Research Brief

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AFTER SCHOOL SCIENCE AND ENGINEERING CLUBS EVALUATION INTERIM REPORT

1 Introduction

The Roberts Review in 2002[1] cited evidence of increasing attainment in Science, Technology, Engineering and Maths (STEM) subjects, but of ongoing decline in progression into the study of STEM subjects and careers.

As part of a wider drive to make the UK more competitive in STEM, one of the initiatives underway is the funding of 250 After School Science and Engineering Clubs (ASSECs) to provide additional resources for pupils who show promise in these subjects.
The ASSECs are aimed at

- enhancing and extending the key stage 3 curriculum
- improving attainment in, interactions with and experiences of science among those pupils already showing interest and ability in these subjects
- encouraging these individuals to consider continuing their education in STEM
- improving collaboration between schools, and between schools and industry and the research base

An evaluation has been commissioned by DCSF to guide best practice and evaluate the impact of the clubs on pupils. This interim report signals the emerging findings of that evaluation, with a focus on a formative evaluation at this stage, to gauge the initial reactions and lessons to learn from the roll out of the ASSECs.

The study's final report in September 2008 will make further recommendations about best practice and hopes to signal what impact the clubs may be having both on pupils and school staff and possibly more widely.

2 Key Findings

- Although there are some delays and changes to how ASSECs are being run, these are mainly in the more ambitious programmes, or due to difficulties in sourcing equipment. The scope and breadth of activities outlined in the clubs initial plans that schools made is, by and large, well underway, and a range of subject departments are involved.
- Even at this early stage, there can be little doubt that ASSECs are perceived as a success by teachers.
- Across the 20 schools interviewed, there is evidence of support from teachers (even those who admit to being cynical in the first instance) and good participation of pupils alongside support from parents.
- Involving pupils who may not be the best behaved or most motivated in class is also anecdotally reported as having a beneficial effect.

[1] H.M. Treasury (HMT/Roberts) (2002), Set for Success (Final Report of Sir Gareth Roberts' Review)

department for
children, schools and families

- Some challenges are reported in maintaining clear links between Science and Engineering, but, by and large, this is being addressed through thematic approaches or long-term projects.
- The biggest success factor is clearly the ability to use funding in response to pupils' interest, and local business opportunities to motivate and enthuse pupils. However, the availability of specific funding which only benefits certain pupils has raised questions for teachers of inclusivity and equality of access. Sustainability is also an issue for schools, although some schools plan to use other budgets (e.g. Gifted and Talented budgets, the departmental budget or the Individualised Learning budget) in future.

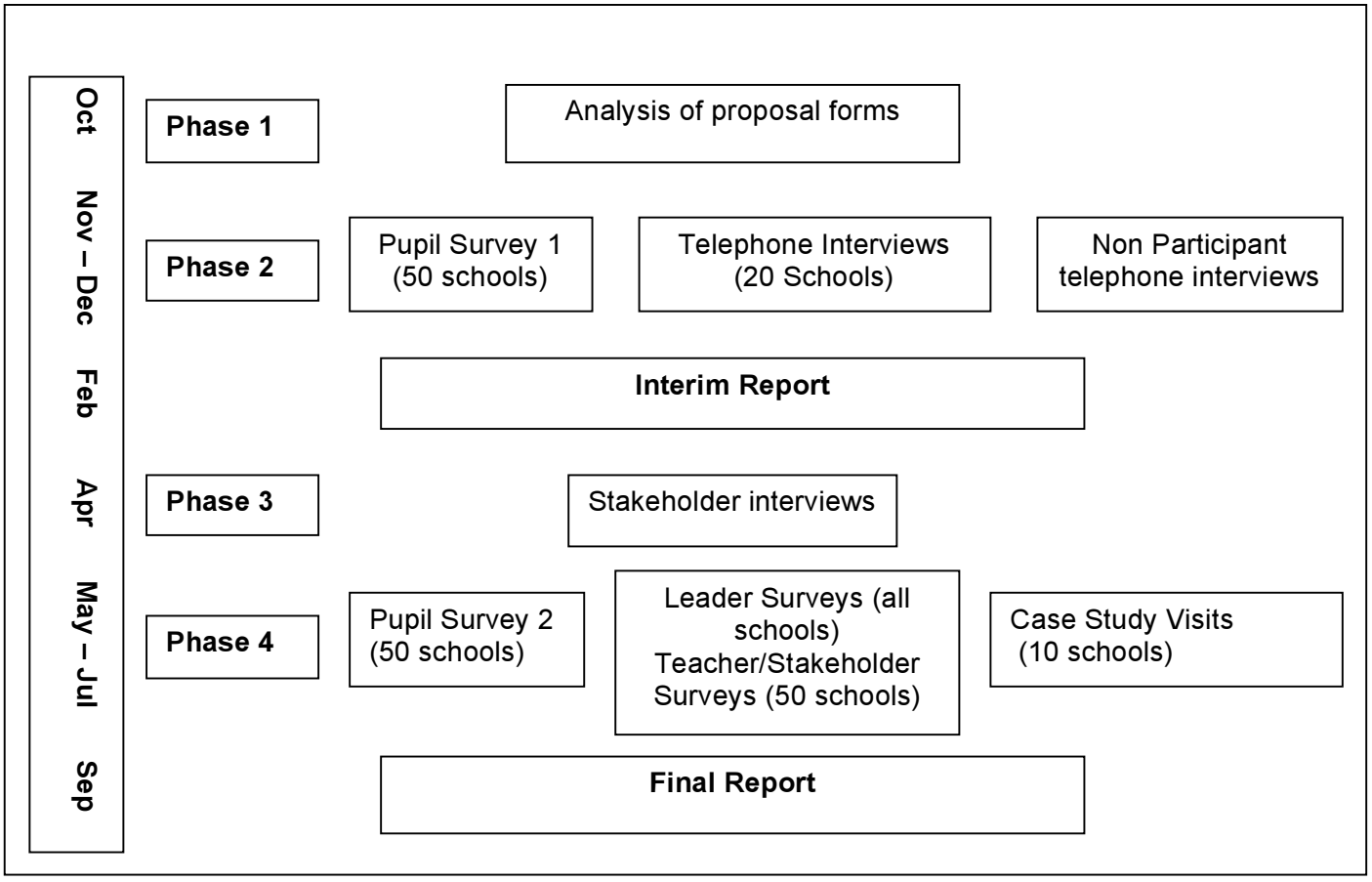
3 Objectives

DCSF commissioned Sheffield Hallam University to evaluate the running of ASSECs to inform best practice and how best to support a wider roll out of the scheme.

In the first instance, this interim report focuses on the impressions of those running and/or leading the clubs and other staff involved to inform best practice and explore any issues that may be emerging. In the final report due in Autumn 2008, evidence will also be reported on the impressions of pupils and the impacts the clubs might have achieved, and further longer term analysis it is hoped will be able to identify any impacts on attainment and progression of pupils who benefit from the ASSECs.

4 Methodology

4.1 Overview



4.2 ASSEC school interviews

20 schools took part in structured telephone interviews in December 2007 and January 2008. Interviews were either with Club Leaders, or Heads of Department, or those supporting Club Leaders. The interviews were conducted

- to provide an early indicator of 'process' issues
- to provide a method for purposive sub sampling for the case study visits
- to feed into the design of the teacher surveys
- to verify how closely the initial proposal forms drawn up by schools for clubs match implementation on the ground

Interviews took between 45 minutes and an hour, and followed a standard topic guide.

4.3 Non-participating Schools

A brief structured telephone interview was conducted with schools that decided not to take part in the programme. A sample of 23 schools was selected, stratified by region, with schools randomly ordered within these groups.

Interviews were conducted, with the Head of Science in 15 of the schools, another science teacher in 5, the Headteacher's assistant in 2 schools and the Extended School coordinator in one. This involved a short structured telephone interview exploring reasons including school-related issues; local contextual issues; programme-related issues.

4.4 Pupil Survey

A random stratified sample of 50 schools was selected approximately weighted across the regions to reflect the population. An information pack and Parental Consent Form were sent to the schools in early November 2007. An on-line survey was opened in late November to the 50 schools, including to both ASSEC members as well as non-club members from the same year group who would act as a best available 'reference group'. Clearly the non club members will not act as a perfect comparison group because allocation to the clubs is based on latent enthusiasm in the subjects covered.

Although the period for completion of the survey had to be significantly extended, this has helped to achieve a good response rate. In total, 44 schools had participated in the survey, including 955 pupils by 25 January 2008[2], (with approximately half this number being ASSEC members, the other half being non-members). The questionnaire included

- information about schools that participated in the survey;
- characteristics of pupil respondents;
- pupils' attitudes to science and engineering in the early stages of the programme.

5 Findings

5.1 ASSEC school interviews

5.1.1 Club characteristics

- Clubs were typically running for 1 to 1 and a half hours after school, with occasional other meetings, and most often had between 11 and 20 members largely drawn from Year 8. Clubs were usually led by a senior science teacher, working with technicians, and one or more members of other departments. 3 Clubs involved pupils in decision-making.
- Student participation in developing activities is the exception rather than the norm at this stage, although there are plans to develop this further in some schools and some proposals clearly highlighted this as a second term activity. Where Pupils from Years 11, 12 and 13 have been involved in a mentoring or Leadership capacity, this is working well and should be promoted as best practice.
- All but one of the clubs were using projects lasting some weeks, with common topics including solar power, rockets, forensic science and robotics. All but 3 schools articulated some degree of 'fit' with the science and sometimes other Key Stage curriculum.
- Nearly three quarters of these clubs had links with more than one department, and there were a small number of examples of collaboration with other schools.
- Engagement with business was not as widespread as might be imagined, with only 12 schools having or planning to link with businesses. Reasons for lack of engagement included lack of time, and few businesses in rural locations.

[2] Questionnaires returned after this date are not included in the data analysis for this report. They will though be included in the final report

- Whilst most schools report it is as yet too early to report anything other than anecdotal impact, all have strategies to address this in their proposal forms. Impact measures mainly relate to results, uptake of science subjects at Key Stage 4, internal tracking systems, before and after attitude questionnaires and evaluation by local advisers or Higher Education Institutions.
- Similarly, schools planned to maintain a record of developing links with Business and Industry, or Further and Higher Education partners, and this should also be followed up as projects become more established. Whilst schools were to some extent aware of the STEM agenda, use of SETPOINT support was more limited than would be expected.

5.1.2 Teachers' Impressions

- It was too early to provide solid evidence of impact on the pupils, but there was anecdotal evidence of increased enthusiasm, motivation, participation, and aspirations. Three schools reported positive impacts on older pupils who were involved as mentors.
- The biggest success factor is clearly the ability to use funding in response to pupils' interest, and local business opportunities to motivate and enthuse pupils. Paradoxically, the availability of such funding which only benefits some pupils has raised questions of 'inclusivity' and 'exclusivity' and equality of access. Sustainability is also an issue for schools, although proposals show plans to use Gifted and Talented budgets, the departmental budget or the Individualised Learning budget.
- Some problems were noted, mainly related to time and lack of experience, and in some cases, small department size. Staff in small departments tend to have multiple responsibilities and attendant time and other pressures. Overall, though, these schools viewed the clubs as a rewarding and positive experience.

5.2 Non-participating Schools

The main reason given by schools for not participating in the ASSEC initiative - by 7 of the 23 schools asked - was 'Staffing issues' These issues included understaffing or over-stretched staff (11 schools) and new members of staff, (8 schools, where in 7 schools the new staff member was the head of department.)

- Ten schools of the 23 approached explained that they had clubs already in place, to which staff were already committed. Nine said that 'timing' was an issue - for example bad timing due to other priorities, staff absence or a new Head of department. A small number (3 schools) mentioned the time needed to complete the original proposal forms as a barrier.

5.3 Pupil Survey

5.3.1 Data limitations at this stage

Note that in this interim report it is difficult to draw conclusions about the impact or effect of ASSEC clubs based on how pupils feel at this early stage. As ASSEC clubs are designed for pupils already showing enjoyment or promise in STEM subjects it is to be expected that they will be more positive overall in these areas. The final report will be able to draw out conclusions more effectively, but it will be necessary to monitor how well ASSEC members perform in the in the longer term to better identify measurable impacts.

5.3.2 Pupil characteristics of ASSEC and non-ASSEC members

- The initial pupil survey of 955 pupils involved a range of different types of schools such as specialist science or engineering colleges, specialist schools, single sex schools, church schools, and schools in rural locations or which had rural catchment areas. The survey data collected show a balanced proportion of both boys and girls, and science club members and non-members participated in the survey.
- Much higher proportions of science club members 'strongly agree' with all the positive statements about science and mathematics compared with non-club members, although half of the non-members stated that they are interested in and enjoy learning science.

5.3.3 Pupil attitudes

- The vast majority of science club participants (82%) reported that they like after school clubs and activities, compared with only 55% of non-members.
- Boys show more positive attitudes to science and mathematics, enjoying it more and finding it easier than the girls, both within and outside the science club, although more girls stated that they like coming to school.

- Girls are more likely to select 'undecided' answers than boys in general.
- There is progressively less interest in science and mathematics, and for after school clubs as a whole, from Year 7 to Year 9. An increasingly larger proportion of pupils reported enjoyment of mathematics lessons from Year 7 to Year 9.
- The proportions of pupils planning to carry on education at 16 and to go to university are higher within the science clubs than those in reference classes. Still, about a quarter of science club members and a third of non-members were not sure if they would plan to go to university.
- Science tends to be the most popular subject of science, mathematics and engineering for both ASSEC members and non-members, although ASSEC participants are more positive about studying all three subjects at all future stages.
- The survey reveals stereotypical attitudes to studying engineering, and particularly of girls, with only one fifth of ASSEC members and 5% of non-members wanting to study it beyond GCSE.
- The ASSEC members, both boys and girls, are more interested than non-members in future jobs in science and engineering, although a larger number of them remained undecided if they want to be a scientist or an engineer (40%).
- There is no evidence of a relationship by age group with attitudes to careers in science and engineering, which indicates that pupils of this age may not relate their attitudes to school and after school clubs or their interests in science and engineering subjects to a future career in science and engineering.

6 Conclusions

- At this stage in the project life cycle, evaluating impact and effect are not possible, as we are collecting base-line, or early stage data. However, we have been able to build a clear picture of the type of activity going on in After School Science and Engineering Clubs, and to some degree match this with schools' original proposals.
- In the teacher interviews, the overall impression gained was one of a successful initiative in the eyes of those still in the early stages of establishing their Club. Most plans are being implemented and are recognisable as being based on their Club applications. A key challenge has been to create programmes which encompass both science and engineering, and this has been achieved mainly through the adoption of a topic or themed approach, allowing subject barriers to be less of a barrier. Schools indicate an increase in terms of working with external organisations e.g. businesses and Higher Education Institutes. STEMNET, particularly through its Regional Directors, already plays a part in supporting Clubs and Club activity.
- Some schools that had initially declined to join the ASSEC initiative did so for the short term, and expressed possible interest in an invitation issued, for example, in the following year. Any expansion of the Club initiative should perhaps focus initial efforts on those schools who 'deferred' at the first time of asking.
- One specific area to address, emerging from both participant and non-participant interviews is the difficulty for small departments to engage with and benefit fully from the project. It should be considered how best to support such departments.
- In the quantitative pupil survey, we found that attitudes to science and mathematics were more positive in the Club cohort than in the non-participant groups. This is likely to be as a result of the ways that pupils were recruited to join the Clubs, where some predisposition to science, engineering or mathematics is expected. Boys surveyed showed more interest in science and mathematics than girls, again reflecting much of the research literature on gender issues and science.
- There are significant numbers of young people in each group who did not express an opinion in response to many questions. This gives us some hope that the club may be able to inform their views in a positive way before the second survey.
- Interestingly, whilst general attitudes towards science declines across Y7 to Y9, there is a less marked reduction in attitudes to careers in science. This may either be because career choice comes later, or career choices are unaffected by attitudes to particular subjects.

  As stated above, as this is a report on the base-line or early-stage data gathering phase, it has not been possible to identify significant impacts. The intention is to use a second phase of data gathering, including a follow up to the pupil survey, to get some measure of change in pupil attitudes.

7 Additional Information

DCSF Research Briefs and Research Reports can also be downloaded for free at: www.dcsf.gov.uk/research/

The full report is currently scheduled for publication on Thursday 30th September 2008, although this date is subject to change.

Further information about this research can be obtained from Joseph Lovell, 6D, DCSF, Sanctuary Buildings, Great Smith Street, London SW1P 3BT.

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