comes across that they will find out more about the course than what it is like to work in the industry]. But, they do also see a lot of stuff about careers and where you can go with Chemistry and, you know, they get to see what PhD students do and the PhD students talk to them about what they're going to do in the future, so I think they do get some good stuff out of it.

Do we take any advice on it? Yes... and no. I think I am probably a bit confident in my beliefs about what a work experience student needs, and for them it is... I probably go too far in giving them a good experience, but for me it is covering some general basics. (...) I think I am aware of the fear factor so I think I am acutely aware of them having a good experience and not having over-expectations of what they can and can't do. So as long as they have been intellectually challenged and they leave with some useful skills, and feeling excited about the subject and knowing a bit about some cutting edge research so they can get it out there, then I think I have done a good enough job. We do have some guidelines from the university and there is more and more stuff about how we should do it, and the paperwork is adding up – outside organisations that arrange work experience, insurance, child safety; and it is often repetition.

I don't necessarily link the work experience student with trying to get them in as an undergraduate. Because they want more information, and if the information and the experience that they get, although positive, confirms that actually they are not going to be right, they don't really want to do [this STEM subject] but rather another [STEM subject], then that is fine as well. What we don't want for a first year undergraduate student is to be unhappy because they are in the wrong place. A good placement for me is, happy student that has learned something, I got some work done that I needed doing that was suitable for their age level and ability, happy school, happy parents; a win-win for everybody.

I don't even necessarily want them to have realistic expectations of the undergraduate course, because they are Year 10s and they wouldn't understand it. I very rarely put them in an undergraduate lecture because it might put run off screaming!

Evaluation tends to happen more informally afterwards with a chat, but one interviewee mentioned that procedures will be more formalised across the University in the near future and that hence she has also started to formalise processes, such as the evaluation of the placement experiences.

Not formally, maybe informally. We do, you know, I mean, it's like as my master student was saying the other day, are we getting some work experience students this year? You know, because he's actually got ideas for things that they can do, which would be useful. But they're good, it's not we're giving them the menial jobs to do, it's a good little project. So I guess, sort of, informal discussions show that we've had a very positive experience with these students and other people around the department have actually valued having them there as a pair of hands.

In terms of with the students, well I guess on the last day I always ask them how it went and they always say what a good time they've had. A couple of them have written letters afterwards saying that and you also get a box of chocolates or something.

We didn't do, at the start, but I've... Obviously with the upcoming changes in terms of higher education and the outreach work that we do and having to prove what we do is effective, this year I've started asking work experience students to fill in a work experience evaluation form. Which is just general things like: what did you enjoy most, what wasn't so good, what do you think you've gained from your time here? Things like that. And then obviously, in terms of contact with the teachers or careers advisors, I'd try and get in contact with them after each placement and just get any feedback that they've had.

What works well and doesn't work well with the year 10 STEM placements

- Students with strong interest, and a knowledge of science are needed
- Students need to be kept busy and with a variety of thing so that they don't get bored, and meeting different people
- It needs to be flexible for other things that come up, if possible
- In the future, work experience will be more formal than it is now at the University
- There is an increasing amount of paperwork and filling in forms that it seems nobody will ever look at, it will be putting people off to take work experience
- It needs to be one to one, student focused
- It is a joy and a privilege working with young people

Certainly feedback I've got is if they're doing repetitive tasks that they do over several days, that that is when it turns into an unsuccessful placement, that they want to see a bit of variety. And I think that's important because even if you're working in a shop

there are many different jobs, not just being on the till, you know. I mean, if you work in a supermarket there are a plethora of different jobs you can do. So, it might be more difficult for some STEM companies to do that because some of these kids… if you're in a hi-tech industry, you can't really get kids in there with this really dangerous, you know, kit. (...) [But} the people organising the placements they need to remember that these are teenagers and especially in this generation, that they're used to doing things for short times and moving on. And actually of course in the real world things can be repetitive and boring, but don't put them off the world of work by just getting them to do one thing.

These kids that I have, they're going to be successful whatever they do, you know. But it could make a big difference to kids lower down that think there are no options for them and they're just going to end up on benefits and you know, I think that's where the difference needs to be made. But that's not really the STEM environment because we're only going to be creaming off the best students, generally. I think variety is important, but I think the ones who are academically gifted will tolerate repetition. They just won't have a good time that's all.

I think in terms of work experience that we do, for the future certainly in terms of my individual role because I'll be working with a wider variety of subjects and people, I think the way that we approach work experience students will have to be a bit more formal than it is now. And obviously potentially having, kind of, pre-made work experience projects, that when we get a request in, we could potentially give them a list and ask them to tick which projects they wanted to do while there where here. I think that would probably get rid of the, kind of, last minute ad-hoc things that we have to sort out.

Is Year 10 work experience worthwhile, something that should be continued?

All outreach officers felt that work experience is very worthwhile, for themselves and the students. For students in terms of gaining more knowledge on what they need for a STEM career, a better idea of whether this is the area and career they want to go into. It is felt that it is especially important for STEM subjects, that students realise what they need and become inspired.

Well it's a lot of hassle for schools that's for sure. Well, I obviously do think it's worthwhile. I wouldn't agree to do it if it wasn't valuable to us. I certainly believe it's valuable to the kids. I can understand why schools see it as a burden because it's a massive administrative load for them and if something goes wrong, you know, they could be accountable. So, in this day and age, it's hard enough keeping them safe on the school site, never mind when you send them off to a company. So, I think there are logistical issues there but as far as I'm concerned I endorse it.

I think, particularly for STEM subjects, that it is really important. Obviously because when they come to making their A Level choices, or A Level equivalent choices, when they leave in Year 11, it's important for them to know that those A Level subjects that they choose to do, will influence what they can and can't do when they apply to university. From informal conversations that I've had with our admissions team, they get quite a few people wanting to do engineering but who don't have the maths or the physics. They maybe have chemistry and biology but not those two key components, which...

And also for those students who aren't really that sure about whether they want to go to university, again it's a key time to, kind of, give them a better understanding of what it is, and what happens at university, and potential careers, and things like that, so.

I think it's... specifically for STEM subjects, it's really important [that they are inspired and engaged].

Value for the department

The value for the department is not seen directly, but there is information that some placement students have later applied and been accepted into one the University STEM courses. However, two outreach officers indicated that the placements are specifically not set up to get the students into their courses – realistic experiences and information are the main thing for the students to get out of the placement, and if they then apply for the course it is seen as a bonus. Maintaining the links with local schools is also seen as a benefit. In one department, work experience checked the marketing materials for suitability for young people, which was seen as hugely beneficial for the department. It is also seen to bring back the enthusiasm in the department about what they are doing, as they are talking with young people about it. Enthusiasm in the students can also rub off on their peers at school when they come back.

> *It's tricky to answer because obviously there isn't a direct impact. As in, we can prove that that student came to us specifically because of that work experience, but in terms of, kind of, general aims and objectives of outreach, so about inspiring young people and dispelling stereotypes and those type of things, it's good. And in terms of letting the wider community know what goes on at university it's good as well. So again we're not just a, kind of, inside a little bubble. I think that's... is probably best.*
>
> *And obviously we have... we have had work experience students who have then applied to the university here, some engineering but some physics as well. Obviously at the moment we don't have the, kind of, systems in place to track those people so it's more done on a... if we, you know, if we recognise them or if we get an email from them, or something like that. But again I think that's something that'll probably change over the next couple of years. So I think in terms of physical evidence or numerical evidence of work experience, we'll have something more definite, fingers crossed, one day.*
>
> *[Do you aim to create an as realistic experience as possible so that the students know what to expect at University later on?] Yes, definitely. We try as much as possible to get them involved with current students so that there's the chance for them to talk to those students about what a typical day in the life of a student is. What you learn about when you come to university and study an engineering degree, career prospects, things like that. And again with the research groups, it's, kind of, giving them that idea that academics in universities, that's a, you know, kind of, separate thing that lives in its own bubble. The research that we do here actually, we work with industry quite a lot, so it's... again it's, kind of, opening minds and dispelling stereotypes and things like that.*

Learning students take from placements

- Seeing the value of science as a subject to study
- A better understanding of the university, of the STEM subject involved
- Enthusiasm about the subject, excitement of what is out there at the moment, awareness of what we do here
- A little experience with research projects
- 'Soft skills' such as team work, social/communication skills, working to deadlines, confidence with communicating with adults, awareness of different levels of initiative so that they are useful to employers in whatever job they do
- Basic office skills

Well, our students will see the value of science as a subject to study, not just in the career options that come out of it, but in the, sort of, the way it opens your mind to things, you know, and that you… because they… what… they always come at a time of year where we've got lots of outreach on as well. So they see us talking about how fantastic science is and they help us set up the outreach and they even will help us to deliver the outreach as well, which is one of the fun bits of it. So I think they start to… they get a different view of science to when they're just sat in a classroom looking at the board, which unfortunately is what a lot of kids do in science lessons these days.

[Social skills] Definitely. [I had a student from Hong Kong who was very shy] At first she'd come in and she'd sit in the office and if you spoke to her she would always reply, but she was a bit shy about asking things. And I, obviously having been a teacher, I spot that and I will pull things out of them.

[Collaborating with other people, teamwork, working to deadlines] Definitely, because I always make sure that there are tasks that I'm giving them that operate in that way. (...) they are always working with someone unless it's one of those tasks where I'm saying to them right I need you to do this PowerPoint presentation, or can you do some research on this.

Hopefully a better understanding of what a university is, what engineering is, that it's not just fixing things, that there's more to it. And being better informed about the curriculum subjects that they're studying. So maths and physics... they don't just have to do maths and physics at university, they can use those subjects to do engineering or computer science or a range of disciplines. Other than that, I guess, in terms of, kind of, soft skills, that we do, we do try and do, you know, research projects, or if there's two or more of them we try and get them to do a project together during their time here. So it's things like team-building and working as a team and communication skills and things like that that we try and, kind of, promote.

Impact on students' futures

That's a bit of an unknown. But hopefully it's given them a better understanding of STEM subjects, university, etc, so.

Students are sometimes seen again when they apply for STEM courses at the University.

Why are we doing work experience for Year 10 students?

Work experience is seen as more important than ever by one outreach officer:

Well, it's probably even more important now than it was in the past, because (...) there are just so many opportunities out there that they don't know about and it's not very easy to get information about these things, because if you go and look up say IBM on the internet you'd have no idea what working for IBM would be like, (...) it's very hard to find out what a job actually is like.

[Because of health & safety as well] in this day and age where it's harder to do that, it's harder for those kids to get that experience, this is a good way of doing it. As long as they're in a well matched placement, I think that's part of the problem, that some of these kids who could be really inspired by a good placement actually aren't getting a placement that's doing them justice. So, that's going to be very, very, difficult to get around that.

And engineering companies are getting, you know, academic students who are going to do engineering degrees, whereas it would be great if we can motivate those kids… I taught some kids who were fantastically gifted, but did no work and didn't care and,

you know, would come out with F's at GCSE. If you could just inspire those kids in year 10, they're the sort of kids that could turn it around and get a C. So going into an engineering company and seeing that actually just with GCSEs, or even if you can get some BTEC or something at college, you could get an apprenticeship, and that could give them something to work to. [If it is difficult to organise then] it's a great opportunity that's going to be missed and it will be the academic students that get the limited number of placements at those companies.

The schools are doing it so we respond to that request. To do work experience any younger is just too scary for youngsters, so it is the right age, clearly, and it can help inspire them onto a path to go and do AS level and end up in a STEM department I imagine. For me and for us it is absolutely worthwhile. The only problem is I wish I could take more, but it is limited. (...) With A level students, they can put their experience on their CV, but they might not come to this University.

Suggestions for improvements

- Money is needed to offer work experience and make sure less academic students also get the opportunity to be inspired by and involved in STEM

I think that [encouraging the less academic students] would be a fantastic selling point for it, but of course these things require support and support really is money, because you've got to pay for people to do it and, you know, I don't know who would pay for that. Certainly not this Government, so. I think you might end up where they start restricting the placements because the kids that don't seem to care, they won't bother. Like I said, they'll have to deal with those kids on school site for two weeks.

Well, and that's the sort of thing which I could see being eroded under this Government because, you know, if you're a head teacher and you're being told your budget's being cut, then you turn around to somebody and say, well we won't be able to afford to do work experience, you know, that might be one of those things I say, well that's okay then, don't do it. So, through the back door we could end up losing this, but I do think it's very valuable.

Role of Universities

I think there should be a dialogue because I think the schools might have misconceptions about what goes on in the university, to be honest. I mean, when you're a student at university, if you do a PhD you don't get a sense of how a university works really. It's… I didn't… until I started working here and saw everything behind the scenes, that's when I understood how universities work.

And the university might, you know, the UK office for outreach and recruitment, or whatever they're called and what they will be called in the future, there might be a role for them in coordinating this in the future. The university might see this as ticking a box for widening participation or something. So, you know, in terms of justifying fees and things like that, that's going to be important, so.

Summary of findings

Student Questionnaire

Of the 76 students taking part in the questionnaire, almost all (94.7%) felt they had a say in their choice of placement, but one out of five had not deliberately chosen a STEM area for their placement. Almost a quarter of the students wanted a placement they couldn't get, mostly for reasons of health and safety and a lack of placements (they either missed out or the company no longer offered placements, sometimes due to the recession).

More than half of students had found their placement through family and almost 20% through contacting a company they were especially interested in. Parents/family members were also most often the ones who helped the students with their applications. 13.2% of students felt that they had received too little information about work placements and 17.1% felt they had not received enough support in choosing and applying for the placement.

Most (86.8%) students were 'quite interested' or 'very interested' to go on a placement. Similar percentages of participating students were pleased (quite or very) with their placement once they knew where they would be going, and found their placements useful and interesting.

However, 14.5% did not find their placement very, or at all relevant and 10.5% did not find their placement very, or at all enjoyable. Significantly, more than a third of students (35.6%) did 'not at all' or 'not very' find their placements challenging.

19.7% of pupils felt their placement had 'not very much' or 'nothing at all' to do with STEM and only 15.5% of students said that their placement had 'completely' met their interests in STEM. 28.9% said it met these interests 'somewhat'.

On a positive note, 42.1% of students say their interest in a STEM career has increased since their placement. Many students in the sample had engineering placements, and the STEM subjects that were most often named by students when asked which of these subjects their placement most related to were engineering, science, technology and maths.

The skills that students most often indicate that they have learnt are the general skills of communication skills, learning about responsibility, and team working skills (in other words, the so-called 'soft skills').

What the students were hoping to learn was centred around finding out more about what working in that specific place of work and company would be like, for future careers; generally finding out about what it is like to work; how a business runs; 'soft' skills.

19 out of the 76 students said that their placement did not link very much to their STEM subjects at school, which is 25%. This might not necessarily be a negative finding as sometimes it was indicated that the placements were much more advanced than what was done at school, for example.

Student Focus Group Meetings

Overall, the views and feelings expressed about STEM work experience during the focus group meetings were very positive. Students seemed to find found it very worthwhile and learning in many areas was reported, both general and personal skills (relating to colleagues, team work, being in a work setting, working 9 to 5, learning about business) as well as specific STEM-related learning. There was great enthusiasm expressed about the placements, and disappointment sometimes to have to go back to school. Many students reported they had been given more responsibilities than

expected, although for some, Health & Safety was felt to have been a hindrance as to the activities they could do in their placements.

The links with STEM areas were often very clear, but it was not always easy to link the learning at the placement back to STEM subjects in school; sometimes because what happened at placements was much more advanced and sometimes it was very different from the STEM curriculum at school. Quite often however, students said that they came back to school with a much stronger sense of what they needed to do know in terms of work focus, motivation, and options. They felt more motivated than before to go into a STEM area later on and more informed/aware of which specific area within STEM they wanted (not) to go into.

Students who had one week placements were not very pleased about this and felt they lost out on many opportunities because of this, in terms of the placements they could get and the learning they could take with them from their placements.

Generally students had felt supported with applying and finding their placements, and during the placements.

Disappointments expressed were mostly in terms of the activities they could (not) do and the reality not completely matching their expectations in that sense: some would have liked more science-related, some more hands on activities, some felt Health & Safety was taking up too much time, some had not been prepared enough in bringing gear so certain activities could not be done, some had not got the placement they wanted etc. Suggested improvements related to Health & Safety preparation beforehand, and the placement being more prepared for the students' arrival.

Interviews with Work Experience Coordinators in schools, companies, and University STEM Departments, and with science teachers in schools

Relationships between schools and companies appear to be hardly existent when it comes to work experience and especially some companies expressed great regret about, and need for this. Within schools, there is reportedly not much collaboration between the STEM departments and the work experience coordinators about STEM work placements, and time constraints are given as a possible reason for this.

All of the company work experience coordinators interviewed reported that no formal advice on what constitutes a good placement was taken, but that they were flexible in activities they could offer to the student on the spot to ensure students had an interesting and challenging placement; also it was felt they had a good sense about whether the placement had been good or not through their feedback procedures. Some felt it would be helpful to have guidelines and criteria. In one University STEM department, the suggestions sent through by Solent EBP were used as guidelines, together with the interests of the students.

With regard to whether placements are sufficiently challenging, students appear to be are given subject-specific jobs where possible, but also some mundane jobs such as data entry or photocopying, as these are also part of many of the jobs in the company and it is felt that it is beneficial for the students to get as realistic expectations of the job as possible. In one company, mundane jobs were specifically not given to the students as they wanted to inspire the students. Most companies also give the students projects to do with deadlines or end presentations. A range of activities is usually offered.

The placements at the University STEM departments appear to be very much bespoke, depending on what the students are interested in and good at and so they can help out and relieve the staff, to give them a good sense of what the undergraduate course is about and what the work is like. Links

with the GCSE STEM curriculum are reportedly not explicitly made, but links with the undergraduate curriculum are, as one of the aims for the departments is that the student comes away with a realistic idea of what studying and a career in the subject is about.

Procedures seem to be in place in all of the schools interviewed, although sometimes more formal than others. In all schools, students are asked to keep diaries or complete a booklet that they have been given. All students are visited during their placements, but these visits are reported to be short due to time constraints. Some schools have tasks for students when they get back, but not necessarily in STEM subjects.

Some companies evaluate informally, others sit down with the student and someone from school, depending on the school. The evaluation within the department is usually done on an informal level. In some companies the students are asked to keep diaries, or forms are filled in, whilst informal evaluation is happening throughout the duration of the placement. There seems to be scope for more formalised evaluation processes in any improvement of STEM work placements for Year 10 students.

Evaluation at the University STEM departments tends to happen more informally afterwards with a chat, but one interviewee mentioned that procedures will be more formalised across the University in the near future and that hence she has also started to formalise processes, such as the evaluation of the placement experiences.

What works well and doesn't work well in placements

- It can be hard for schools to track down students for schools sometimes as some links with companies are reported to be quite weak; conversely, some companies find it hard to get hold of the relevant person at school in the case of issues with a student during their placement
- The age of the students is becoming more of an issue due to increased health and safety checks; it is therefore becoming more difficult for 15 year olds to go out and do work experience.
- Sometimes students don't organize a placement until the last minute and then they end up with something that is not very useful. Time constraints for teachers are reported as an issue in helping all students find appropriate placements. Generally, STEM students are seen to be particularly motivated and keen to go on a placement
- Companies feel that it is important to keep students busy and to give them a variety of activities, things which challenge them and which take a reasonable amount of time; giving students a project with a deadline and some form of presentation at the end of the placement seems to work well.
- Honest communication from the side of the company about what is and isn't possible during the placement is important, as is honest communication from the student, for example about special needs, so that the right kind of activities can be arranged for
- University STEM departments feel that students with strong interest, and good grades and a knowledge of science are needed for their placements
- Students need to be kept busy with a variety of things during their placements at the University STEM departments, and the placement needs to be flexible for other things that come up for as far as possible
- In the future, work experience at the University will be more formal than it is now; and there is an increasing amount of paperwork which makes offering work experience more difficult

Student learning

- Placement experiences represented crucial learning about the world of work. Students grow up a little; they come back more focused as to what they need (to do) for their future career of choice. Even if the placement wasn't very interesting for the student, this can be a positive experience as they come back into school knowing what they don't want to do.
- Student learning at companies is seen to take place in the areas of: the basics in the world of work; time keeping and being on time; taking initiative; interacting with employers, colleagues and customers (rather than only peers), meeting new people; developing social and communication skills; learning respect for others; learning how to write in proper English; seeing people enthusiastic about their working environment; developing realistic views about STEM work, especially in the case of engineering where there exist many misconceptions amongst students about the types of work involved.
- The University STEM departments' work experience coordinators reported the following student learning: seeing the value of science as a subject to study; a better understanding of the university, of the STEM subject involved; enthusiasm about the subject, excitement of what is out there at the moment, awareness of what is done in the department; some experience with research projects; 'soft skills' such as team work, social/communication skills, working to deadlines, confidence with communicating with adults, awareness of different levels of initiative so that they are useful to employers in whatever job they do; basic office skills

Links with STEM subjects in school

Companies to not report to make any special effort to make sure the placements are STEM related. Sometimes this is because any activity would naturally be STEM-related due to the nature of the work place. There might a be a case for letting schools write recommendations as to the kinds of activities that would be useful for students in STEM-related placements, as some companies feel they can and would like to improve in this aspect.

Suggestions for improvements

- Limitations put on placements due to Health and Safety measures, especially for 15 year olds
- More links for schools with local companies offering STEM placements, especially engineering
- More communication and interest from the schools towards the companies, and more links between schools and companies about/around:
    - the placement and the student on the placement
    - involvement from the school and parents in the STEM activities
    - Structure and timing
    - links made with the curriculum (closing the gap between what the student does at school and the STEM content of activities organised at the placement)
    - selection criteria for students as to what subjects they need to be studying
- Companies meeting work experience coordinators/careers advisors at school, talking with them face-to-face about integrating activities with the curriculum
- Making use within the curriculum of what the company can offer in terms of ideas, activities and resources, making the curriculum learning more linked to the real world
- Payment for companies for doing work experience, as it takes time to organise.

- In one of the university departments, it is felt that money is needed to offer work experience and make sure less academic students also get the opportunity to be inspired by and involved in STEM.
- Schools also report that funding for placements is an issue

Are STEM related placements worthwhile experiences?

Almost all work experience coordinators feel that work experience is very worthwhile and important:

- It helps raise aspirations in the students
- It makes students more self-confident as they experience what things are like in the wide world
- Questions about whether students have to be taken out of school for their work experience or whether it could also be done in the school holidays? Supervision from teachers is very limited anyway. Is it not a waste of a fortnight of school as the curriculum is already very tight?
- Some question whether Year 10 is the right age to do work experience.
- In universities: students gain more knowledge on what they need for a STEM career, a better idea of whether this is the area and career they want to go into. It is felt to be especially important for STEM subjects, so that students realise what they need and become inspired.
- Work experience is seen as more important than ever by one outreach officer, because of the variety of opportunities available nowadays and the difficulty of finding information about them.

Ways in which Higher Education could be involved in the Year 10 STEM placements

- Universities could help track back what is needed academically to do certain degrees and jobs, so that students are not oblivious to what they need at GCSE level for their further education.
- Universities can provide information to students about the earning potential of certain jobs and careers, so that tuition fees might be less of an issue
- Universities could help by communicating to students what they are looking for, for a student to come in and have experience in.
- Universities could help schools and colleges find placements with the right kind of activities in terms of what they would be looking for in a student; perhaps by laying down a list of criteria which placements should fulfil, so that companies/University STEM departments know what that student should be experiencing in different activities they undertake during their placement.
- Universities could inspire the pupils more according to one STEM teacher, and work experience in their labs could be valuable as well.
- One company work experience coordinator saw great opportunities in working together with the University to help them teach students more of the skills they will later on need in the jobs; helping to teach the subject their company works in in a more holistic way, as many subject areas are integrated into it.
- In other companies the role for HE could not be seen clearly as it was felt that students at this stage need to see more about academic and undergraduate student life in order to find

out whether it suits them, and that work experience comes second to this in deciding about a career path, as they are still only Year 10 students. It is felt that it is more for the University STEM outreach departments to work with schools about what studying STEM subjects at University is all about.

- More dialogue between universities and school is felt to be needed because the schools might have misconceptions about what goes on in the university as it is difficult to get a sense of how a University works unless you actually work there. The schools would have to ask questions and then make suggestions, rather than the school coming and saying, this is what we want.

Conclusion and Recommendations

The main purposes of this research were:

3. To identify positive and negative impacts of STEM-related work experience as perceived by pupils, teachers and placement organisations.
4. To explore how the HE sector could assist in addressing shortcomings to encourage students to consider STEM-related subjects at university.

Below, the most important findings of the research with regard to these main point are summarised.

Positive aspects of STEM-related work experience

Almost all work experience coordinators felt that work experience is very worthwhile and important:

- It helps raise aspirations in the students
- It makes students more self-confident as they experience what things are like in the wide world
- In universities: students gain more knowledge on what they need for a STEM career, a better idea of whether this is the area and career they want to go into. It is felt to be especially important for STEM subjects, so that students realise what they need and become inspired.
- Work experience is seen as more important than ever because of the variety of opportunities available and the difficulty of finding information about them.

Most students valued work experience placements highly as well, and found their placements useful and interesting. Often students said that they came back to school with a much stronger sense of what they needed to do know in terms of work focus, motivation, and options. Around 40% of students surveyed said that their interest in STEM had increased as a result of their placement. The skills that students most often indicate that they have learnt are the general skills of communication skills, learning about responsibility, and team working skills (the so-called 'soft skills'). Many students in the focus group meeting reported they had been given more responsibilities than expected, although for some, Health & Safety was felt to have been a hindrance as to the activities they could do in their placements.

Negative aspects of STEM-related work experience

About 1 in 7 students surveyed did not find their placement very relevant and 1 out of 10 did not enjoy their placement. Importantly, more than a third of students did not find their placements very interesting.

Only a little more than half of the students felt their placement had matched their interest in STEM and 1 out of 4 students said that their placement did not link very much to their STEM subjects at school. It was not always easy for students to link the learning at the placement back to STEM subjects in school.

In the student focus group meetings, some students expressed disappointments with regard to Health & Safety measures limiting time and activities during their placement, or otherwise not being able to do things they had hoped they could do. Some students also felt the company of placement had not been sufficiently prepared for their arrival.

The age of the students is becoming more of an issue due to increased health and safety checks; it is therefore becoming more difficult for 15 year olds to go out and do work experience.

Relationships between schools and companies appeared to be lacking with regard to work experience and especially some companies expressed great regret about, and need for this. Within schools, there seemed to be little collaboration between the STEM departments and the work experience coordinators about STEM work placements, and time constraints were given as a possible reason for this.

Schools sometimes found it hard to track down students as sometimes the links with companies are quite weak; conversely, some companies find it hard to get hold of the relevant person at school in the case of issues with a student during their placement

Time constraints for teachers are reported as an issue in helping all students find appropriate placements. Generally however, students interested in STEM careers are seen to be particularly motivated and keen to go on a placement.

In the future, work experience at the University will be more formal than it is now; and there is an increasing amount of paperwork which makes offering work experience more difficult.

Ways in which Higher Education could be involved in the Year 10 STEM placements

Universities could help track back what is needed academically to do certain degrees and jobs, so that students are not oblivious to what they need at GCSE level for their further education. Universities can also provide information to students about the earning potential of certain jobs and careers, so that tuition fees might be less of an issue.

Universities could help schools and colleges find placements with the right kind of activities in terms of what they would be looking for in a student; perhaps by laying down a list of criteria which placements should fulfil, so that companies/University STEM departments know what that student should be experiencing in different activities they undertake during their placement.

One company work experience coordinator saw great opportunities in working together with the University to help them teach students more of the skills they will later on need in the jobs; helping schools to teach the STEM subject area in which the company works in a more holistic way.

In other companies the role for HE could not be seen clearly as it was felt that students at this stage need to see more about academic and undergraduate student life in order to find out whether it suits them, and that work experience comes second to this in deciding about a career path, as they are still only Year 10 students. It is felt that it is more for the University STEM outreach departments to work with schools about what studying STEM subjects at University is all about.

More dialogue between universities and school is needed because the schools might have misconceptions about what goes on in the university. The schools would have to ask questions and then make suggestions, rather than coming in and saying, this is what we want.

Recommendations

"Links" seems to be the key word when it comes to recommendations for Year 10 STEM work experience placements:

- Improving links between Universities, schools and companies about:
    - What kind of student is required for particular placements;
    - The kind of activities companies and STEM departments (can) offer, and the kinds of environments they are, so that schools can make more suitable/appropriate requests towards activities they think would be useful during the placement, and send the right students, but also inspire students about the world of STEM work
    - What is happening with the student during the placement
    - More formalised evaluation processes with all parties involved
    - Better links between University STEM departments and schools/students about what Universities require from students at undergraduate level, and helping students backtrack what they therefore need at GCSE level
- Links between the STEM content and learning at the placement and the STEM curriculum content at school – making these more explicit to students
- Involving companies in how to teach STEM subjects more 'holistically' at school and in a way that is more connected to the real world.

Furthermore, a closer look needs to be taken at how students can be appropriately challenged at their STEM placements, as students reported this as an issue.

It also seems that funding is an issue for all parties involved, which needs to be addressed if STEM work experience placements are to be improved or even to be remained at the same level.

The right balance needs to be found in the level formalities that need to be taken care of with regard to work placements – the amount of paperwork that needs to be dealt with by the work experience coordinators in companies before the placement is sometimes seen as too extensive and unnecessary; on the other hand the evaluation of the placement could become more formalised, and companies could take more advice from guidelines on what constitutes a good placement.

It would be valuable to carry out further research into what would be a suitable "challenging" STEM placement for students as it was only a quantitative finding from the survey used in this research that more than a third of students did not find their placement sufficiently challenging.

Furthermore, bringing the people involved in STEM work experience in schools, companies and University STEM departments together to explore useful ways for collaboration in order to improve STEM placements would be important. This process could be investigated via qualitative research methods so that recommendations then can be made for other University catchment areas.

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Appendices

Appendix 1. Student Questionnaire

Students' Experiences of Work Experience Placements in Science, Technology , Engineering and Maths

Thank you for filling in this questionnaire! It will take about 15 minutes to fill in. We are very interested to find out how you feel about your work experience placement. Please be as honest as you can.

Your answers are completely anonymous and confidential. We will use students' answers to try and improve future placement experiences, so your answers are very valuable.

About you

1. Your age: …… years old

2. Your gender (please circle): Female / Male

3. Where did you do your placement?

4. What kind of things did you do on your placement?

5. How long was your placement?

- 1 week
- 2 weeks
- 3 weeks
- Other, please say how long: ……..

6. Which of the following subjects are you currently taking? Please tick all that apply:

☐ Science GCSE (double award)

☐ Biology GCSE

☐ Chemistry GCSE

☐ Physics GCSE

☐ Maths GCSE

☐ Engineering GCSE, please say which kind of engineering: ……

☐ Technology GCSE, please say which kind of technology: ……

☐ Psychology GCSE

☐ BTEC Introductory in Applied Science

☐ BTEC First in Applied Science

☐ BTEC First in Engineering

☐ BTEC First in Technology

59163

7. How interested are you in a career in science, maths, technology or engineering? (please circle one)

very interested	quite interested	not very interested	not at all interested

8. Which of these subject areas are you most interested in?

About the Application Process for a work placement

9. Did you have a say in your choice of placement?

YES	NO

(please circle)

10. How did you find your placement? Tick all that apply:

☐ Through school, please say who helped you find it:……

(for example 'science teacher', 'form tutor', 'work placement coordinator' etc.)

☐ Through a website

☐ Through friends/family

☐ Through contacts with a (local) company

☐ I contacted a company I was especially interested in

☐ Through Connexions

☐ Through another agency, please say which: ……

☐ Other, please say: ……

59169

11. Did you want a placement that you couldn't get?

YES	NO

(please circle)

12. If you have said 'Yes' to question 11, please explain which placement you wanted to do and what happened:

13. Who helped you with your application for a placement? Tick all that apply:

☐ Teacher, please state the subject of the teacher: ……..

☐ form tutor

☐ year head

☐ careers person in school

☐ work experience coordinator

☐ agency outside the school, please say which: ……

☐ parent or other family member

☐ Other, please say who: ……

59175

14. How much information about work placements did you receive? (please circle one)

not enough	about right	too much

15. How much support did you get in choosing and applying for the placement?

not enough	about right	too much

BEFORE your placement

16. How interested were you in going on a work experience placement? Please circle one:

very interested	quite interested	not very interested	not at all interested

17. Did you choose to do your work experience in the area of Science, Technology, Engineering or Maths?

YES	NO	(please circle)

18. Which of these subject areas were you particularly interested in?

19. How pleased were you with the placement you were going to go on?

very pleased	quite pleased	not very pleased	not at all pleased

20. What were you hoping to learn during/from your work experience placement?

DURING your placement

20. What did you learn during your placement?

21. Was your placement:

	Very	Quite	Not very	Not at all
Useful?	○	○	○	○
Interesting?	○	○	○	○
Relevant?	○	○	○	○
Enjoyable?	○	○	○	○
Challenging?	○	○	○	○

22. How much did your placement have to do with science, technology, engineering or maths? (Please circle one)

A lot	Quite a lot	Not very much	Nothing at all

22. Which subject do you think it had most to do with?

23. How far did your work experience meet **your interests** in science, technology, engineering or maths? (please circle one)

Completely	To a large extent	Somewhat	Not very much	Not at all

24. What links did your placement have with science / maths / engineering / technology topics at school?

25. Since your placement, has your interest in a career in science / maths / engineering / technology:

Increased?	Remained the same?	Decreased?

(Please circle one)

26. Which skills have you learnt in your placement and how much?

	A lot	Quite a lot	A little	Not very much	Nothing at all
Responsibility	○	○	○	○	○
Team working	○	○	○	○	○
Business & customer awareness	○	○	○	○	○
Problem-solving	○	○	○	○	○
Communication	○	○	○	○	○
Application of numeracy	○	○	○	○	○
Application of IT	○	○	○	○	○

27. Any other skills you feel you have learned?

28. Is there anything else you want to tell us about your work placement experience?

Thank you very much! ☺

Appendix 2. Questions used at interviews and focus group meetings

2.1 Interview Questions for School Work Experience Coordinators

1. What is your role as Work Experience Coordinator generally?
2. How do you help students find work experience placements in Science, Technology, Engineering, and Maths (STEM) particularly?
3. Are you involved in making sure students find *interesting* and sufficiently *challenging* placements in STEM? In what way?
4. In helping students find STEM placements, do you have and make use of contacts with:
    a. Local companies
    b. STEM ambassadors
    c. Other?
5. Do you work together with the STEM departments and/or careers adviser in order to help students find STEM placements?
6. Are you involved with the application processes? In what way?
7. Do you help students prepare for their placements? In what way?
8. Do you visit students at their placement?
9. At what point in the year are Year 10 students at your school currently going on work experience? What are your views on the timing of this?
10. What are your views on:
    a. What works well/doesn't work well with STEM placements in:
        i. Finding them
        ii. Preparing for them
        iii. The actual placement experience
        iv. The learning from the placement and reflection afterwards
    b. What should be improved?
11. Do you find work experience in STEM is currently a worthwhile activity for young people?
    a. Why work experience?
    b. Do you feel students enjoy it?
    c. Do you feel they benefit from it?
    d. What is your perceived impact of STEM work experience on students' futures? (their aspirations, motivation, attitudes to STEM, realistic expectations of STEM related careers)

e. If you do not think it is very useful, how could it be made more worthwhile?

f. Should Work Experience happen or not? Do you think it should be continued in your school?

12. What would be the most ideal set-up for STEM work placements and who could/should assist with this?

    i. Within the school

    ii. Outside the school

13. Should Higher Education be involved and in what way?

14. Any other comments?

2.2 Interview Questions for School STEM Teachers

1. What is your role in helping students acquiring STEM work experience placements?
2. In what way do you help students find the most interesting/challenging placements in STEM?
3. In helping students find STEM placements, do you have and make use of contacts with:

    a. Local companies

    b. STEM ambassadors

    c. Other?

4. Do you work together with the work experience coordinator/careers adviser in order to help students find STEM placements?
5. Are you involved with the application processes? In what way?
6. Do you help students prepare for their placements? In what way?
7. Do you visit students at their placement?
8. Do you have activities in your class after students have come back from work experience to reflect on their learning?
9. At what point in the year are Year 10 students at your school currently going on work experience? What are your views on the timing of this?
10. What are your views on:

    a. What works well with STEM placements in:

        i. Finding them

        ii. Preparing for them

        iii. The actual placement experience

iv. The learning from the placement and reflection afterwards

b. What doesn't work well with regard to these aspects?

c. What should be improved?

11. Do you find work experience in STEM is currently a worthwhile activity for young people?

a. Do you feel students enjoy it?

b. Do you feel they benefit from it?

c. What is your perceived impact of STEM work experience on students' futures? (their aspirations, motivation, attitudes to STEM, realistic expectations of STEM related careers)

d. If you do not think it is very useful, how could it be made more worthwhile?

e. What would be the most ideal set-up for STEM work placements and who could/should assist with this?

i. Within the school

ii. Outside the school

f. Should HE be involved and in what way?

g. Should WE happen or should it NOT happen?

11. Any other comments?

2.3 Interview Questions for Company Work Experience Coordinators

1. What is your role as Work Experience Coordinator in the company generally?
2. How many students do you get annually for Year 10 work experience? How long are their placements usually?
3. How do usually get the students? How do you select them? Which kinds of students do you prefer and which students would you turn down?
4. Do you work together with the STEM departments and/or careers adviser in schools in order to get the 'right kind' of students for your placements?
5. Are you in any databases schools use to help students find placements? I.e. Wexonline
6. Do you have any 'special' contacts/relationships with particular schools with regard to year 10 STEM placements?
7. How do you make sure students are prepared for their placements?
8. How do you prepare/train the employee in receiving the student?
9. In preparing the placement, have you taken any advice on what constitutes an effective work placement?

10. How do you make sure STEM placements are sufficiently *interesting* and *challenging* for students? What kind of activities do you aim to offer?

11. Do you work together with the STEM departments and/or careers adviser in schools in order maximise STEM placement experiences for students? In what way?

12. What are your views on/experiences with students' motivations to go on, and attitudes during their placements?

13. Do you evaluate the process in any way afterwards?

14. What are your views on:

    a. What works well/doesn't work well with Year 10 STEM placements? in:

        i. Getting the right students

        ii. How prepared students are for their placement in your company

        iii. How successful the actual placement experience is for the company and the student (in your view)

        iv. The learning students take from the placement and reflection afterwards

        v. How much you are able to offer in terms of STEM-related activities and learning

        vi. Any factors you feel prevent the placement from being as successful as it could be

    b. How could things be improved?

15. Do you find Year 10 work experience in STEM is currently a worthwhile activity for young people?

    a. Should Year 10 (2 week) Work Experience happen or not? Do you think it is something that should be continued?

    b. Do you feel students enjoy it?

    c. Do you feel they benefit from it?

    d. Is it worthwhile for your company / branch?

    e. What is your perceived impact of Year 10 STEM work experience on students' futures? (their aspirations, motivation, attitudes to STEM, realistic expectations of STEM related careers)

    f. If you do not think it is very useful, how could it be made more worthwhile?

16. What would be the most ideal set-up for Year 10 STEM work placements and who could/should assist with this?

        i. Within the school

        ii. Outside the school

17. Should Higher Education be involved and in what way?

18. Any other comments?

2.4 Interview Questions for University STEM Department Work Experience Coordinators

1. What is your role in coordinating (Year 10) STEM Work Experience in your department?
2. How many students do you get annually for Year 10 work experience? How long are their placements usually?
3. How do usually get the students? What are selection criteria?
4. Do you work together with the STEM departments and/or careers adviser in schools in order to get the 'right kind' of students for your placements?
5. Are you in any databases schools use to help students find placements? I.e. WEXOnline
6. Do you have any 'special' contacts/relationships with particular schools with regard to year 10 STEM placements?
7. How do you make sure students are prepared for their placements?
8. How do you prepare/train the employee in receiving the student?
9. In preparing the placement, have you taken any advice on what constitutes an effective work placement?

10. In your view, and taking into account undergraduate student admission requirements/selection criteria, what constitutes an effective placement?
11. How do you make sure STEM placements are sufficiently *interesting* and *challenging* for students? What kind of activities do you aim to offer?
12. Do you work together with the STEM departments and/or careers adviser in schools in order maximise STEM placement experiences for students? In what way?
13. What are your views on/experiences with students' motivations to go on, and attitudes during their placements?
14. Do you evaluate the process in any way afterwards?
15. What are your views on:
    a. What works well/doesn't work well with Year 10 STEM placements? in:
        i. Getting the right students
        ii. How prepared students are for their placement in your department
        iii. How successful the actual placement experience is for the department and the student

iv. The learning students take from the placement and reflection afterwards

v. How much you are able to offer in terms of STEM-related activities and learning

vi. Any factors you feel prevent the placement from being as successful as it could be

b. How could things be improved?

16. Do you find Year 10 work experience in STEM is currently a worthwhile activity for young people?

    a. Why are we doing it? Should it be continued?

    b. Do you feel students enjoy it?

    c. Do you feel they benefit from it?

    d. Is it worthwhile for your department / branch?

    e. What is your perceived impact of Year 10 STEM work experience on students' futures? (their aspirations, motivation, attitudes to STEM, realistic expectations of STEM related careers)

    f. If you do not think it is very useful, how could it be made more worthwhile?

17. What would be the most ideal set-up for Year 10 STEM work placements and who could/should assist with this?

    i. Within the school/company/department

    ii. Outside the school/company/department

18. Should Higher Education be involved and in what way?

19. Any other comments?

Appendix 3. Students' answers to open text survey questions

Placement activities described by students:

- Designing/drawing on computer
- I assisted students with their experiments and typed office memos etc
- I help younger children with their dance
- Data base work, looking at planes
- Created a research product, went out and trawlered to the Solent, researched the BP oil spill
- I built a 666 timer box. I learnt about different tools used in making a satellite. I saw the different work places.
- Cargo control, ship stability, engine maintenance, navigation, water ballast control.
- Simulator - pilot and helped with strips
- Use excel to input data, work with customers and occasionally learn to work and use the tills
- I washed equipment and used complicated machines
- fixing computers
- Call outs, fixing bathroom
- CAD/Auto CAD on computer
- made tea, stock counts and mail merged letters
- make keys and filed orders
- Editing and filming
- help the music dept
- part of everything at the navy base/every area of the navy that we visited
- work on helicopters
- look at the weapons they use on ships
- engineering and business admin
- worked hard, helped paint, built thing etc
- looked at how they make things and helped out
- made a PowerPoint and learnt how to put equipment together
- prepared the security stickers; helped do the daily inspections; assisted in fixing the planes
- secretarial work, filing, phoning contacts, gathering information
- Administration role since I was not 16. I also went into the labs, looked at bone marrow down microscopes and saw different areas of the hospital.
- I did 'off-sighting', gathering documents, placing in box, organise for them to be taken off premises. Watched how computer programmes were used. I helped children in lessons, helped teachers etc.
- take co2 reading and emission, also helped on repairs
- help at events/sort money/phone companies
- write reports, photocopy, file, visit bure hole
- fabricated windows, site surveying, price estimation
- built pumps, tested pumps, fitted engines, tuned engines, filled pumps
- programming computers; writing and fixing software; taking apart desktops
- Making hot drinks, writing training manuals, operation automotive cathe..?
- update accounts; went in meetings; charity day; billing companies
- prepping doctor files; tracking files

- assisted the vet nurses, watched operations, helped vets in consulting rooms, took dogs for walks, cleaned kennels+ the theatre, held puppies, ran errands, made tea + coffee, washing up
- research/helped on the boat
- research, help with various tasks (e.g. helped on a research vessel)
- assisting vet nurses, watching operations, watched consults, cleaning and washing, held animals, making drinks
- fix and improve documents using IBM software for an IBM product (Websphere MQ); took apart a computer; sat in on various meetings
- Made a gun mounting model, went on a tour around the yard, saw the harriers? being built
- mainly work in the shop but some work in the dispensary
- CAD designs, full-on work within the company
- fix cars
- Autotrack and AutoCAD drawings, CAD design. Drawing drainage systems and looking at CONTOURS.
- Joinery and CAD
- clean floors, make drinks, and do MOTs
- brick laying, plastering, painting
- Worked with numbers e.g. debts, bills of residents; helped with old people.
- Worked on scaffoldings and travelled around Southampton.
- took things apart and fixed them
- bar work - customer service/office work
- deliveries to offices, firms
- Learned about cement, how it is made and with certain materials to make a certain cement.
- Helping out on the two head start courses and help a little bit on the small piece course.
- designing a car park, taking photos of a plot, making pages for their new marketing book
- service MOT and general repairs
- Stock taking - counting mechanical parts. Office work
- worked on wind sonics; cleaned up wind sonics; built wind sonics; filed worksheets; tested equipment; made sure the staff were doing the right things
- Boiler fitting, pipe fitting, boiler maintenance
- learn mechanics, practicals experience
- Helping to draw plans and fit electrics
- I worked with people
- I shadowed various different engineers helping and learning what they do on a day to day basis I also learnt a lot about the refinery
- Worked with the people in the control building, mechanics, electricians and instrumentalists
- Helping out, doing office based work and attending meetings
- Chemical analysis into suspect sub stages and articles
- Used programmes such as Sketchup 7, created architectural designs by hand of building. I made a small scale model on Sketchup 7 of Gilford
- site visits, in the designer studios working/practising on a few drawings using CAD
- Filed case studies, helped extend the M25 by calculating where safety barriers are going to go, photocopying, assessed how environmentally friendly planned bridges on the M25 are.

- Made blister packs; served customers; checked prescriptions; checked deliveries.
- shadowing PhD Students and reading their protocols; a project on schizophrenia and other mental illnesses
- Watch procedures: root canals, extractions, denture fitting, x-rays, cleaning; Admin work: IT & manual; answering the phone. Assessing dental health. Making tea & coffee
- admin; shadowing doctor

STEM subjects students are most interested in

Engineering (26)
Technology (13)
Maths (12)
Science (12)
Biology (4)
Chemistry (4)
Medicine (2)
Physics (2)
Psychology (2)
BTEC first in engineering
Product design
Geology/physics

What the students were hoping to learn

- about structured engineering
- I was hoping to learn more about chemistry (which I did), about university life and about office conditions
- How a small business runs.
- What oceanography is and any other jobs associated with the sciences/maths
- About the company, what work they do, what it is like to do that form of work.
- I was willing to learn any and everything. It was the experience that I was looking forward to.
- How air traffic works and what it looks like
- People skills as well as experiencing the 'workplace' environment
- What work was like
- How to fix computers
- Work life and till 5
- more skills
- not much
- more about editing and videoing
- what navy life is like and how the navy works
- don't know
- Not a lot because I didn't know what to expect as it had no relevance to my future career.
- business
- how to be a builder and build things
- wasn't hoping to learn anything just experience work
- wasn't
- To see if I liked this type of job.
- I was hoping to experience the area of work to help me decide on potential career options for the future
- if I would want to work in a hospital environment in the future

- Whether I would enjoy teaching if a career in law didn't work out...
- How to repair cars and find out how MOT's work. Also what to look for in a fault with a car
- running events
- about the different types of engineering and what they include
- whether I was suited for hard labour
- general engineering practices
- computer language
- not much
- about office work, and what sort of work is involved in banking
- insight into the running of a hospital
- about what it is like to be a vet; it would confirm whether I wanted to follow a career in this path
- learn more about oceanography
- a better understanding of jobs involving oceanography
- what it is like to be a vet and whether I wanted to become one
- About the office environment, computer skills.
- About the jobs that I wanted to do when I grow up, and get experience in that field.
- What the different medicines used are and have experience working with the sort of people GPs have to.
- A further understanding and maybe a future opportunity.
- how to fix cars
- Gain some more knowledge on engineering and to use computers for design better.
- the basis for an apprenticeship
- everything about cars and how to sort them
- What work life is like and if I would enjoy that specific bit of work.
- how to cope in working environments and hours
- I don't know, I had to wait and find out
- how to correctly use tools and fix machinery
- customer service skills/people skills
- about cement/business
- more about marine engineering
- what an architect does as a job
- general car repairs, how the engine functions
- life in office work; life in warehouse - parts/names/numbers
- electronic engineering
- Skills within boiler maintenance, pipe fitting etc. What a real job is like.
- practical experience
- how to plan and fit effectively
- what it is like to be an assistant in a dental practice
- I hoped to learn more about the petrochemical business and what a job in a refinery would be like
- how the power station works and what each part plays a role
- loads of info about a career in later life
- Lots on biochemical engineering and testing. How specialist equipment works, is maintained and operated.
- Just to get experience and a idea of what working in an architectural environment would be like.
- what that type of work was like - for future
- What daily life is like for an engineer at work, and whether I could enjoy it.
- team work, responsibility, experiencing real-life situations in a pharmacy

- application of science in society
- To see if I would enjoy and be interested in that particular job.
- I wanted to get an idea about the hospital experience. I also wanted to gain some knowledge of medicine through conversations, documents etc.

STEM subjects the placements were felt to be most related to

Engineering (26)
Science (16)
Technology (14)
Maths (13)
Chemistry (5)
Biology (4)
Physics (2)
IT
None at all

What links did your placement have with science/maths/engineering/technology topics at school?

- n/a
- I wrote a few articles for the chemistry library which were involved with physics, chemistry and maths. It was almost completely linked to science.
- none
- science - non-renewable fuels; fuses; maths - formulas
- marine biology
- Technology: how things work and how to construct them. Science: why things work; Maths: how to theoretically construct objects.
- Maths - navigation; science - stability, navigation; engineering - maintenance
- It uses an array of technology; calculations must be made to make the right decisions
- Not any in particular - if at all.
- none that I can think of
- pipes, gas
- Learning how to draw using engineering tools
- working with machines
- ICT and film studies
- RM and ICT
- engineering/technology
- none
- none
- not many
- no topics
- no topics
- none-bar engineering if we have done it at school
- It linked well with business and economics due to the work completed. Some of the calculations done linked to topics studied in maths
- When it came to walking around the labs, I understood a lot of what was going on.
- Computer technology - HSBC bank offices
- emissions, how components work
- none
- it was an engineering company so it included maths, science and technology.

- materials = polyvinalchloride; solvents, glue (science); price estimation and measuring (maths)
- engineering for the construction
- all about computers
- none
- None! only graphs and basic maths
- based in a hospital so linked to science
- linked a bit with anatomy of creatures in biology, but not much other than that
- not many, it was more specific
- some links to biology, generally more specific
- a bit to biology
- computers
- It had a lot of links and things to do with maths and science at school, and especially technology, because I made a gear mounting model with an electrical circuit.
- Chemistry because of the usage of chemicals and biology because of the fact it is used on people to treat illnesses.
- CAD
- none
- engineering - computer drawings
- It linked mostly with my design and technology lessons.
- maths, engineering, English
- science with how perhaps to make cement
- Maths -working out sums - looking at numbers.
- decorating for decorating products
- taking engines apart
- science (chemicals etc)
- I was in the engineering sciences part so there was a lot in common.
- Maths + engineering
- linked with engineering
- n/a
- engineering/technology
- not much
- learnt a bit about it in science
- Not much just in a small amount of chemistry when making a tooth mould.
- It was a more advanced level but definitely linked.
- none
- The basic school chemical analyses were taken up a huge amount of levels. Everything became computerised, chemical engineering was far more accurate and everything was very precise.
- nothing at all really
- not very much, if any
- I worked at an engineering firm, and as part of my placement I had to do calculations, and I saw how engineers created computer graphics of the things they planned to build.
- chemistry and biology
- physics: how MRI scanner works; Biology: human anatomy (brain) and how drugs affect it)
- SCIENCE: bio, human anatomy, materials + chemicals, technology-procedures + equipment/appliances
- science: diseases (biology); medicine (chemistry)

Any other things you feel you have learnt during your placement?

- A little of banking jargon and how to apply maths in the workplace
- better at making things less complicated
- business
- confidence boost
- follow complicated instructions
- following instructions
- general car repairs
- how to care for elderly (residents)
- How to deal with the public and how to handle animals. I've learnt how to work under pressure and in a hectic environment. And I'm now pretty good with a mop!
- how to fabricate windows
- how to make keys
- how to make tea
- how to turn planes off and lock them
- how to use contours
- How to use the conventional till, electronic, in future retail jobs.
- I also felt I developed confidence when talking to employers
- I feel I have learned more in the 4 subjects mentioned and how they were applied throughout the refinery. It taught me problem solving greatly.
- I feel I have learned more on problem solving and team work
- I have become more confident in myself, asking questions and working with others.
- I learnt quite a lot about time management/efficiency
- It had nothing to do with science as I don't like science.
- Learnt to deal with stressed animals. I am now very good at mopping and general cleaning.
- making a cup of tea awesomely
- n/a
- n/a
- n/a
- none
- none
- none
- nope
- not really
- not really
- nothing
- practical experience
- research skills
- social skills
- taking part in new challenges
- Tapping, cutting and folding metals.
- team building
- The ability to see harder trends in chemicals. That team competition is better than competition in a team.
- the awareness of confidentiality.
- The use of time.
- to be better at communicating with people and working with them
- to get along well with everyone you come across
- travel requirements needed for work
- Use of 3d design software. How to use resistors and read them.

- using phonetic alphabet
- working in an office environment

Any other comments?

- A very good placement, friendly, helpful, educational and involving.
- Brilliant experience. I really want to become a vet.
- enjoyable/fun; taught me a lot about mechanical parts
- grumpy old men work in engineering
- I enjoy science and my work experience really showed me how it can be applied in the real world/work place, though some of the time, the university forgot about me, I really enjoyed my time there.
- I enjoyed going there and meeting the people I met!
- I enjoyed it and made a lot of friends.
- I found my work experience extremely enjoyable and was able to collect some useful experience from it.
- I liked it a lot and hopefully I could work there.
- I really enjoyed it and I wish to do an apprenticeship there.
- I really enjoyed it and it had nothing to do with my change of mind concerning my future for the A levels I chose.
- I really enjoyed working at the school, the sense of achievement you receive is tremendous when you explain something to a pupil they don't fully understand, and then they understand.
- I think you get the picture
- I went there at night and in the day
- It needs to be large
- It was an amazing experience. On the first day a huge Newfoundland had a caesarean - and came out with 11 healthy puppies! I got to hold and rub one as soon as it came out of the womb. I really want to be a vet now.
- It was brilliant!
- it was fun
- it was fun.
- It was good and I learnt a lot.
- it was great fun and a good experience was gained. There was a lot of chips.
- it was the best thing I have done with school
- It was very interesting and it opened my eyes to a work placement in engineering.
- n/a
- n/a
- none
- not really
- People are very moody if you don't do something right or if you get it wrong.
- That it is not a good idea to work with family.
- the Kraken rules
- there were lots of social/charity events there and they meet clients lots
- They have offered me a work placement for when I leave school.
- very enjoyable and education
- very fun good experience and helped me think through my future
- very interesting
- When applying for w/e at a hospital, check the age restrictions for working in each area. If wanting to work at a hospital I recommend immunology where someone worked at the same time as me - they got to do a lot more lab work.