Evaluation of STEM Insight programme

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### About CRAC (The Careers Research & Advisory Centre)

CRAC, registered as a charity in 1964, provides research, expertise and innovation services for all who support career development, at all ages and across all sectors. CRAC’s research and consultancy work focuses on career-related learning, employability development and career transitions, including STEM and researcher careers. CRAC also owns and manages Vitae, a programme of professional, career and personal development for researchers in higher education.
1. **Executive summary**

The STEM Insight teacher placement programme aims to increase STEM career learning and awareness amongst students and enhance schools’ careers provision. CRAC has carried out an evaluation of the programme. This aimed to investigate the impact of the scheme on its participants (teachers), their students and schools/colleges, and host employers. The research was carried out on a purposive sample of 18 placements, through over 40 interviews with participants, senior staff colleagues and their placement hosts (employer or university). The sample included teachers from a range of STEM disciplines and other educators, different types and locations of school/college and a range of hosts. Information from the interviews was supplemented with data collected by STEM Learning from scheme participants including feedback questionnaires.

**Main findings**

- Overall, the STEM Insight scheme is highly valued by teachers and other educators, their schools and their placement host employers: all the participants would recommend it to others while all the hosts wish at minimum to sustain their involvement in the scheme.
- Many of the desired outcomes and impacts are being achieved but the extent of those outcomes varies for different teachers.

**Direct impacts on STEM career learning in the classroom and at school level include:**

- All participants reported increased understanding of current STEM jobs and career pathways and all were now more passionate advocates for STEM careers and giving better-informed personal advice and guidance on progression and potential career choices to students and parents.
- The programme increases the range and extent of schools’ engagement with STEM employers, particularly when placement hosts were locally based and were also interested in follow-up engagements.
- The increased STEM careers awareness amongst teachers and more contacts with employers result in improved STEM careers support outside the classroom, which enhances overall careers provision in school.
- 80% of teachers (12/15) improved their understanding of how to contextualise the curriculum with cutting-edge STEM knowledge and real-world applications.
- Teachers were in a better position to embed career information within their curriculum teaching and some (5/15) had already changed how they teach in this respect, supporting development of employability and practical skills.

**Observed ‘mediated’ (or indirect) impacts on STEM career learning include:**

- 80% of teacher participants (12/15) reported improved STEM subject and pedagogical understanding and increased confidence and enthusiasm for STEM.
- All participants reported increased teaching competence, and the more experienced teachers reported enhancements to teaching quality and subject leadership.
Increases in overall enthusiasm, motivation and competence were widely recognised, with 5/15 teachers reporting that the programme would enhance their likelihood of remaining in the profession and progressing their career.

Teachers and senior colleagues reported early signs of increases in students’ engagement, interest, enjoyment and achievement in STEM subjects. 5/15 teachers reported evidence for increases in take up of STEM subjects post-16, but further time and study is required to provide more robust evidence.

- **Impacts for placement hosts:**
  - All STEM Insight hosts reported that they believed hosting teachers or educators contributed to their aspirations to better inform young people and parents about STEM career pathways and opportunities available with STEM employers, and multiplied the reach of their influence on young people.
  - Hosts with recruitment-related goals reported the scheme was making a contribution to their ability to access potentially employable young people with STEM skills.
  - Staff involved in placements improved their communication skills and gained greater understanding of the education environment and how best to engage with schools.

- A range of operational findings were obtained including that local placements provide the most benefit and sustained impact in terms of ongoing employer engagement and related increases in enrichment activity. It was also noted that impacts from university placements were somewhat distinct from those gained in industrial placements.

**Recommendations**

- STEM Insight should be positioned as an important element in the delivery of STEM careers information, advice and guidance in schools and as such can make a valuable contribution to the Government’s proposed careers strategy.
- STEM Insight should expand its focus and do more to target careers professionals (school-based careers leaders and advisers) and senior school leaders, since they are key agents for improving STEM career learning and awareness of STEM careers among students.
- STEM Learning should develop a clearer narrative on the unifying features of university- and industry-based placements within STEM Insight whilst at the same time defining more clearly the different outcomes expected from these two types of placement.
- STEM Learning should establish a process through which impacts on teachers and the school community are shared with the placement host and partner organisations, to sustain relationships with employers and universities.
- STEM Insight should gather impact data over time on teachers, school culture and student attainment and progression, and develop and monitor other measures of teachers’ engagement with schools’ careers provision.
- STEM Learning should consider and pilot some alternative models of placements to increase participation. This should include spending time with a host – employer or university – across a more flexible model, such as time spent across a series of weeks. This should help determine whether a less immersive, intensive placement experience delivers comparable quality of engagement and impact.
2. Aims and scope

2.1. Evaluation aims

The purpose of this research was to provide an evaluative view of the STEM Insight Programme during the period July 2014 to December 2016, against the programme’s stated objectives. The intention was to include both summative and formative elements, potentially both to ‘prove’ and also ‘improve’ the initiative (in Easterby-Smith’s evaluation terminology\(^1\)).

The high-level aims were to investigate the impact of the programme overall and on its participants and other intended key beneficiaries, but also to seek insights into the efficacy of delivery of the programme and whether and how that might be improved. The evaluation should provide a sufficiently robust view for STEM Learning to consider how best to take the programme forward.

2.2. Context

Increasing the supply of STEM skills been an element of UK and devolved education strategies for successive governments. More recently implementation of that strategy has shifted from significant direct investment in initiatives to deliver such increases (e.g. the STEM Programme, broadly 2005-10) to more limited market interventions. The latter rely on and leverage support from educational institutions, employers, professional bodies, trusts and foundations to fund or co-fund activity on the ground which will increase the supply of STEM skills.

At the highest level, increases in the number of young people pursuing STEM pathways are expected to result from: (1) enhancements in formal education through improved subject teaching and in informal education such as enrichment, and (2) building greater STEM careers awareness – i.e. more understanding by young people and adults of the positive career opportunities available through studying STEM subjects. Increasingly these two strategies are seen to be related, and embedding careers awareness within subject teaching is now a recognised and common aspiration.

Responsibility for careers support shifted directly to schools (from Local Authorities) in 2012. The current statutory guidance for schools\(^2\) includes the requirement:

“… pupils understand that a wide range of career choices require good knowledge of maths and the sciences. Schools should … emphasise in particular the opportunities created for girls and boys who choose science subjects at school and college.”

It also recommends that schools provide a range of inspirational activities to build careers awareness and build strong links with employers. At the time of writing, a new careers strategy for young people in England is awaited, within which there is expected to be recommendation for careers provision to reflect the 8 benchmarks identified in the Gatsby report ‘Good career guidance’, which specifically include linking curriculum learning to careers, encounters with employers and employees and gaining experience of the workplace.\(^3\)

The STEM Insight programme is positioned within STEM Learning’s range of CPD opportunities for teachers and educators to offer them an opportunity for an authentic experience of a contemporary STEM working or research environment through a placement.

\(^1\) Evaluation of management development, 1994, Gower Press
\(^2\) Careers guidance and inspiration in schools. Statutory guidance for governing bodies, school leaders and school staff, 2017, Department for Education
\(^3\) Good career guidance, 2014, Gatsby Trust
Related CPD support helps them embed their learning into their professional practice. The aim is for teachers to be able to build students’ STEM careers awareness by embedding career-related information into their STEM curriculum teaching, as well as by providing better-informed personal advice or guidance. Together these will improve the extent and level of careers support within the school, resulting in enhanced STEM careers awareness amongst students.

The current STEM Insight programme has evolved from two precursor placement schemes. The Teacher Industrial Partners Scheme (TIPS), originally launched in 2014, was a joint initiative within Project Enthuse⁴, conceived and supported by the Institution of Mechanical Engineers with further support from the Institution of Engineering and Technology. TIPS aimed to increase awareness among teachers, schools and young people of the nature of modern engineering and career opportunities in the engineering and manufacturing sectors, by providing STEM teachers with opportunities for placements with a STEM employer, supported by educational input from the National Science Learning Centre. The Teacher Academic Partners Scheme (TAPS) was subsequently developed in a partnership between the Biochemical Society and the National Science Learning Centre, aimed at biology teachers with the objective of supporting schools to develop long-term relationships with local universities. The two schemes were brought together by STEM Learning under the name STEM Insight in 2016, and their targeting widened to encompass all STEM subjects.

It is hoped that teachers on placements hosted by STEM industries will develop a better understanding of the skills required by young people to be successful in a STEM industry or occupation and the progression routes available to achieve such careers. Teachers will then use that knowledge to enhance the learning of their students. Those attending a university placement should gain better awareness of how different higher education (HE) courses link to the subjects they are teaching, become better equipped to support students in a transition to HE and also be inspired to improve their teaching.

There is currently heightened interest in the impact of career- and employability-related support in education, at many levels. The Careers & Enterprise Company is undertaking a programme of work to improve understanding of careers activities “that work” (based on evaluation evidence), with the intention that it will use investment funds to expand those activities and target them to areas of greatest need. Its recent review of impact evidence for career-related interventions in schools believes that what it calls “teacher CPD delivered by employers” is a type of activity for which there is currently insufficient evaluation evidence.⁵ This evaluation of the STEM Insight Programme is therefore particularly timely.

### 2.3. Scope and methodology

#### 2.3.1. Research approach

The methodology selected for the evaluation was to undertake a programme of in-depth interviews with a purposive sample of around 20 participants who undertook placements and for each of those – where appropriate – also to interview a senior staff colleague and their placement host (employer). The sample focused on placements between July 2014 and December 2016, with participants from a range of STEM teaching disciplines and other

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⁴ Project ENTHUSE is a partnership of government, charities and employers that have come together to bring about inspired science teaching through CPD for science teachers and technicians.

educational roles, types and locations of school/college, hosted by a range of employers. Interviews were semi-structured using approved interview guides, and conducted by two researchers with expertise in career-related education. This information was supplemented with data collected from scheme participants by STEM Learning through feedback questionnaires, case studies and participant blogs. These sources also provided some information on participants not selected for interview. More information about the methodology and sample can be found in Appendix 1.

2.3.2. Research themes
The STEM Insight Programme Steering Group has established a series of Key Performance Indicators (KPIs) for the programme and also a potential model of impact. These were used to develop and frame key research themes and questions. The approach and findings of a very early evaluation of the TIPS programme, based on the first four placements, were also noted. The main themes of this new investigation were to identify:

- Impacts on participants (educators) such as increased knowledge and awareness of STEM-related career pathways and opportunities, in order to enhance their ability to deliver career education via contextual teaching of curriculum subjects and informal support for educational / career progression, as well as improved quality of subject teaching;
- Impacts on learners in terms of increased awareness of STEM employability skills, careers and progression pathways, increases in uptake of STEM subjects or pathways post-16 that align with STEM careers, and improvements to subject learning and attainment;
- Impacts on their schools/colleges in terms of improved STEM education outside the curriculum, increased linkages and collaboration with STEM employers, and increasing the level of awareness among parents of STEM career paths and opportunities;
- Impacts for hosts (industrial employers and universities) relating to their provision of career inspiration activities for young people and other engagement in education.

2.3.3. Sample achieved
The final achieved sample comprised 18 participants from 16 different schools. They had undertaken placements with 15 different host organisations. In total 43 interviews were conducted, which comprised 18 with participants, 11 with senior school colleagues, and 14 with representatives of host organisations. Of the 18 participants, 14 undertook placements with industrial employers and 4 with universities.

The characteristics of the achieved sample can be found in Appendix 1. The intended broad stratification of the sample was achieved in all respects other than the year of the placement, as it proved much harder than expected to engage those who participated in placements in 2014/15 (and a significant number had left their school in the meantime). The majority of participants interviewed had undertaken a placement in 2016, meaning that there had been only around a year for impacts to develop.

The interview sample was deliberately designed to reflect the range of types of participant and therefore does not represent the overall participant profile in the years studied. Amongst the 68 participants between 2014 and 2016, 64 were subject teachers in secondary schools, sixth

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forms or further education (FE) colleges. There were also 4 participants who were not subject teachers at this level (3 in school leadership teams who were not themselves directly engaged in STEM subject teaching, and a primary school teacher). These individuals were all deliberately included in the interview sample as they were expected to be particularly interesting cases.

For simplicity, results are reported based on the number of responses against the number of that type of informant (i.e. 12 out of 15 subject teachers improved their STEM subject knowledge). Some verbatim quotations have been included to illustrate results, but should not be taken as representative of the balance of views expressed; all are from placement participants unless otherwise shown. Participants’ institutions are all referred to as their “school” for brevity.
3. Strategic results and findings

Measures of strategic impacts of the placement programme are considered here, while more operational issues are treated in Chapter 4. Impacts are reported for educators (i.e. the placement participants), learners (the students they teach or support), the schools in which they work, and then for placement hosts, respectively. Where possible, these findings are reported in relation to STEM Learning’s ‘STEM career learning model’ (Figure 1). Direct impacts on career learning are emphasised but ‘mediated’ outcomes which support career learning indirectly are also reported.

Figure 1 Model of impact for STEM career learning

3.1. Impacts on educators

80% of teachers (12/15) gained understanding of how to contextualise the curriculum with cutting-edge STEM knowledge and real-world applications.

“I can excite the students – I tell them about things that [host] is developing that they are willing to disclose, they in turn become excited about things being done that are not in the public domain”

“It is more engaging linked to real world content. I am obviously more knowledgeable, I can use a lot more examples”

The wide extent of this impact was also seen in analysis of feedback from scheme participants, which they provided post-placement (using the P1 questionnaire) and/or after the CPD event which is commonly around six months later (using the P2 questionnaire). Figure 2 summarises the activities that teachers reported and Figure 3 the perceived impacts on their practice. These reinforce the interview findings that most teachers use new industry-or university-based examples in their teaching as a result of the placement, and are better able to contextualise their curriculum teaching with reference to ‘real world’ applications, jobs and careers, in addition to gaining improved subject and pedagogical knowledge.
Although the sample sizes are small, there is also evidence that the extent of this impact increases after the follow-up CPD event. In both Figures 2 and 3, the proportions of participants reporting activities or impacts were greater after the CPD event than before. Many interviewees confirmed that they gained significant knowledge about a wider range of STEM industries and careers (than those seen during their placement) when they attended the CPD event. Figure 2 also shows that up to half of the teachers embedded new placement-related examples within updated schemes of work.

Figure 2 Activities reported to have been completed as a result of the placement scheme, by participants providing feedback post-placement (P1, N=26) and post-CPD (P2, N=17)\(^7\)

Figure 3 Types of impact of the placement on teachers, by participants providing feedback post-placement (P1, N=25) and post-CPD (P2, N=17)\(^8\)

All participants reported increases in their understanding of current STEM jobs and career pathways, which supported the personal advice that they gave to students and meant that they were in a much stronger position for embedding career information or employability skills into their STEM subject teaching.

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\(^7\) There is some overlap between the sample of participants providing feedback and the interview sample

\(^8\) Where no result is given for P2, this is due to non-comparability of questionnaire options
All the subject teachers interviewed who attended industrial placements (and one of the 4 on university placements) reported an increase in their understanding of how their teaching applied to industrial contexts and the careers of people working in those settings. One third of the teachers (5/15) reported a strong impact on the extent to which they embedded information about careers into their subject teaching (for some of whom it was transformational).

“In lessons I am able to tell specific stories to illustrate how this learning will be useful”

“It is our intention to change the scheme of work for Year 13 to embed more real-life career-related information into the curriculum, starting each lesson with “Why are we doing this? Why is it important? How might this learning be useful?”

“The big change was recognising that there are potential career pathways in science for my C-graders”

The remainder all acknowledged that they were in a better position to embed such elements into their curriculum teaching, but were not doing so on a routine basis or were yet to do so. The same applied to employability skills development; teachers reported more knowledge of the skills that employers would value but most had yet to embed this into their teaching.

All interviewees reported additional or renewed confidence in the career or progression support they gave students in tutoring or pastoral roles, and all reported more confidence in answering questions about careers and progression. The desire to help their students’ progression was a key driver for their professional development and they all now saw themselves as more passionate advocates for STEM careers. The widespread extent of these impacts can also be seen in Figures 2 and 3.

“I learned about] the range of career pathways, from the very brightest right through to young people who had only studied to GCSE level… and just how many technicians a company like this needs”

“I would have never have known that studying physics at university could allow you to become a lawyer. I now understand the value of STEM. [I] convey this to parents… let’s look at the subjects that will keep options open. Parents tend to like that, they haven’t thought about that before”

“I am like a walking STEM ambassador who is always talking about STEM career pathways”

The other types of educators interviewed (who provide careers support as part of their role) reported strong increases in knowledge about career pathways, occupations and skills needs. Of particular interest to them were apprentices, whom they met during their placements, and learning how they were progressing towards highly valuable and skilled roles. Interestingly 7/15 of the subject teachers (which was 7 of the 11 subject teachers who had attended industrial placements) also mentioned that they had learnt about apprenticeship pathways, which was an area about which they had previously had little knowledge.

“The greatest impact on me has been not just the huge improvement in my knowledge of both STEM and non-STEM careers but on the types of industry in our area”

Careers leader

“The most valuable moments of the placement included meeting enthusiastic apprentices at different stages of their training programme”
Half of those who had attended industrial placements had subsequently contacted the host for practical help or advice, or to engage them in future enrichment activity – which resulted in an increase in the extent of employer engagement (as also seen in Figure 2). The location of the placement was important, as sustained engagement with the host was more common where it was local.

“A key legacy was that […] developed the skills to engage with employers; it has led to other interactions, students going out and so on, and effectively bridged the gap between school and employers. So the benefits of STEM are now embedded right across the school”

Senior school staff colleague

Half of the participants interviewed also reported an increase in their confidence in talking to and engaging with an employer. They were reassured that many employers wanted to engage with schools and developed ‘warm’ personal contacts with hosts.

A number of other benefits were seen in the form of ‘mediated’ outcomes, which will contribute to enhanced STEM career learning indirectly. **80% of teacher participants interviewed (12/15) reported improved STEM subject and pedagogical understanding,** particularly being able to use up-to-date examples they encountered on their placement in their teaching. The more experienced teachers, in particular, relished the opportunity to extend their learning to fine-tune their teaching and the placement also re-fired their interest in their discipline. The less experienced teachers (7/15) gained additional competence in teaching certain aspects of the curriculum.

“The hands-on sessions that related directly to the A-level curriculum were great. I particularly enjoyed talking to the scientists about their research. The placement has already had a huge impact on my professional practice. It has re-enthused my passion for biology, which I hope comes across in my teaching”

“I no longer see myself as the source of all knowledge, but a facilitator whose job it is to equip students with the tools they need to learn. It massively influences what I do”

Two thirds (10/15) of teacher participants interviewed reported **increases in their confidence, motivation and enthusiasm for teaching STEM subjects,** with 5 participants recognising that undertaking the placement would **enhance their potential retention and career progression.** Two participants had progressed to new roles since the placement, one becoming STEM Coordinator and the other a personal tutor, both of which they directly related to the placement experience. Two others considered that the placement could be valuable on their CV – views supported by interviews with senior colleagues -- while one other participant’s manager (in a UTC) intimated that such experience was “required”. Several other teachers reported that the placement had raised their profile in the school, which could support their future career trajectory. Data in Figure 2 reinforce these findings, with over half of participants perceiving improved prospects for career progression and motivation to remain in teaching.

“Attending the programme excited me and made me more enthusiastic. I now teach with more enthusiasm”

“I think I now feel more confident. If something came up, I would go for it, whereas before I probably wouldn’t”
“Seeing that everything I had learned and trained for in science actually being used… feeling what I do matters”

Taken together, this evidence on mediated outcomes indicates that all the teacher participants reported at least some **increase in their teaching competence**, particularly in relation to applying subject knowledge to the wider world, with the more experienced teachers reporting **enhancements to teaching quality and subject leadership**.

### 3.1.1. Relating impacts to motivations

The range and extent of impacts for any particular teacher or educator varied and were dependent on their educational context but also their personal motivations for participation. There was widespread evidence that teachers had multiple motivations to take part in the scheme, including to gain access to current application examples from industry or university to improve their subject teaching, to improve their understanding in relation to STEM careers and pathways and to increase the extent of engagement with employers. Figure 4 summarises motivations identified in pre-placement questionnaire responses from 41 participants who undertook placements between 2014 and 2016.

Figure 4 Motivations for participants: potential impacts sought of placement, indicated by participants prior to placement (N=41)

[Bar chart showing motivations for participants.]

The interviews consistently confirmed this range of motivations, but with more insight into the balance of different motivations for individuals. Teachers consistently sought up-to-date and ‘real-life’ applications and examples for their subject teaching (11/15 teacher participants), a more informed position to offer advice on careers and progression (10/15), and more knowledge of specific job roles in industry (6/15). Additional motivations expressed by some individual teachers were an increase in self-confidence or to support other particular STEM-related activities that they were developing, such as projects or work experience.
“A better insight into what’s out there in the real world. We all work in our little bubble pushing for better exam results, focusing on curriculum, without having a clear idea of what is possible and where it might take the students”

“I felt my background was limited and therefore I only had limited advice to give to my students”

“I wanted to keep up-to-date with advances in my subject but also understand the needs that research labs have for skills in our students”

The primary teacher and 3 of the secondary teachers wanted to embed knowledge about jobs or careers into their subject teaching. Only the lecturers in FE colleges overtly mentioned development of employability skills. Teachers particularly saw potential value in having better career-related knowledge so that they could support their students when tutoring or giving advice on progression, to back up the subject- or context-based improvements they sought in their curriculum teaching.

Over half the participants (8/15) specifically sought more links with employers or businesses, reflecting schools’ strategies for increased employer engagement:

“By establishing a link […] I hoped we would get an insight into which skills (curricular and extra-curricular) they look for in apprentices and staff”

“I wanted to get the names of people I could invite back to our school as speakers to inspire our students and to get work experience opportunities”

The participants in leadership positions were much more focused on career- and progression-related impact, unsurprisingly given their roles, and also sought more links with employers. Although they were less interested in subject-specific teaching expertise, they all also sought knowledge to share with their teaching colleagues to contextualise subject teaching. These participants were much more familiar with the concept of embedding employability and career awareness in teaching than the secondary teachers. They had also stated in advance of their placement their intention to share knowledge widely amongst their schools, as this was part of their role.

The motivations for the teachers in FE colleges were somewhat distinct, as they pointed out that some of their teaching was of adults who have already made occupational choices and/or were already in employment. Equally, the 4 teachers who attended university placements had different and distinct motivations, being much more focused on progression to university and developing links between their school and universities in order to enhance their teaching.

3.2. Impacts on learners

Almost three quarters of participants providing feedback reported that their students now had increased knowledge about STEM career opportunities and pathways towards them. Over half reported that students had increased aspirations for STEM education and careers, more understanding of the importance of STEM skills and greater motivation to pursue higher levels of STEM education (Figure 5). Students are receiving improved support for development of employability and practical skills from the teachers and educators who have undertaken placements, with their enhanced understanding of current workplaces and skills needs, either embedded within subject teaching or, especially, in the form of personal support or tutoring.
For most participants, this evaluation took place around one year after they had undertaken the placement. Over one third (6/15) of teachers interviewed reported by this time emerging evidence for increases in post-16 pursuit of STEM subjects and which aligns with increases in progression into STEM-related study and careers, but further time and study is required to evidence this more robustly. These 6 teacher participants identified changes in student choices in study pathways which correlated with a recent placement. Of these, 3 reported increases in the take-up of a particular subject relating to the participating teacher, either post-GCSE and/or within GCSE options. The other examples were more anecdotal, reporting cases of individual students who had made different choices following personal support from the participating teacher (which included female students now pursuing engineering).

“The number of students has almost doubled in each STEM subject; I think this is partly due to my placement”

“DT numbers have increased for the past 2 years [now over-subscribed] – it must be through [host] placement”

“We will be measuring the number that go on to higher apprenticeships, as we do now push apprenticeships amongst our Post-16 and Post-18 options”

Teachers and their senior colleagues reported some early signs of increases in engagement, interest, enjoyment and achievement in STEM subjects. As most of the teachers interviewed had undertaken placements during 2016, relatively little time had ensued for impacts on students to develop. Several interviewees reported making revisions to schemes of work that had not yet been implemented with students. A somewhat longer-term view is available from the teachers who provided feedback after their placement and/or CPD event. Half of these participants reported increased motivation and engagement of students during lessons, and increasing progress in STEM subjects (also shown in Figure 5). One of the teachers interviewed reported a clear increase in attainment during classwork, as students used more sophisticated software tools made available by the host after the placement.

“The students are more engaged, their performance has improved and I enjoy teaching more”
“The students are in a position to understand the pathways better and are making more informed choices”

3.3. Impacts on schools
The extent to which there was reported impact on the whole school was more varied and dependent not only on the participant’s will and time to share their learning, but also the school context. The scale of the school and its STEM teaching was important as this affected the number of other teachers in similar subject areas, who could directly benefit from shared knowledge. Those in larger teams reported more formalised time and opportunities to share learning.

One direct career-focused impact of participation at school level related to collaboration with employers. Of the 14 participants who undertook an industrial placement, 9 reported increased employer engagement triggered by the placement. In most cases, the host additionally became involved in school visits, careers fairs, hosting student groups or offering work experience. These instances tended to be where the placement was local. In 4 cases, teachers subsequently had the confidence to contact other employers which had not been engaged before. It was notable, however, that none of the universities in the sample of university placements had visited the participants’ schools.

“[Host] offered support at several in-house careers events. So far, around 400 students have benefited in some way from my experience on STEM Insight”

“[Host] opened up so many more things for our students because it is so local to us. It’s a huge impact on work experience and visits. Work experience is possibly the most important outcome because we have specific points of contact”

Just over half (8) of the teacher participants had shared at least some of their learning and knowledge gained during the placement, through a mixture of informal and more formal structures such as embedding ideas into schemes of work and new project software. One participant was successful in securing a grant for a research project, which involved all year groups and multiple subjects; the application was a direct result of learning about the opportunity during the placement (and support from the host in the application).

The following quotations are from senior staff colleagues, about the respective participants’ sharing of knowledge and insights post-placement:

“The biggest impact has been the […] project – this has shown what is possible. Beyond this she has made several improvements to schemes of work and passed these onto trainee teachers”

“He had a slot at the last departmental meeting and has also spoken to me about presenting [on extra-curricular enrichment for the 6th form] at assembly. I know he has spoken to the tutor teams and Head of 6th form”

“[He] ran two departmental meetings discussing how we were going to make changes to the curriculum. As he is in charge of KS3 he is in a position to do that. There are 12 teachers so the placement has impacted on how they teach [and the resources given by the host]”
The participants who were in senior leadership teams, careers and/or STEM coordination roles all reported that their school was strategically emphasising STEM, and a condition of their participation was that they would share their learning right across their school. These participants reported stronger and more widespread influence on their schools and colleagues than the teacher participants, particularly in providing careers support, greater employer engagement and in one case through a new model of work experience for the school prompted by the placement. Overall 7 of the 14 participants interviewed who had undertaken an industrial placement) suggested that the placement had led to an increase in the amount of STEM enrichment activity in the school.

“We have transformed how we inform and support those interested in vocational pathways and especially apprenticeships. This would not have happened if I had not met some real apprentices”

“We are doubling the amount of time that students spend on careers”

“As a result of its success, we are recruiting employers to allow us to offer [the new work experience scheme] to 160 students in June”

There was also some evidence for ‘spillover’ benefits to other schools. All the senior leadership team participants (including STEM Coordinators) had explicitly shared learning within networks or twilight CPD events involving partner or local schools, but this was only reported by a small minority of teacher participants.

Figure 6 Impacts on colleagues and school reported by participants providing post-placement feedback (N=25)

The specific nature of impacts on schools is summarised in Figure 6, as reported by participants in post-placement feedback, indicating that the most common wider impact was increased use of examples from industry in teaching. This also corroborates the interview evidence that half of the schools from which participants had attended an industrial placement had subsequently increased their extent of employer engagement. Overall, however, the proportion of participants reporting impacts on schools and colleagues was lower than for impacts on their own practice (see Figure 3).
3.4. Impacts on hosts
Interviews with the 10 industrial and 4 university hosts revealed a range of motivations for these employers’ participation in the scheme. Overwhelmingly the industrial hosts had high-level motivations, to enhance the overall long-term supply of STEM skills, CSR\(^8\) aspirations to support their local community and in one case to improve the image of their sector. Only 3 of the 10 industrial hosts had a specific goal of enhancing their local recruitment, specifically related to apprentices. The larger industrial hosts saw teacher placements as one element within a wide range of engagement activity with schools and young people, but reported that the STEM Insight scheme was distinct due to the potential it offered to multiply the reach of the company’s influence on young people. The motivations of the university hosts included enhanced recruitment of local students and aspirations to ease transitions to HE-level learning.

“Our senior management understand the overall skills shortage and gaps, so they want to put something back into the region. It is more about a contribution to the regional economy and skills needs then for our own benefit, although improving our apprenticeship recruitment would be welcome. But if we hire 1 from 1000 young people we engage that would be fine”

“[Industry host] wants to make a positive impact in its immediate area and community; we set out to be a good neighbour”

“[Our involvement is] not directly about recruitment, it is more about improving the image of construction and ensuring the supply of skills. We want to show that construction is not just about trades but also needs a whole range of skills many of which are graduate level”

“[University host] teaching style is problem-based learning, which mimics the research process; students who have been spoon-fed information at school tend to find this difficult – if teachers are aware how we teach they are in a better position to prepare their students”

All the industry hosts interviewed reported that they believed hosting teachers or educators contributed to their aspirations to better inform young people and parents about STEM career pathways and opportunities available with STEM employers, although the extent to which they had evidence for this varied.

The 3 industry hosts that had a direct recruitment-related goal reported that they believed the scheme was making a contribution to their ability to access young people with employability and STEM skills with the potential to become future employees in the STEM labour market. All industry hosts were seeking to recruit graduates in the long-term, and 8 of the 10 reported that the placement contributed positively to their overall aim of increasing the visibility of STEM industries and careers to young people and helping them to understand the skills they would need to succeed in the current workplace.

80% (8 out of 10) of the industry hosts considered that through the placement they gained greater understanding of the educational environment and how best to engage with

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\(^8\) Corporate social responsibility
schools if they wanted to (and valued having a ‘warm’ contact). This included having a better insight into what and how STEM subjects were taught.

“Normally it is really hard to engage a school as you cannot get past the front desk and talk to a teacher. I think businesses are more flexible than schools in this respect. So [we now have] a much better understanding of how to engage more, how it all works and the barriers that they have”

“We have produced some careers videos which we give to schools and teachers. We also help teachers with some very modern aspects of the curriculum, such as epigenetics which is now in the A-level”

Industrial hosts recognised that through hosting placements some of their staff increased their communication skills. 7 of the 10 industry hosts reported the benefit of employees interacting with the teacher/s developing their aptitude for explaining technical issues to a non-expert audience. Five explicitly saw the placement as a way to develop this skill in a wider range of employees, not just those who were already STEM Ambassadors or regularly involved in outreach. Although several hosts indicated that this type of outreach was “expected” of their long-term staff, they did not report progression- or retention-related benefits.

Over half of the industry hosts (6/10) reported that there had been a significant upturn in engagement between the host and the participant’s school after the placement, with an increasing variety of activities being undertaken, which could lead to a sustained link. However, 3 industrial hosts (who were large employers) stated that they did not seek or anticipate continued interaction with the teacher or school after the placement.

One of the 3 hosts that were recruiting apprentices will subsequently monitor apprenticeship applications from the school on the programme to ascertain if there are correlations between the placement school and the level of engagement. The hosts had little evidence of impact on teachers or schools and 8 of the 10 industry hosts were interested in receiving this information. The 4 university hosts interviewed had also not considered the impact of their placements.

All of the 14 hosts interviewed thought the scheme was valuable and wished to sustain their involvement in the scheme, and 5 of them wished to expand their participation and host more placements. Amongst the industry hosts, 7/10 expressed some concern about what they saw as a disappointing number of applications they had received from teachers for placements.

3.5. Evidence for impacts in relation to enhanced STEM career learning

Table 1 summarises the evidence available for the range of potential impacts on STEM career learning identified in STEM Learning’s ‘routes to impact’ model, depicted in Figure 1 (Chapter 3). Together these impacts, either directly or indirectly, contribute to the overall aim of fostering greater STEM career awareness amongst young people, together with increased aspirations towards or improved prospects for achieving such a career. More detail on the extent of the evidence for each of the impacts listed has been outlined in the previous sections.
Table 1 Evidence available by impact type (direct impacts identified in bold)

<table>
<thead>
<tr>
<th>Impact type</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classroom teaching/learning</strong></td>
<td></td>
</tr>
<tr>
<td>STEM career education via contextual teaching of curriculum subjects</td>
<td>Gains in terms of knowledge of cutting-edge STEM examples and applications, and personal experiences, with which to contextualise teaching</td>
</tr>
<tr>
<td>Informal support for career / educational progression</td>
<td>Better informed and more confident advice given on progression and career options/opportunities</td>
</tr>
<tr>
<td>Employability skill development</td>
<td>New insights into how to embed careers information and employability skills into STEM subject teaching</td>
</tr>
<tr>
<td>Engagement with STEM experts or employers</td>
<td>Enhanced networks and improved confidence to engage with employers or staff in universities</td>
</tr>
<tr>
<td>Improved quality of subject teaching</td>
<td>Gains to STEM subject and pedagogical understanding</td>
</tr>
<tr>
<td>Improved student learning / attainment</td>
<td>Increases in student engagement and interest; some early evidence for improved attainment and progression</td>
</tr>
<tr>
<td>Raised interest and enthusiasm</td>
<td>Increases to confidence, motivation and enthusiasm for STEM subject teaching and careers support</td>
</tr>
<tr>
<td><strong>School-level</strong></td>
<td></td>
</tr>
<tr>
<td>Increased collaboration with STEM experts or employers</td>
<td>Increases to number, range and depth of interactions with employers and universities</td>
</tr>
<tr>
<td>Improved STEM career education outside the classroom</td>
<td>Improvements to work experience schemes, employer collaborations and careers advisory support</td>
</tr>
<tr>
<td>Increased STEM careers awareness amongst parents</td>
<td>Better informed and more confident advice given or available to parents</td>
</tr>
<tr>
<td>Development and sharing of resources / activities relating to STEM careers</td>
<td>Some new career-related teaching resources obtained and developed, and shared across team/schools</td>
</tr>
<tr>
<td>Development and sharing of new STEM curriculum resources</td>
<td>Some new schemes of work and resources developed and shared across team/department/schools</td>
</tr>
</tbody>
</table>
4. Operational findings

4.1. Participant range and numbers

As noted in section 2.3.3, all but 4 of the 68 participants between 2014 and 2016 were subject teachers in secondary schools, sixth forms or FE colleges. The other 4 participants were not subject teachers at this level but members of school leadership teams, including a careers lead, a STEM Coordinator and a Principal (none of whom taught STEM subjects) and a primary school teacher. This overall balance reflects that the STEM Insight programme has been promoted as “for teachers”.

The level of experience of the teachers in the interview sample ranged from moderately experienced (for example, five years in teaching) to very experienced; there were no trainees, NQTs or inexperienced teachers. Two of the teacher participant interviewees had won national prizes for their exceptional work. Half (9) of the participants interviewed had worked in another occupation for at least three years before they became a teacher or member of school staff.

Although all hosts were positive overall about the scheme, 7 of the 10 industrial hosts were concerned about the low number of applicants that they were receiving, which led some of them to question the extent to which the scheme is being promoted. In turn, this perception led to some concerns about the sustainability of their participation in the scheme, much as they wanted to continue or, in some cases, expand it. Most would like to host more than one teacher at a time, but they were concerned that this was not matched by the current flow of applicants.

One of those who actively wished to increase their reach through teacher placement activity felt that other, additional models of placement should be explored in order to increase total participation.

4.2. Placement logistics

Analysis of STEM Learning’s records suggests that of the 68 placements in the period 2014 to 2016, 25 took place during half-term holidays, 35 in the month of July and only 8 at other times of the school year. The placements undertaken by the interviewees reflected this pattern, with 7 of the 18 placements in autumn or spring half-term breaks, and 9 others during July.

Our interviews confirmed that those who undertook a placement in their own time at half-term did so because they believed or knew school leadership would not authorise an absence for CPD during term-time, as well as teachers’ concern for the impact on their students of being absent for a week.

In 13 of the 18 placements investigated, the location(s) of the placements were sufficiently local to the participants for them to be able to travel on a daily basis, thereby reducing accommodation costs. However, the remaining 5 did require a week’s accommodation, costs of which could be supported by the Project ENTHUSE bursary. Almost all the participants were concerned that CPD which had costs attached would simply be out of the question for the school budget; this was supported by interviews with senior leaders and others more aware of the budget for CPD. The ENTHUSE bursary attached to the project was vital for teachers to attend their placements, to fund travel, accommodation costs where necessary and also cover costs, where these were needed.

Feedback from both participants and hosts indicated that local placements provide the most benefit and sustained impact in terms of ongoing engagement with the employer. This could result in greater frequency but also a wider range of involvement and collaboration, and an increase in the extent of enrichment activity.
Although the management of the placement scheme was thought by hosts to be generally good, a number of hosts reported certain specific issues with administration processes, promotional work and information flows.

4.3. Placement models and experiences

The placement model differs depending on the size and type of employer: in general, larger companies offered highly planned programmes through which participants spent time with large numbers of different teams, while understandably placements in small companies were less complex or rigorously pre-planned. In all cases where participants had wanted to have some influence on the content of their placement programme, they were able to do so, although several participants were happy not to seek that influence. It was clear from the large industrial hosts that planning of placement programmes took place a long way in advance, so any participant intentions needed to be indicated early to have any effect.

Based on the 4 university placements studied, the pattern in universities was broadly similar, and there was more flexibility still in fitting the programme around the participant. As these placements took place during term-time, participants were able to plan for themselves the extent to which they could attend student laboratory sessions or lectures in addition to meetings with researchers, teaching academics and careers or admissions staff.

9 out of the 10 industry hosts interviewed, and one university (for a total of 4), stated that it would more efficient for them to host a small group of participants (between 2 and 5) rather than a single attendee. Part of their rationale for taking part in the scheme was to maximise the extent of potential outreach to young people from the time they invested.

In terms of length, there were a variety of different placement models: 11 participants had undertaken a contiguous 5-day placement (one of which was a day in 5 different companies) and another 5 days spread over a longer period), and one a bespoke 3-day placement. The remaining 5 had undertaken a 10-day placement. Participants who had undertaken a 5-day placement widely reported (10/11) that it represented a good balance between the amount they learnt and the time they invested in it, while 3 of those on a 10-day placement reported that they what they learnt could have been achieved in less than 10 days out of school.

All but one host expressed a preference for 5 day placements in future, although 5 of them also said that they would welcome more flexible arrangements in addition to this ‘standard’ model.

Every participant interviewee reported that their placement experience was highly enjoyable, positive and valuable, and many said it was the most valuable CPD that they had ever engaged in. All would recommend the experience to others (and many had already done so).

"The impact far outweighs that of other types of CPD that I have done, classroom CPD"

"I was surprised to learn how much recent technological advances actually did relate to what we teach in school. It blew my mind, I was like a kid in a toy shop. My colleague said that I looked as though I was fizzing at the end of each day."

This is consistent with the post-placement feedback collected, in which 36 of 41 (88%) participants rated their placement as very good, 4 as good and a single participant that it had been poor.
The follow-up CPD event day in York or London was reported to have significant value by all 12 participants interviewed who had attended one, particularly its value in maintaining engagement in their learning, embedding benefits of the placement, hearing and reflecting on others’ experiences, and sharing career resources and knowledge from other sectors.

Use of other aspects of the CPD offer, such as the online community group, was much more sporadic. Although rare, where a participant’s manager or supervisor was able to attend a day of the placement this was reported by the teacher to have helped to embed the benefit of the placement more widely across the school.

4.4. University placements

Interviews with those involved in the 4 examples of university placements revealed that the participants approached the placements each with their own motivations and desired outcomes. This reflects positively on the flexibility available in the university placement model and, as a result, has allowed for the outcomes from university placements to be wide ranging. In some cases these outcomes were very different from those for their industrial placement counterparts. The university placement model allowed each participant to create their own placement agenda, which could combine attendance at their choice of student lectures, seminars or practical sessions, along with more bespoke discussions with staff around admissions, pedagogy, outreach and/or employer engagement. Participants appreciated the opportunity to see new teaching styles in practice with student groups. Engagement with researchers enabled some participants to enhance their subject knowledge in specialist or new areas of learning.

The most common impact demonstrated by the 4 participants was an enhancement to pedagogy through the potential to use university-based teaching practices or examples in class. Participants also reported an aim to improve progression of students from school to university, which was reinforced during the placement by the chance to meet admissions staff and in some cases further partnership work agreed with the university for after the placement. For all 4 participants, the people they met and the activities they undertook during their placement closely related to their initial motivations to take part in the programme and, as a result, all these participants reported benefits in participation.

It should be stressed that the number of university placement examples studied was small (4) and it would be wise to do further work evaluating this type of placement to obtain more robust findings in relation to its outcomes and impact. It may be that the current impact model should be adapted to suit the university placement environment, recognising that most of the potential impacts will not be direct in terms of increased knowledge of STEM workplaces and careers but will be more indirect such as enhancement of the quality of curriculum teaching and greater awareness of progression routes and processes.
5. Overall findings, issues and recommendations

5.1. Overall findings

- Overall, the STEM Insight scheme is highly valued by teachers and other educators, their schools and their placement host employers: all the participants would recommend it to others while all the hosts wish at minimum to sustain their involvement in the scheme.

- Many of the desired outcomes and impacts are being achieved but the extent of those outcomes varies for different teachers.

- Direct impacts on STEM career learning in the classroom and at school level include:
  - All participants reported increased understanding of current STEM jobs and career pathways and all were now more passionate advocates for STEM careers and giving better-informed personal advice and guidance on progression and potential career choices to students and parents.
  - The programme increases the range and extent of schools’ engagement with STEM employers, particularly when placement hosts were locally based and were also interested in follow-up engagements.
  - The increased STEM careers awareness amongst teachers and more contacts with employers result in improved STEM careers support outside the classroom, which enhances overall careers provision in school.
  - 80% of teachers (12/15) improved their understanding of how to contextualise the curriculum with cutting-edge STEM knowledge and real-world applications.
  - Teachers were in a better position to embed career information within their curriculum teaching and some (5/15) had already changed how they teach in this respect, supporting development of employability and practical skills.

- Observed ‘mediated’ (or indirect) impacts on STEM career learning include:
  - 80% of teacher participants (12/15) reported improved STEM subject and pedagogical understanding and increased confidence and enthusiasm for STEM.
  - All participants reported increased teaching competence, and the more experienced teachers reported enhancements to teaching quality and subject leadership.
  - Increases in overall enthusiasm, motivation and competence were widely recognised, with 5/15 teachers reporting that the programme would enhance their likelihood of remaining in the profession and progressing their career.
  - Teachers and senior colleagues reported early signs of increases in students’ engagement, interest, enjoyment and achievement in STEM subjects. 5/15 teachers reported evidence for increases in take up of STEM subjects post-16, but further time and study is required to provide more robust evidence.

- Impacts for placement hosts:
  - All STEM Insight hosts reported that they believed hosting teachers or educators contributed to their aspirations to better inform young people and parents about STEM
career pathways and opportunities available with STEM employers, and multiplied the reach of their influence on young people.

- Hosts with recruitment-related goals reported the scheme was making a contribution to their ability to access potentially employable young people with STEM skills.
- Staff involved in placements improved their communication skills and gained greater understanding of the education environment and how best to engage with schools.
- A range of operational findings were obtained including that local placements provide the most benefit and sustained impact in terms of ongoing employer engagement and related increases in enrichment activity. It was also noted that impacts from university placements were somewhat distinct from those gained in industrial placements.

5.2. Key issues
- All the hosts were positive about the scheme but reported that there are not enough applicants currently to match their aspirations, leading to them to question the extent to which the scheme is being promoted.
- Participation was heavily focused on placements during half-term holidays and in July. Continuation of such concentration could limit expansion as hosts have limited capacity.
- A key issue is whether it is possible to shift school mindsets sufficiently for leadership teams to enable teachers to attend placements during term-time. Evaluative evidence will assist this, especially identification of attainment-related outcomes (that could drive a change in school behaviour). Tying the scheme to career-related quality recognition in schools could also help, especially if the scheme is targeted towards careers staff as well as teachers.
- Several hosts suggested more flexibility in the placement model, rather than reliance on a contiguous week during term-time, and would prefer groups of teachers to solo placements to enable more teachers to participate.

5.3. Recommendations
- STEM Insight should be positioned as an important element in the delivery of STEM careers information, advice and guidance in schools and as such can make a valuable contribution to the Government’s proposed careers strategy.
- STEM Insight should expand its focus and do more to target careers professionals (school-based careers leaders and advisers) and senior school leaders, since they are key agents for improving STEM career learning and awareness of STEM careers among students.
- STEM Learning should develop a clearer narrative on the unifying features of university- and industry-based placements within STEM Insight whilst at the same time defining more clearly the different outcomes expected from these two types of placement.
- STEM Learning should establish a process through which impacts on teachers and the school community are shared with the placement host and partner organisations, to sustain relationships with employers and universities.
• STEM Insight should gather impact data over time on teachers, school culture and student attainment and progression, and develop and monitor other measures of teachers’ engagement with schools’ careers provision.

• STEM Learning should consider and pilot some alternative models of placements to increase participation. This should include spending time with a host – employer or university – across a more flexible model, such as time spent across a series of weeks. This should help determine whether a less immersive, intensive placement experience delivers comparable quality of engagement and impact.
Appendix 1: Methodology and sampling

Approach

The focus of the project was to investigate the direct impact of participation in the STEM Insight programme on those who participated and the indirect impacts on the schools/colleges in which they work, and known or perceived student outcomes. This approach broadly follows Guskey’s model of levels of evaluation of CPD activity. A further angle to shed light on future sustainability of the programme was to assess the impact on participating industrial and academic employers (hosts) providing placements. Together these approaches sought to provide responses to the key question “what is the unique impact of the programme?”

The formative aspect of the work was based on management information as well as participants’ and employers’ reported experiences of the programme (including the placement). Ultimately this aimed to answer the second, related question: “how well is the programme working?”

The timeframe for the project (April-May 2017) and its budgetary scale placed some constraints on the evaluation possible. There was no opportunity to investigate some of the KPIs for the scheme, such as changes over time in student outcomes that might be visible in destinations information or attainment records (e.g. in the National Pupil Database). The approach focused on perceptions from participants, which was triangulated with perspectives from their staff colleagues and employers. There was also no opportunity to compare impacts for participants with any counterfactual group.

Interview sample and its representativeness

The final achieved sample comprised 18 participants from 16 different schools. They had undertaken placements with 15 different host organisations. Artefacts of the sampling resulted in two instances of two participants in the same school, and three instances of two participants at the same host (but not at the same time). In total 43 interviews were conducted. Interviews with a small number of targeted senior school colleagues and one host could not be achieved during the fieldwork period, which was essentially the month of May 2017.

The 43 interviews comprised 18 with participants, 11 with senior school colleagues, and 14 with representatives of host organisations. Of the 18 participants, 14 undertook a placement in industry and 4 in universities. In total, 9 of the interviews were conducted face-to-face and the remainder by telephone. The proportion carried out face-to-face was lower than expected but a direct result of interviewees’ availability within the timeframe; however, this did not impact on the total extent or nature of information collected.

The stratification of the achieved sample is shown in Table 2, demonstrating that participants were broadly from the desired wide range of school types and teaching specialisms. Geographically the sample was concentrated on London, the South East and Eastern England (although not exclusively), but this largely reflects the location of the majority of participants at that time.

During the sampling process, participants were selected and invited to participate on an iterative basis. Where an invitee did not respond (or, very rarely, declined), a replacement was

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10 Evaluating professional development, 2000, Corwin Press
identified with similar characteristics in order to maintain the intended stratification of the sample. A total of 28 participants was invited, resulting in 18 participants successfully engaged.

Table 2 Stratification of target and achieved interview samples

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Target (N=20)</th>
<th>Achieved (N=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>UTC</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Other 11-18 school</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>6th form college</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>FE college</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>School location</td>
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<td></td>
</tr>
<tr>
<td>London/SE</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Eastern</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Other region</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>School status</td>
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<td></td>
</tr>
<tr>
<td>Maintained</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>Independent</td>
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<tr>
<td>Participant role</td>
<td></td>
<td></td>
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<tr>
<td>Subject teacher</td>
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<td>15</td>
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<tr>
<td>Other</td>
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<td>3</td>
</tr>
<tr>
<td>Teaching discipline</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics/chemistry</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Biology</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Science</td>
<td>7</td>
<td>2</td>
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<tr>
<td>ICT/DT/Eng</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Gender</td>
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</tr>
<tr>
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<td>8</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Placement year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014/15</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>2016</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

The intended stratification of the sample was broadly achieved in all respects other than the year of the placement. It had been hoped that up to one third of participant interviewees would have undertaken their placement in the 2014/15 trial phase of the scheme, and the other two thirds during 2016 when the scheme was larger. However, it proved much harder to engage the earlier participants. As Table 3 shows, whereas 14 of the 15 invitees from 2016 were interviewed, only 4 out of a total of 13 invitees from 2014/15 were successfully engaged. Many of the unsuccessful invitations were due to inability to contact the invitee, despite repeated invitations and search for alternative contact details; only 3 such invitees declined to take part.

Table 3 Engagement with invitees by placement year

<table>
<thead>
<tr>
<th>Placement year</th>
<th>Target number of interviews</th>
<th>Invitees</th>
<th>Interviews achieved</th>
<th>No longer at original school</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014/15</td>
<td>6</td>
<td>13</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>14</td>
<td>15</td>
<td>14</td>
<td>0</td>
</tr>
</tbody>
</table>
We noted that 5 of the 13 participants from 2014/15 were no longer with their original school (and could not be found elsewhere); if representative of teacher mobility, this could have implications when considering some of the intended longer-term impacts of the programme which arise following the placement, if participants’ learning is not effectively shared.

This study was qualitative in nature and not designed to obtain results that are statistically representative (as might be achieved in a survey using a random sample). The approach taken was to obtain in-depth information from a highly purposive sample of interviewees which was designed to reflect the range of types of participant. That said, the 18 participants interviewed comprise over a quarter of the 68 participants during the period of the scheme studied, and the 14 hosts interviewed constitute the majority of the 21 hosts involved during that period. A limited amount of information was also available from the feedback and other questionnaires completed by varying numbers of participants at different stages of their programme. This was a larger subset of participants than those interviewed, for the pre-placement and immediately post-placement questionnaires. In the results, reference is made to those responses where it augments the information from the interviews.

The total corpus of information obtained, which was dominantly from the interviews, therefore not only reflects views from the intended range of types of participant but also a substantial proportion of the placements that took place. On that basis, we believe the findings should be broadly reflective of the perceptions of participants during the period studied. In its assessments of “what works”, the Careers & Enterprise Company has adopted the Early Intervention Foundation’s rating of the quality of evidence to support an intervention. On that basis we judge that this evaluation could represent EIF Level 3 endorsement of the scheme, which is recognition of positive impact based on evidence from at least one high-quality evaluation.

For simplicity, results are reported based on the number of indicative responses against the number of that type of informant (i.e. 12 out of 14 subject teachers improved their STEM subject knowledge). All the information collected has been anonymised in this report. Example verbatim quotations have been included to illustrate the results, but should not be taken as representative of the balance of types of views expressed. They are from participants unless otherwise shown.

11 http://www.eif.org.uk/elf-evidence-standards