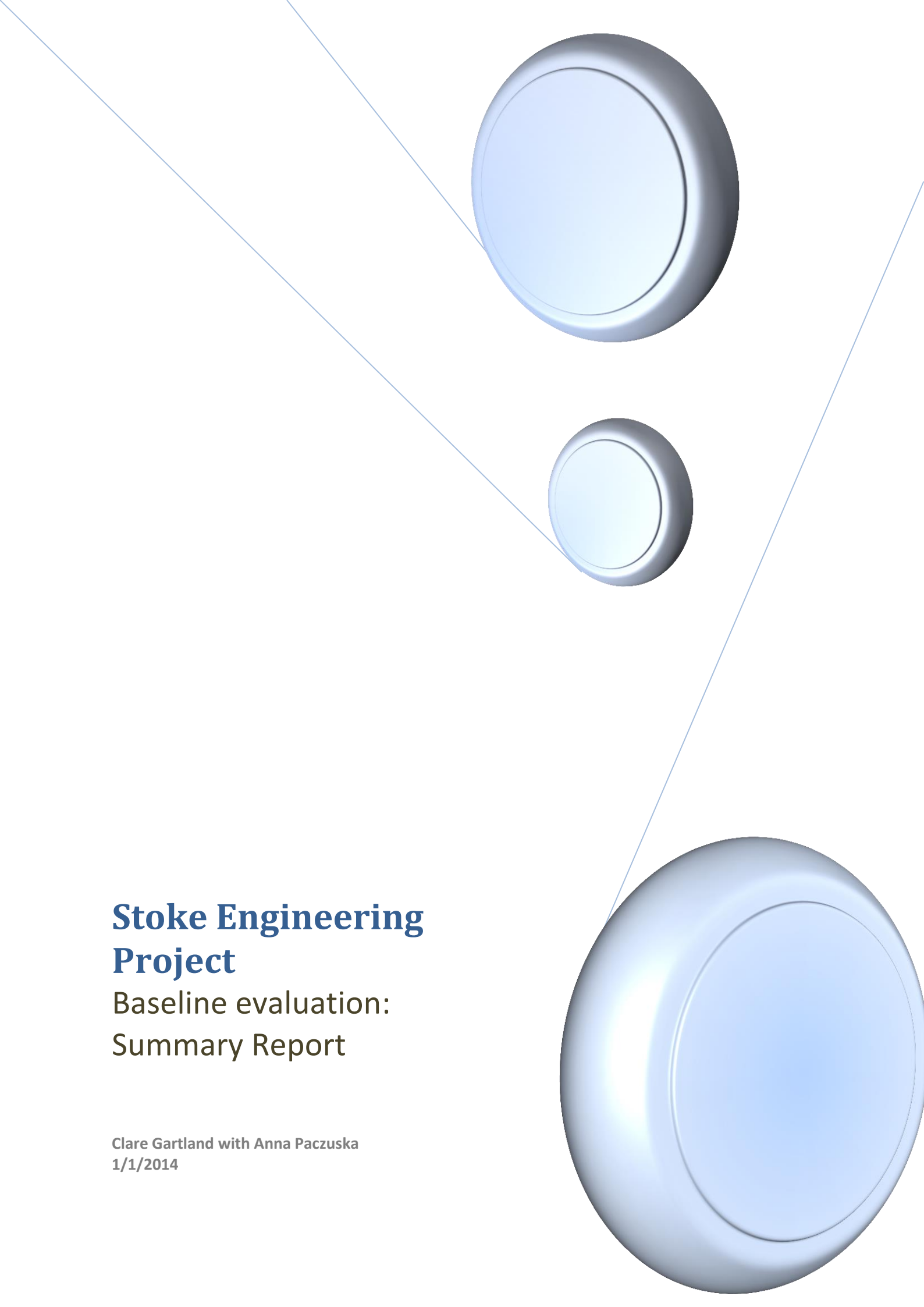

Stoke Engineering Project

Baseline evaluation: Summary Report

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1/1/2014

Introduction

The Stoke Engineering Project (StEP) was launched in November 2013 with the intention of running for at least three years. The project is a focused local project that is being developed following other successful similar projects, the London Engineering Project (LEP) and Barrow Engineering Project (BEP). At the time of the baseline evaluation four secondary schools and two post 16 colleges were actively involved; the project has subsequently recruited another secondary school and aims to involve feeder primary schools starting in September 2014. A range of STEM activity including STEM challenge days, activities in National Science and Engineering Week and National Women in Engineering Day are funded and coordinated through the project. CPD is also provided for teacher coordinators from project schools and colleges. Additionally funding is available for the set up and coordination of a Stoke Education and Skills Partnership (SESP) to promote communication and collaboration between local education providers and businesses.

The specific aims of the project are to:

- *Raise the overall profile of engineering in the local area*
- *Raise awareness of the valuable contribution of engineering to society*
- *Enrich the attainment and skill levels of local learners within the project – both through existing curriculum and extra-curricular activities*
- *Motivate more local learners to progress with STEM related studies at FE and HE, including undertaking apprenticeships*
- *Stem the outward flow of talented young people from the local area by highlighting to students the range of career opportunities available to them locally*
- *Contribute to improved attainment, extending educational pathways, widening participation and local regeneration*

The objectives of the baseline evaluation link to these aims. Specifically the baseline evaluation aims to:

- *Explore existing awareness of and enthusiasm for STEM amongst senior leaders and teachers in Stoke schools and colleges*
- *Identify the extent of whole school/ college engagement and commitment to STEM and existing cross curricular working practices*
- *Identify the extent that STEM is embedded within the school/ college curriculum and through extra- curricular activities*
- *Consider existing sense of competence and confidence amongst teachers in STEM*
- *Explore StEP coordinators' perceptions of pupils engagement with and awareness of STEM and achievement and progression in these subject areas at their institution*
- *Explore StEP coordinators' perceptions of SLT, teacher and pupil knowledge of engineering opportunities/ local SMEs and understanding of core skills required by employers*
- *Consider SME representatives' views of existing STEM provision in schools and colleges*
- *Outline StEP coordinators' and SME's initial expectations and concerns relating to StEP*

The report is organized into three sections: the first presents an account of attitudes to STEM in schools and colleges at the start of the project; the second section presents details of activity that has been developed as a result of StEP and initial project outcomes and the third explores existing relationships between industry and schools and colleges. The report offers insights into issues associated with developing education links with small companies in a geographically dispersed area and into the opportunities the project offers for increasing and widening participation in STEM by engaging large groups of students.

Evaluation framework

The baseline evaluation of the Stoke Engineering Project is an exploratory study that has involved the use of different research approaches. Data has been gathered through drawing on ethnography; participant observation was undertaken at a meeting of StEP coordinators and two initial meetings of the Stoke Education & Skills Partnership. Telephone interviews were also used to explore StEP coordinators' views of existing STEM provision at their institutions and developing project activity. Seven interviews were held in total as the coordinator role had been recently passed on at one institution and both the old and new coordinator participated.

Interviews with StEP coordinators were loosely structured around evaluation objectives but aimed to enable participants to relate and explore their own understanding, knowledge and experiences as freely as possible (Kvale, 1996). Interviews were recorded and transcribed in full. Notes from observations and transcripts were coded and analyzed drawing on grounded theory (Charmaz, 2003). The report is organized around dominant foci in participants' accounts and at meetings. Further information is drawn from score cards and notes from meetings supplied by the project coordinator.

Section 1: Schools and colleges at the start of the StEP

School and College Contexts

Six schools and colleges took part in the study. These have a variety of pupil profiles and offer a range of provision. The sixth form college comprising some 1700 students is an inclusive college drawing on twenty feeder high schools. It offers Level 2 and Level 3 courses including A Levels, BTECs, GCSEs and an opportunity for students to retake GCSE maths or English alongside doing a Level 3 programme. The student body includes a number of under sixteen aged students who have been home schooled as well as 'a significant number of looked after children'. The FE College runs a range of engineering provision including mechanical, electrical, welding and motor vehicle and construction courses. It includes a separate studio school running Level 3 courses. There are up to three hundred students on engineering courses as well as students on part-time national diploma and foundation degrees courses, HNCs and HNDs including building services students. The intake on engineering courses is predominantly male. There are active attempts to attract woman and girls but these have had limited success. Four schools were signed up to the project at the time of the evaluation. One is a mixed comprehensive, a business and enterprise college. Much of the intake is from low income families and the pupil body is ethnically mixed including Asian, Polish and Romany students. Another is an 11-16 academy in a deprived area with 20 per cent ethnic minority students. Another school is an 11 -16 science college with 'a strong engineering and technology provision'. Another academy is a Catholic school in the north of Stoke-on-Trent with a predominantly white intake but includes some students with Philipino backgrounds and some from Romany backgrounds. It has a combined sixth form with the other three Catholic schools in Stoke-on-Trent.

Existing STEM activity

Schools in Stoke on Trent had already engaged in some STEM activity and understood the importance of promoting STEM subject areas but had little experience of working collaboratively on STEM, possibly because of the large geographical spread of schools. Three StEp coordinators expressed frustration about lack of collaboration between departments around STEM. Two StEp coordinators who were D&T teachers said they felt D&T departments in general and D&T teachers in particular were seen as responsible for STEM activity. Two coordinators felt there was some willingness among teachers from other departments to become involved in STEM activity but this was hindered by organisational issues within their institutions.

Existing STEM activity was limited and teachers explained that STEM was still an unfamiliar term for many students. In three schools activity appeared to be limited to a small number of extra-curricular interventions with small numbers of pupils, but at one school, STEM was beginning to be further embedded with activity targeting larger groups of pupils. Existing activities included KMF and ENTRUST and the KMF eco car project was being run in two schools. These STEM activities were described by the project coordinator as only involving a small numbers of pupils. Two coordinators discussed interactions with local universities, including providing opportunities for pupils to talk to medical students and attend maths competitions. One coordinator described a poster from Range Rover outlining STEM careers, saying that was the only resource about STEM careers available before the school engaged with the StEP. At one school a heat transfer project had taken place within D&T lessons and there were other small cross curricular projects.

The FE College had been involved in a STEM subject learning coach project which had facilitated networking with other colleges across the region and supported the sharing of ideas and resources. This project had helped the engineering department at Stoke College to develop projects, including introducing PICAXE, which had a positive impact on project outcomes and running taster days for girls, providing opportunities for them to engage with practical engineering and maths projects. This

STEM project activity stopped when the project ended.

The StEP coordinators themselves were generally confident about leading STEM activity. This appeared due to several having had experience of teaching different STEM subject areas or having studied other STEM subjects. However, one coordinator suggested that lack of confidence amongst some teachers may account for their reluctance to take on STEM activity unless it is already prepared for them.

Institutional Agendas

Leadership team Priorities

The level of engagement from senior leadership teams (SLTs) varied. The project coordinator indicated that SLTS were very positive and several had attended the launch or the first SESP meeting. The project coordinator, however, does not normally communicate directly with SLTs but works with the StEP coordinators.

For two institutions, StEP clearly resonates with their existing agendas. One school had formerly been an engineering college and the governors were keen that the school maintain a reputation for engineering. One of the colleges had been awarded funding to build a new advanced manufacturing and engineering centre, and the SLT there are keen to promote engineering. At the other college, the StEP coordinator, who was also a senior manager, explained that while it had not previously been high on the agenda, the college was keen to move forward with STEM and lead the way for schools.

At other institutions, however, the focus on STEM was less high profile and though SLTs are supportive, other more pressing agendas, such as literacy and numeracy across the curriculum were seen as priorities. One StEP coordinator explained that the SLT were supportive but that STEM was viewed as being something s/he was responsible for and that it was not effectively embedded across the school. This coordinator viewed support from the SLT and governors as key to facilitating the development of STEM. At one school one of the governors is a StEP coordinator from another institution, which was viewed as helpful in promoting STEM at the school.

Encouraging STEM progression

Using StEP project funds to encourage progression in STEM was identified as a clear priority by some StEP coordinators. At one college, the money provided had enabled the coordinator to focus on promoting STEM to Level 2 pupils and, to girls in particular, pupils who were unlikely to consider progression into these subjects at Level 3. At the other college, the focus was more specifically on raising awareness of engineering as this is not covered in the school curriculum, especially with the decline of take up of electronics and other related subjects in D&T. At both colleges, activities directly funded through StEP or developed as a result of StEP were being used to market STEM courses at the institutions. At one college students who had been involved in STEM challenges were involved in open evenings and taster days. At the other college, STEM challenge days were used to encourage Level 2 students attending the college on a day release programme to consider engineering. At this college a particular priority was to encourage progression to Level 4. Competition between institutions for students seen to be capable of progressing in engineering was described as ‘fierce’. One college priority was to increase the number of girls on engineering courses.

Encouraging progression in STEM subjects internally was also a priority for schools. At one of the schools the StEP coordinator said STEM challenge days had been effective in promoting D&T and was being targeted at Gifted and Talented students to encourage them to continue there and not

move to the JCB Academy. The RAEng capacity to provide independent advice about routes into engineering was seen as much needed in an increasingly competitive education system.

Meeting bench marks

The need to meet benchmarks is a priority for schools and colleges. The resulting focus on GCSE results by SLTs and department heads was seen to detract from engagement with STEM. The pressure on science and maths departments was seen by StEP coordinators who were also D&T teachers, to contribute to their lesser engagement with StEP. One coordinator suggested a combined approach where cross curricular work in STEM would support attainment in core curriculum subjects. One explained that StEP project activity had been placed on hold because of pressures to support year 11 students with coursework. Another coordinator explained that this pressure led to a focus on teaching to the test and less 'risk taking' in teaching strategies.

The focus on meeting benchmarks was seen to impact on decisions about taking pupils off timetable for STEM activity days and on decisions for teachers to organise trips and leave groups of students who are studying for exams. One recently qualified teacher explained there was an additional pressure because if pupils do not achieve well, then the teacher does not receive a pay rise.

At several schools subject areas tended to work very separately and there was little timetabled opportunity for collaboration.

Section 2: Initial Project Activities and Developments

Project Activity

Overall project activities engaged 3177 young people from years 7 to 13, 1766 boys and 1411 girls. Activities involved 170 members of staff, 7 STEM ambassadors and 13 employers as well as the employers encountered by those students who went to the Big Bang Fair. There was a range of activities across the different institutions. All participants were offered a fully funded STEM Challenge Day and then were asked to bid in for other activities as they thought appropriate for contexts they worked in. Responses to this invitation were positive. StEp coordinators seemed to welcome the offer of resources for STEM enrichment and also the chance to meet regularly with other teachers.

Teachers particularly appeared to welcome the chance the project offered to work with larger numbers of pupils and even whole year groups, rather than concentrating just on small numbers of pupils. The choice of activity varied from institution to institution. At one college the focus was on using the resources to promote STEM with year 12 students, those doing GCSE top-ups and similar courses in the science and D&T areas. The target was Level 2 students and the selected activities, which as well as the Alton Towers visit included the RAEng Wheelchair activity and a Why You Should Study STEM session, had enabled successful engagement with girls.

At another college no girls were specifically involved in project activity. Here college project activity focussed on groups of year 11 and year 12 students and included Young Engineers STEM Challenge events on underwater exploration and robotics, visits to the Big Bang Fair and to a local engineering employer and Nitro Car Challenge. The coordinator seemed to view these project activities as a direct continuation of work undertaken in a previous STEM project. At one of the schools project events included a Young Engineers Day involving 53 Year 8 students which was rated 'a booming success' by the StEp coordinator. Events here targeted some large groups of KS3 pupils and focussed on Gifted and Talented students. There were roughly equal numbers of girls and boys at these events. The focus on Gifted and Talented KS3 had resulted in increased recruitment to D&T at the

school. The school had also used the Stoke Project to organize events for pupils from Years 9 and 10. Events included Ergonomics and Anthropometrics Study, Dye Sublimation Project, Lighting Project, and 3Doodler. Here the participation of girls was much lower, for example only 4 out of 53 participants at each of three events were girls.

At another school which had previously specialized in engineering there was also a focus on KS3 events including a whole year 8 group outing of 200 pupils to the Big Bang Fair. These activities accorded with the school's traditional focus on STEM and on engineering in particular. The events were all managed as part of the school curriculum 'building it within school time in the day'. This had been done because after school events would have involved fewer pupils. Pupils were taken 'off timetable' for the events which had the support of senior managers and the school governors. The school also runs a Greenpower Club (Year 10. 15 boys, no girls) and a Science Club (Years 7-9. 5 boys, 5 girls).

At one school a series of events including STEM Challenge events, a Dyson Project, Conductive Dough Project and Maths in Motion was organised for KS3 pupils during school time. There were also sixth form visits for year 10 students. The StEp coordinator worked collaboratively with the maths department and with the physics staff and explained this was possible because there were good links across STEM at the school. The school also has a Go Cart Club for years 7 to 9 (10 boys, no girls).

At another school the StEp coordinator, a D&T teacher, organised a range of activities targeted mainly at KS3 pupils. Quizzes were organised for National Science Week with prizes funded by the project. An NSEW whole year group activity based on Dyson Hoover tests was organised during D&T lessons using hairdryers. Activities involved equal numbers of boys and girls including the school's year 10 Greenpower Club.

Project coordination

StEP coordinators were positive about project activities and several said that these would not have been possible without the support of the project coordinator. StEp coordinators described how project organizers had made participation easy because they seemed to understand the pressures teachers are under. One college coordinator explained how this meant the project had fitted round participants rather than the other way around. One school coordinator equally praised a Young Engineers facilitator for understanding the different pressures from different areas of the school. The project coordinator explained that coordination has to be managed without getting cross with people and said he believed that without a coordinator the project would not be ongoing.

Promoting engagement with STEM

StEP coordinators reported strong engagement with STEM project activity amongst pupils and students. One coordinator indicated that their ambition had been to use StEP project activity to engage a wider group of young people with STEM than just those already studying STEM A level subjects and that this had been very successful .The StEP coordinator at the other college also explained that STEM days that had run through the StEP had engaged a 'broader audience'. Another coordinator indicated that StEP project activity had led to pupils equating STEM with 'something fun and interesting;'

A coordinator in one of the school described how pupils' enthusiasm for D&T and maths had been increased by their attendance at STEM days, though he expressed some concern that increased motivation was short lived. He suggested that supporting and maintaining this enthusiasm is more difficult and something that needed attention.

It was clear from coordinators' accounts that the funding provided by the project is essential in enabling these teachers to provide engaging activity of this kind and without funding this activity would not take place.

Promoting awareness of STEM

StEP coordinators indicated that initial project activity had already had an impact on students' awareness of STEM. One observed that the fact that project activity spanned schools and colleges was supporting an increasing STEM awareness amongst students. This coordinator's belief was that StEP was entirely responsible for the increased collaboration between schools and colleges around STEM.

Other coordinators said that STEM activity had reached far larger numbers of pupils than any previous STEM activity. Two teachers explained that 'cross curricular activity'' built into the school day had increased the numbers of pupils aware of STEM. Coordinators also described how projects and activities were being linked to extend and embed engagement amongst pupils. One coordinator described how a STEM challenge day for years 7, 8 and 9 linked to a Greenpower car competition that a small group of year 10 students were involved with. The STEM challenge day had successfully engaged the lower school with the competition. Without this, awareness of the competition would have remained limited to a small group of year 10 students.

At one of the colleges, activities undertaken by groups of college students during STEM days were being redeveloped for use during a taster day for potential students. StEP activities, especially where departments worked collaboratively, were also described as having increased pupils' understanding of links between STEM subjects.

StEP activities were seen to have supported pupils in understanding how STEM relates to the real world and possible careers. This was an area identified as being inadequately covered at school. A coordinator from one college explained that young people were not provided with sufficient CIAG and that the StEP project was filling an important gap in providing better information for young people. One coordinator said a STEM Challenge day had encouraged students to make connections between subjects and careers. One coordinator identified understanding of real world applications for STEM as being a 'real gap' and discussed how s/he hoped senior management would support a more integrated approach in the future by allocating time for members of staff to work together.

Collaboration across subject areas

Initial StEP project activity appeared to be effectively supporting more collaboration across STEM departments in most institutions though the extent of engagement was affected by the agendas of individual institutions. At one school, the StEP coordinator described a dramatic shift with STEM activity increasing across the school and subject areas working together to develop STEM activity. Other schools also described how planned project activities had encouraged or even forced collaboration between STEM departments where this didn't usually take place.

One of the colleges described how project activity was supporting cross curricular collaboration in STEM. An introduction to prospective new students to the college was planned which included an activity that ran across STEM subject areas. One coordinator observed that members of the science and maths departments at her school sometimes appeared reluctant to get involved with STEM but were enthusiastic if presented with pre-planned activities

Participants discussed how the funding made available through the project to buy new equipment was supporting cross curricular collaboration. One coordinator described how the funding had drawn in a reluctant science department at the school though their engagement was still limited. Lack of formal meeting time with other departments was identified as problematic by coordinators.

In some instances, collaborative work had been supported by individual coordinators' own extended areas of responsibility and teaching. One coordinator described how responsibility for Art had enabled them to use the large art rooms for whole year group activity and another how teaching science as well as D&T had enabled her to introduce more STEM activity to pupils in the science department.

StEP coordinator meetings were seen as a useful site to develop collaborative working. One StEP coordinator suggested that StEP coordinator meetings should include discussions about what they had used funding for, as input from science and maths coordinators would be usefully fed back to these subject areas at their schools. Another described how members of staff from different STEM subject areas had attended StEP coordinator meetings and that this had supported collaborative work at the college.

Section 3: Partnerships with industry

Background

Businesses were approached to become part of the project by joining a Stoke Education & Skills Partnership (SESP) with local education providers. Initial meetings drew representatives from KMF, Olympus Engineering, Alstom, Goodwins International, Grenville Engineering, and Axair. StEP coordinators and/ or senior leaders attended from: The Cooperative Academy, Haywood Academy, Sandon College, St Margaret Ward Catholic Academy, Trentham High and Stoke FE College.

Existing links

Existing relationships between schools and colleges and industry varied widely and partly depended on whether institutions ran vocational courses in engineering related subjects. The FE College had extensive connections with local engineering companies through apprenticeship schemes and HND/ HNC programmes. Apprenticeships were seen as providing opportunities for collaboration between the college and local businesses. SMEs were viewed as less likely than larger companies to provide higher apprenticeships. Whilst clear benefits for employers and young people were seen in higher apprenticeship programmes, most current apprenticeship programmes at the college are ' bespoke Level 2 and Level 3 engineering apprenticeships' with 'fabrication and welding' identified as growth areas. HNCs and HND programmes were seen to appeal to larger engineering companies and for people on a different career trajectory, for example those interested in planning and design.

At one school which was running an engineering GCSE, the coordinator reported strong links with industry. Links at other institutions were developed by engaging in project activity run by industry. Some coordinators' accounts indicated that knowledge about industry was limited to particular departments or to senior leaders. One coordinator, also a senior leader, commented that while the college has no direct involvement with engineering companies the SLT is aware of the skills industry needs and stressed the importance of developing links between the college, young people themselves and industry.

Motives for engagement

The project coordinator suggested that the predominance of SMEs in Stoke compared to Barrow was likely to provide more challenges for company engagement as smaller companies are not as well-resourced and do not have designated people to engage with schools. Another issue is that larger companies in Stoke are already committed to working with schools, especially KMF. An assumption made by companies generally was that SESP would be a new project requiring substantial commitment. During meetings KMF emphasized existing commitments to 35 primary and secondary schools and questioned their capacity to do more. Alstom, another large company, expressed similar

concerns. One issue was that STEMNET was an existing point of contact and Alstom would not want to provide ambassadors independently of STEMNET. Another was that Stoke was not local for one business.

A key factor identified as likely to impact on the success of the SESP was whether businesses view the partnership as beneficial to them. This was emphasized by one StEP coordinator who suggested that industry needed to be convinced that schools would be providing pupils with relevant skills. This presented the relationship as being between individual schools and industry with schools providing appropriate skills so pupils are seen by industry as good potential employees. The project coordinator was keen for the SESP to work to develop skills across the whole student population to support all businesses needing these skills rather than focusing on individual relationships between schools and businesses with individual companies competing for young people in the same pool.

Schools and colleges were positive about engagement with industry seeing it as broadly beneficial for pupils. The FE College identified a range of specific benefits that could come out of closer working relationships with industry. These included developing practical skills through accessing industry standard equipment. Industry sponsoring student access to equipment was seen as an ideal outcome. Another positive outcome was to effectively engage and motivate young people by providing them with an understanding of what they are working towards. Effective industry links that enable young people to progress into working for companies were seen as a way of supporting recruitment to college programmes.

Businesses suggested areas of work that may motivate engagement with SESP. These included a concern that apprenticeships currently do not receive enough publicity in schools, the need to recruit engineering technicians, a focus on recruiting women and targeted activity to engage girls and identifying strategies to engage parents who were seen as 'key ' in effectively motivating young people towards STEM jobs and careers.

Different perspectives: industry and education

The project coordinator identified a need to promote better understanding across sectors. Specific issues that affect working relationships include businesses' lack of awareness of the constraints on schools and schools' ability to engage with activity within short time frames and to respond to invitations and requests.

Conversations revealed different priorities for businesses and schools. Businesses felt teachers are not 'up to date' in their knowledge about jobs and that there is currently a 'big gap between what teachers think and the reality'. There was concern that young people do not leave school or college with appropriate practical skills. A lack of soft skills was also identified as a problem. Missing skills include 'general communication skills', the ability to 'write a letter or report' and understanding how to present at interview. Business representatives observed that young people need to have a positive attitude to work and 'a core grounding in the basics'. There was general agreement that it was better to recruit 18 year olds than 16 year olds as they are 'more rounded once they've been through college'.

Businesses felt that schools did not use work experience well and used valuable work placements on young people without a genuine interest in engineering. There was also frustration that funding for year 10 work experience has been withdrawn and that schools can no longer afford the health and safety checks required.

Representatives from schools focused on what qualifications and grades industry want young people to leave school with. There was discussion about the education focus on the EBAC to the detriment of D&T in schools. The EBAC, so important to schools and their rating in league tables, was not familiar to all business representatives. Other discussions revealed the mismatch between school

and business agendas. The focus of businesses was on the need to prepare young people for employment. This did not appear to relate to schools' focus on examination success. Schools reported that budgetary constraints have made it difficult to resource practical activity.

Both schools and business discussed the need for better CIAG for young people. One company said that parents discourage young people who attain A and B grades from taking up jobs or apprenticeships in favour of university, but that the company needs young people with good maths skills. The need to reach more girls was also raised by both business and schools. Teachers discussed the low number of girls on D&T courses, and businesses identified problems with recruiting women. One company suggested their female apprentices could be available to provide role models for girls. Schools also identified the need for accessible information for young people regarding progression routes into engineering jobs. One business commented that such information was available on their website, but it was clear that schools were not accessing this. Discussion around the timing of careers fairs concluded that the current focus on year 10 and 11 students is too late to influence young people's choices of relevant subjects.

Developing collaborations

An SESP meeting in May agreed that a future meeting with a focus on supporting progression should take place. The project coordinator viewed this as a successful outcome and expressed the hope that this would lead to businesses developing a better understanding of how to work more effectively with local schools. The project coordinator identified the engagement of school SLTs as important in supporting the SESP and in raising businesses' awareness of the pressure on schools in relation to GCSE results.

The future direction of the SESP was seen to 'depend very much on the shared dialogue in meetings'. The project coordinator outlined how it was important to understand the different starting points of those involved.

Points for consideration

This evaluation study suggests that before the Stoke Engineering Project there was little coordinated STEM activity in the majority of schools and colleges in Stoke and that the project is quickly and effectively becoming established in institutions, raising the profile of engineering and STEM more generally and engaging larger numbers of students. This study highlights features associated with the particular setting of the StEP which is being set up in a very different context to previous initiatives such as the London Engineering Project and Barrow Engineering Project. One key difference is that the project is functioning in a landscape where both schools and businesses are geographically dispersed and there is little history of collaboration between institutions. Another difference is that businesses in the region are predominantly SMEs. One important difference to larger companies is that SMEs are unlikely to have personnel readily available to engage with project activity. This context provides particular challenges and it will be especially important to closely monitor businesses levels of engagement with the project.

It is clear from participant comments that dedicated project funding and the presence of a project coordinator are seen as vital to driving the development of STEM activity. There are some areas of focus that the evaluation highlights:

- It appears crucial that there is sustained liaison between the different groups involved to support the development of SESP and to ensure a sense of purpose and engagement is

maintained. Further detailed exploration of what businesses hope to achieve through SESP as the project develops may usefully support its development.

- StEP coordinators welcome the opportunity the project provides for meeting teachers from other institutions and coordinators' meetings appear to provide a valuable link between schools and colleges across Stoke. The opportunity to share good practice provided by these meetings and the chance they offer to promote and encourage collaboration between STEM departments in schools and colleges as the project develops could perhaps be further developed to support project progress.

- Institutional agendas and particularly the need to recruit and retain students are powerful drivers in schools and colleges and monitoring how these foci are affecting project development in individual institutions could be valuable. While senior leaders are clearly supportive of the project it may be worth developing further formal ways of engaging SLTs and governors with project activity to encourage their understanding of and commitment to project objectives.

- Project activity has begun to successfully target large groups of pupils, extending existing pupil engagement with STEM. It will be important to closely monitor numbers engaged with project activity in schools and colleges and to encourage the use of resources to continue this engagement beyond existing small groups of pupils on particular courses. This is also important to increasing the profile of STEM and encouraging participation amongst girls as existing groups of students involved in D&T and engineering are often male dominated.

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