University of Glasgow | Robert Owen Centre for Educational Change

Evaluation of the SSERC Primary Cluster Programme in Science and Technology

Final Report

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Key findings

The main findings contained in this final evaluation report of the SSERC Primary Cluster Programme in Science and Technology reveal that it has been extremely successful in meeting its stated aims. In particular, it has developed and implemented a model that has empowered mentors who have:

- liaised with colleagues to identify needs, adopting a collaborative action-research model to inform practice and providing professional development sessions;
- provided support and guidance for science and technology to other teachers in their school and cluster;
- raised levels of confidence and expertise regarding teaching science and technology;
- developed teachers' pedagogic and assessment skills;
- promoted and exemplified more varied approaches to learning and teaching of science and technology;
- promoted more science and technology activities in classrooms;
- promoted collegiality between staff in school and across cluster schools;
- facilitated a network that has shared ideas and expertise and influenced the direction of appropriate CLPL;
- increased pupil and teacher engagement with science and technology;
- increased awareness of sources of support for teaching science/technology.

There was consensus across mentors, senior management and other teachers in the schools regarding the Career-Long Professional Learning (CLPL) Programme's high level of impact. Almost all respondents in these groups agreed that the Programme had a positive impact across the range of evaluation criteria, including those specified above. In a number of instances, senior managers and other teaching staff were more likely than mentors to suggest that the mentoring development had impacted to a large extent demonstrating the broad impact that is visible to mentors' colleagues in their clusters.

There was an extremely high level of praise for the SSERC staff delivering the training, the organisation and content of the CLPL events as well as the quality of the associated resources and follow-up support. In addition to the quality of the SSERC CLPL, other factors appear to be key to the success of the model. These are: the collaborative developmental/ research activity approach that focused mentors' reflective planning and activity; mentors working collaboratively across clusters to assess and address colleagues' science and technology teaching needs and having

the support of school management for mentors' work. Indeed, the evaluation has highlighted the importance of having sufficient time in schools for mentors to plan and provide appropriate support for colleagues and, linked to this, having the support of school management to reflect the lessons learned from mentors' work in school planning. It should be noted that the time and effort invested by SSERC personnel to liaise with headteachers and local authority officers has played an important role in facilitating the support of senior management across the schools and alignment of the Programme with local authority policies and priorities.

Key recommendations

The findings suggest a number of recommendations which are detailed in Section 7 of the report and address the following issues:

- Sustaining and expanding the Programme. Given the very positive evaluation findings, the SSERC primary Cluster CLPL Programme should be sustained and expanded. The need for such a Programme delivered by SSERC as an established and trusted provider is particularly salient given local authority officer feedback on the increasing staffing and resource challenges they face in supporting schools' CLPL;
- Exploring how best to build on the initial impact of the Programme within and across Local Authorities;
- Exploring ways to enhance primary and secondary partnerships regarding the teaching of quality science and technology and particularly for points of transition;
- Extending the SSERC primary mentor model to the secondary sector as a way of addressing that sectors' particular needs;
- Exploring ways that the CLPL model can enhance the Early Years – Primary transition across the clusters;
- Recognising that stakeholder feedback highlights that SSERC is exceptionally well placed to inform the focus of national science CLPL and models for its delivery and to be at the centre of national efforts to promote teachers' ability to effectively teach science topics;
- Developing SSERC's strategic partnership with Education Scotland that recognises SSERC's unique position regarding their expertise and close relationship with schools and networks of key partners, professional bodies and associations within and beyond Scotland;
- Education Scotland and the Scottish Government should ensure that SSERC has maximum opportunity to extend the Primary Cluster Programme with its local authority partners;
- Recognising the need for further research on the longer-term impact of the SSERC Primary Programme;
- Developing international perspectives and links with other similar programmes.

Section 1: Introduction and context

The Scottish Government and SSERC and NSLC identified the need for a national programme to improve the confidence and expertise of primary teachers in science and technology. SSERC's proposal for their SSERC Primary Cluster Programme in Science and Technology cites various research sources such as the SEEAG report (Scottish Government 2012) that highlight the need for a focus on promoting the confidence and competence of primary teachers to effectively teach STEM education (section 2.1 p4). The CLPL model builds on SSERC's effective professional development programme but is also informed by the HMIE publication: *Learning Together – Improving teaching, improving learning (HMIE 2009)*. This advocates central CLPL supplemented by follow-up events and activities at cluster and school levels.

Research, including that cited in EPPI systematic reviews of research evidence (Hargreaves D, 2003, Hopkins and Harris 2001, Cordingley et al 2003 and 2007) has identified key features of CLPL that are likely to impact on the skills and knowledge of teachers and ultimately on pupils' learning. These studies stress that at the core of effective CLPL are reflection and professional learning (Harris *et al* 2005). Such reflective CLPL is seen as central to school improvement and transformation (Gray, 2000; OFSTED, 2000; Harris *et al*, 2005, Harrison et al 2008).

The SSERC CLPL approach with teacher mentors supporting their cluster schools at its core is well founded given that much of it is grounded in research evidence and the wider literature. For example, research has shown that teachers' professional development is much more likely to be successful when it "involves collaboration between staff and that effective mentoring and coaching is key to this professional development" (CUREE 2011). Such research has found that when teachers worked together on a sustained basis (over at least one term but more usually two or three terms), this collaborative and sustained CLPL was linked to positive effects on:

- students' learning, motivation and outcomes;
- teachers' commitment, beliefs, attitudes, self-esteem and confidence in making a difference to their pupils' learning;
- teachers' repertoires of strategies and their ability to match their teaching approaches to pupils' different needs;
- teachers' attitudes to their pupils, the curriculum and to learning; and
- teachers' commitment to CLPL.[1]

Hargreaves' (2005) research has also explored the spectrum of mentoring, coaching and the value of mentors as a 'critical friend' in CLPL. It is arguable, then, that the core component of the SSERC model is particularly innovative and novel. This is the emphasis on supporting nominated teachers in each cluster who then act as mentors to drive and support the Science and Technology professional learning and development of their peers. For this reason a rigorous independent evaluation was

[1] http://www.curee.co.uk/mentoring-and-coaching

warranted, not only to assess its impact but also to inform thinking on effective CLPL approaches.

1.1 Programme aims

The main aims of the Programme are for all primary teachers in a cluster in the areas of science and technology to:

- raise levels of confidence and expertise;
- further develop pedagogic and assessment skills;
- develop further individual professional practice;
- develop further collegiality.

1.2 The CLPL model

The cluster approach involves centralised training involving two residential events; Part One, consisting of three days and Part Two consisting of two days. During the five-month interval between the events, the teacher-mentors implement a 'task' in their schools and clusters. Mentors from a cluster work as a group in a session at the first residential event called 'cluster conversations' with a view to jointly devising an approach to the task of designing and implementing a programme of Career Long Professional Learning that will support promoting science and technology teaching in their cluster. The mentors adopt a collaborative action research approach to implement and evaluate their task. During Part 2 of the residential, the cluster mentors, working as a group, showcase progress and impact of their work to date. This is shared with the other clusters from their own and other local authorities participating in the same residential. Additionally, and with a view to promoting collegiality across the primary/secondary sectors, clusters have invited colleagues from the associated secondary school to the Showcase. Local authority officers with responsibility for science and technology have also been invited.

This process is supplemented by access to follow-up CLPL events and activities at cluster and school levels provided by a range of accredited agencies and individuals, SSERC on-going support and interactive e-learning via Glowmeets. Each cluster receives around £4,000 to help support the work.

The role of the mentor-teachers is to work with mentor colleagues to:

- disseminate relevant activities / information;
- share training experiences amongst other primary teachers working across CfE levels;

- liaise with colleagues to identify and select professional development sessions;
- provide support and guidance for science and technology to other teachers in the cluster;
- promote more science and technology activities in classrooms;
- promote and exemplify more varied approaches to learning and teaching of science and technology;
- promote collegiality between staff across all cluster schools;
- be part of a network that will share ideas and expertise and influence the direction of appropriate CLPL;
- promote science and technology pursuits outwith everyday classroom activity which enhances and enriches the curriculum.

By November 2015 the SSERC Primary Cluster Programme had involved the following:

- 21 Local Authorities
- 56 clusters
- 313 schools
- 313 mentors
- greater than 280 Face to Face workshops
- greater than 50 'interactive e-learning sessions (SSERC-meets), sometimes run through Glow'
- 2,400 teachers
- 8,300 attendances.

1.3 Aims and objectives of the evaluation

SSERC commissioned a research team from the SCRE Centre (now a part of the Robert Owen Centre for Educational Change - ROCEC) at the University of Glasgow, to conduct an evaluation of the SSERC Primary Cluster Programme in Science and Technology.

The main aims of the evaluation are to:

1. gauge the standard and satisfaction rates regarding the CLPL across the participating local authorities;
2. collect baseline data on mentors' needs, aspirations and plans and then assess the impact from the perspective of mentors, teachers, headteachers and other relevant key stakeholder groups;
3. use the emerging findings to inform and refine the development of the Programme and to feed into knowledge exchange process with SSERC's local

authority members, ADES and other relevant professional bodies.

1.3.1 The research approach

The main research approach for the evaluation comprises:

a) survey of teacher mentors: This involves a census of all the participating teacher mentors at two points in the Programme:

i) upon completion of part one of their residential event to allow identification of needs, aspirations etc.

ii) six months after the work has begun in their cluster. This gives sufficient time for the work to have developed and progress to be assessed. It focuses on mentors' perceptions of their work and their impact on cluster schools, teachers' practice, aspects of the curriculum and pupil engagement, enthusiasm and attitudes towards science and technology.

b) *postal survey of all headteachers/senior management* in *those clusters where teacher mentors have been involved in the SSERC CLPL Cluster Programme.* This took place 9-12 months after the first residential events, giving time for the work to have developed and embedded itself in schools. It focussed on headteachers' perceptions of the work of the mentors and its impact on teacher practice, aspects of the curriculum and pupil engagement, enthusiasm and attitudes towards science.

c) *on-line survey of all teachers in those clusters where teacher mentors have been involved in the SSERC CLPL Programme*. This again took place almost 12 months after the work began in their cluster. It provided data to triangulate with findings from mentor and headteacher data. It focussed on teachers' perceptions of support received (from both mentors and wider SSERC activities/events) and impact of the initiative on teacher practice, aspects of the curriculum and pupil engagement, enthusiasm and attitudes towards science.

d) focus groups with mentors with a purposive sample of teacher mentors across the participating schools at the end of their first and second CLPL residential sessions. These discussions explored in detail participants' views of the CLPL experience, its ability to prepare them for working in their clusters and, from the second session, progress to date.

e) *supported action research/reflective practice*. The Glasgow University research team provided self-evaluation input during initial sessions as appropriate to mentor teachers to supplement the input from SSERC to enhance teachers' reflective practice capacity. This input was primarily aimed at encouraging teachers to keep a reflective diary to provide a narrative to inform their practice, the evaluation and, if desired, to contribute evidence for possible accreditation of their learning.

f) observation of CLPL events. These included; i) observations of a sample of Part 1 and Part 2 residential training events for each participating local authority and ii) observation of a sample of non-residential CLPL events selected from the range

of courses offered by SSERC approved providers as part of the wider Programme support available to the clusters. These observations provided valuable insights to enhance the interpretation of the data and provide an opportunity to gather additional feedback from participants. To date, the research team have collected 60 reflective diaries.

1.3.2 Survey and administration

Mentor questionnaires are distributed as part of the final session at Part 1 and Part 2 CLPL residential events. The headteacher questionnaires were sent out at the end of the summer term 2013, 2014 and 2015. The headteacher questionnaire also asked headteachers to make their teachers aware of an online questionnaire designed to gather evidence of the impact of the initiative on teachers across the clusters. Mentors were also provided with guidance on the use of their reflective diaries during the initial (Part 1) CLPL event and were asked to bring along their diaries at the follow-up (Part 2) CLPL event.

1.3.3 Approach to analysis

Analysis of questionnaire returns was conducted using SPSS (Statistics Package for the Social Sciences) and largely comprised the running of frequencies and cross-tabulations. Anonymity of responses meant that we were unable to match and track responses from individuals. However, analysis of responses would appear to indicate that the overwhelming majority of responding mentors had taken part in both the initial and follow-up CLPL sessions. Indeed, SSERC's own attendance sheets for the events confirm that almost all mentors returned for a Part 2 event.

Qualitative material gathered from the open-ended sections of the survey and focus groups was thematically analysed to highlight key topics and issues emerging within and across the various groups. This evidence helped to corroborate the quantitative findings and provide insights on the factors and processes underpinning survey findings.

1.4 Scope of this report

This report builds on the previous interim reports, adding and analysing new responses from increasing numbers of participants who have attended the CLPL events. With greater numbers becoming involved in the Programme the evaluation of the Programme has become increasingly robust and confidence in the findings grows. To date, SSERC have initiated The Primary Cluster Programme in 56 clusters across 21 Local Authorities.

Only the data from the mentor follow-up questionnaire (distributed at the end of Part 2 residential CLPL), headteacher questionnaire, and the other cluster teacher questionnaire included questions on the reported impact of the initiative.

Findings from the surveys have been supplemented by information gathered during focus group discussions conducted at the CLPL training and observations of

additional SSERC organised CLPL or SSERC recognised CLPL events offered to staff. In some instances clusters organised their own internal CLPL events with staff and the members of the research team attended a sample of these events.

This report builds on previous interim ROC reports and complements SSERC's own reports to the Scottish Government; 'Scottish Primary Cluster Programme 2012-2013', 'Scottish Primary Cluster Programme 2013-2014' and 'Scottish Primary Cluster Programme 2014-2015'.

1.4.1 Structure of this report

The report is organised around the findings from the questionnaire surveys with additional qualitative input from, focus group discussions, observations and reflective diaries where applicable. In particular, the report focuses on the impact of the initiative from the perspectives of mentors, headteachers and other staff members.

Section 2 provides a brief summary of the characteristics of those who took part in the surveys, Section 3 reviews their opinions of the SSERC CLPL while Section 4 focuses on the impact of the initiative by drawing on survey data from schools where mentors had completed both Part 1 and Part 2 CLPL. Section 5 provides insights from local authority officers/ QIOs. Section 6 provides a conclusion and commentary while Section 7 provides recommendations.

Section 2: CLPL survey respondents

2.1 Who took part in the CLPL survey?

In total 499 questionnaires were returned from mentors who took part in the initial (296) and follow-up (203) CLPL sessions. In addition 142 headteachers/senior management staff and 93 other teachers from schools where the mentor had completed both Part 1 and Part 2 CLPL also returned questionnaires. See Table 1 for details.

Table 1 - Questionnaire responses to date

Mentors		Headteachers	Other Cluster teachers
Initial residential CLPL event	Follow-up residential CLPL event		
296*	203**	142	93

***** 95% of all mentors involved in the CLPL Programme up to end of Oct 2015

****** 90% of the 226 mentors who have attended both initial and follow-up CLPL events at the time of writing.

Mentors were overwhelmingly female (reflecting the gendered nature of the profession at primary level) and the majority were experienced teachers - three quarters of staff at the initial session and 82% at the follow-up session had taught for at least six years. Moreover, 32% of respondents at the initial session and 37% at the follow-up session were in promoted positions. Tables 2 to 5 profile the mentor respondents.

Table 2 - Sex of respondents

Sex of respondent	% Initial session	% Follow-up session
Female	84	84
Male	16	16
N=	**294**	**200**

Table 3 - Role within the school

Role	% Initial session	% Follow-up session
HT/DHT/AHT	14	18
Principal teacher	18	19
Class teacher	66	61
Other	2	3
N=	**294**	**200**

Table 4 - Part or full time working

Full or Part time	**% Initial session**	**% Follow-up session**
Full time	93	94
Part time	7	6
N=	**225**	**200**

Table 5 - Teaching Experience

	% Initial session	**% Follow-up session**
Probationer	<1	<1
Teaching up to 5 years	25	18
Teaching 6-15 years	48	48
Teaching 16 years or more	27	33
N=	**294**	**201**

Section 3: Mentors' views of the SSERC CLPL events

This section reports on mentors' assessment of the SSERC CLPL and how well it had prepared them for their science and technology mentoring role. This included preparation of their chosen task activity from Part 1 sessions, assessment of the initial outcomes of this task, and early indications of progress in the clusters as they concluded their Part 2 events.

3.1 Mentors' views of their initial and follow-up CLPL sessions

Science and technology mentors who attended the SSERC initial and follow-up events were overwhelmingly positive about their experiences (see Table 6 for a summary of responses). It was clear that the CLPL Programme was regarded by participants as relevant, supportive and encouraging of their work and development as science and technology mentors. Moreover, it was also evident that participants regarded the CLPL as very useful in supporting the development of their own science teaching skills and practice and in enthusing pupils towards science. For example, at least four out of five mentors at both events indicated complete agreement with the following statements:

- the events were conducted in a professional manner
- comprised presentations of a high standard
- gave access to quality support materials
- encouraged networking with other colleagues
- increased their enthusiasm for science and technology
- provided a number of useful ideas for teaching
- encouraged them to try new ideas
- will help them enthuse pupils about science and technology
- increased their confidence for teaching science and technology
- was relevant to their science and technology teaching
- increased their awareness of sources of support for teaching science/technology
- highlighted the importance of science/ technology education for pupils
- left them with a desire to attend similar CLPL

Mentors' open comments often praised the CLPL for being well planned, delivered by passionate, enthusiastic and approachable staff and seen to be relevant to science development in their school. The following comments were typical,

It has been an excellent opportunity to work with cluster colleagues to make improvements in Primary science in our schools.

Acting DHT. Boroughmuir Cluster

It's been really enjoyable, hands-on workshops. Working with scientists has meant that what were once quite difficult concepts are now easier to understand; thus easier to teach.

Class Teacher. Perth and Kinross Cluster.

The training has been fantastic, I've had the opportunity to develop team teaching within the school. I am so much more aware of excellent resources.

Depute Head Teacher. St Machar Cluster

Great ideas and networking with colleagues to share ideas and experiences, very supportive.

Class Teacher. Perth and Kinross Cluster

In addition the residential nature of the CLPL was also praised with participants who often stated that this model facilitated greater and more meaningful professional dialogue.

Table 6 – Mentors' views of the initial and follow-up CLPL sessions

The CLPL event …	Completely agree 1st (2nd)	Mostly agree 1st (2nd)	Not sure either way 1st (2nd)	Mostly disagree 1st (2nd)	Completely disagree 1st (2nd)
Was conducted in a professional manner N=294 N=202	98 (97)	2 (3)	-	-	-
Comprised presentations of a high standard N=294 N=201	96 (92)	4 (8)	- (1)	-	-
Gave access to quality support materials N=292 N=201	98 (94)	2 (5)	- (1)	-	-
Encouraged networking with other colleagues N=291 N=201	96 (91)	4 (9)	<1 (1)	-	-
Increased my knowledge of science and technology N=293 N=202	89 (85)	11 (14)	<1 (1)	1 (-)	-
Increased my enthusiasm for science and technology N=294 N=201	91 (91)	9 (9)	<1 (1)	-	-
Increased my confidence for teaching science and technology N=294 N=201	85 (84)	14 (14)	<1 (2)	-	-
Was relevant to my science and technology teaching N=293 N=201	88 (83)	12 (16)	<1 (1)	- (1)	-
Provided support for my development as a school mentor in science and technology N=291 N=201	90 (78)	10 (20)	<1 (2)	-	-
Provided support for my development as a cluster mentor in science and technology N=289 N=201	86 (74)	13 (23)	1 (3)	-	-
Provided support for my leadership development N=293 N=201	64 (52)	28 (36)	8 (10)	1 (3)	-
Provided support for developing science and technology education in my cluster N=292 N=201	88 (74)	11 (24)	<1 (3)	-	-
Provided a number of useful ideas for teaching N=293 N=202	97 (92)	2 (8)	1 (1)	-	-
Encouraged me to try new ideas N=293 N=202	96 (91)	4 (8)	<1 (1)	-	-
Increased my awareness of sources of support for teaching science/technology N=290 N=202	91 (81)	9 (18)	- (1)	-	-
Highlighted the importance of science/ technology education for pupils N=293 N=202	88 (80)	11 (17)	<1 (3)	-	-
Left me with a desire to attend similar CLPL N=293 N=201	82 (80)	15 (17)	2 (3)	<1 (1)	-
Underlined the importance of CLPL for my professional development N=290 N=200	79 (77)	17 (21)	4 (2)	- (1)	<1 (-)
Encouraged me to be more positive about my career prospects N=290 N=202	48 (36)	28 (34)	21 (27)	2 (3)	<1 (1)
Will help me enthuse pupils about science and technology N=293 N=202	90 (89)	9 (10)	<1 (1)	<1	-
Will mean I'm better able to meet the range of pupil needs in teaching science and technology N=293 N=201	86 (72)	13 (24)	1 (4)	-	-
Improved my pedagogic skills in science and technology N=293 N=202	83 (70)	16 (26)	1 (4)	<1 (-)	-
Improved my reflective practice skills in science and technology N=291 N=202	61 (63)	28 (31)	10 (5)	1 (1)	1 (-)
Left me with a better understanding of what SSERC offers N=293 N=202	92 (80)	8 (20)	1 (1)	-	-

3.2 How well did the CLPL prepare mentors?

Most participants indicated that the CLPL had prepared them well for their role as a science and technology mentor. Table 7 summarises responses from both the initial and follow-up events. It is encouraging to see that the follow-up survey figures are very similar to those from the initial survey, suggesting that mentors' initial expectations of the CLPL were subsequently borne out in their experience. Indeed, there were almost no instances where mentors initially believed, or subsequently reported, that they were left unprepared by the SSERC CLPL.

Table 7 - How well did the CLPL prepare mentors for the following?

Prepared for…	% Well prepared 1st (2nd)	% Prepared 1st (2nd)	% Unprepared 1st (2nd)	% Not at all prepared 1st (2nd)
Planning for your mentor role N=294 N=196	62 (59)	37 (39)	1 (3)	-
Carrying out gap task activities N=290 N=195	70 (60)	29 (38)	1 (2)	-
Reporting on these activities N=289 N=195	57 (54)	42 (43)	2 (3)	-

3.3 Participants' views on becoming a Science and Technology mentor

On completion of the initial CLPL, 83% of respondents indicated that they were feeling confident about becoming a mentor and were looking forward to it. The remaining 17% indicated a degree of nervousness at the prospect. Following the second CLPL event all participants indicated having *mostly or completely* enjoying their mentor roles. Sixty-five percent of these mentors reported *completely enjoying* the experience.

Participants' qualitative comments from the surveys reinforced the view that all had enjoyed their experience of mentoring. Some also reported being surprised at how much they had achieved already given their initial nervousness. Working with colleagues in their school and especially working with other mentors across their cluster were seen as particularly enjoyable experiences. Informants also mentioned rewarding feelings as their confidence in their new role grew and they saw the impact of their efforts. Mentors also noted that their own enthusiasm and ability to teach science and technology had been enhanced. They had also unanimously enjoyed the Programme and found the experience 'inspiring'. The following comments were typical,

> *Not being from a science background…I was a little nervous about my abilities but the SSERC residentials have made learning for me, my colleagues and pupils accessible and fun!*

The experience was so positive and encouraging that I have become a more enthusiastic teacher of Science in that my understanding that practical, mind-challenging, hands-on experiences are an absolute necessity to capture the minds of tomorrow's scientists

Class Teachers St Ninian's cluster

The whole Science Champions experience has been fantastic. It has really impacted on my personal teaching of science but more importantly, my confidence to pass on resources and knowledge to other staff in the school and cluster. The course has been delivered in a very professional and inspirational way throughout.

Class Teacher Mearns cluster

3.4 Engagement with other SSERC-supported CLPL support sessions

The initiative also provided mentors and their fellow teachers with access to a range of other relevant science and technology CLPL delivered at school/cluster level and organised and run by SSERC and a number of individuals and other organisations known to SSERC. For example, to date there have been:

- more than 280 Face-to-Face workshops;
- more than 50 'SSERC-meets', some run through Glow have been conducted as pat of the non-residential aspect of the Programme;
- approximately 2400 teachers participating.

Details of these sessions and satisfaction levels are recorded in the appended annotated follow-up mentor questionnaire. In the overwhelming majority of these sessions participants[2] reported that the CLPL had been *very helpful or mostly helpful.* Ninety-eight mentors also indicated that they had organised and/or conducted additional science CLPL in their cluster or were intending to do so in the near future. This CLPL was also well received with 89% reporting the session(s), that had taken place, as *very helpful*.

Having mentors acting as CLPL co-ordinators was another innovative component of the SSERC Programme and had the added benefit of allowing additional science and technology CLPL needs of teachers to be addressed at a local level. Each event was co-ordinated by the mentors themselves and was additional to their coaching and mentoring activities.

The quality of these additional courses and participant satisfaction was also carefully monitored by SSERC's own internal evaluation.

[2] In many instances the number of respondents who attended individual sessions and replied to the questionnaire was very small.

Section 4: Impact of the Programme

This Section of the report summarises the impact of the initiative from the point of view of the mentors, senior management and other teaching staff in participating clusters. Annotated questionnaires are appended.

4.1 Impact of the SSERC CLPL on mentors' role in Science and Technology teaching

Following both CLPL events, participants were asked about the extent to which they, expected to or, had taken on a greater role in science and technology developments in their school, cluster, local authority, and/or nationally. Table 8 demonstrates that, in a relatively short period of time, the overwhelming majority of mentors had taken on development roles in both their own school and in their cluster. There was also evidence that some mentors had embarked on science development roles within their local authority and, in a small number of cases, had taken on a role at national level.

Table 8 - How well did the SSERC CLPL facilitate mentors' role?

I will / I have taken on a more significant role in science and technology developments …	**%** ***Very* or *quite likely*** **From 1st event (N=295)**	**% Has happened By 2nd event (N=203)**
in my school	99	93
in my cluster	98	90
at local authority level	44	16
at national level	12	8

4.2 Contribution of the CLPL Task to the mentors' work

A key feature of SSERC's CLPL, both for secondary and primary programmes, has been the inclusion of a 'task' progressed between CLPL events. In relation to the Primary CLPL initiative, this entails participants at the initial residential session identifying a focus or activity for development that will promote Science and Technology teaching when they return to their school/cluster. At the follow-up CLPL residential participants reflect on the impact of their activity and share lessons learned with other participants. In the primary cluster Programme this activity was collaborative with groups of cluster mentors working together to develop plans for promoting the capacity for Science and Technology teaching across their schools. Seventy-eight percent of participants agreed with the statement that the 'task' had been a *major help* in their mentor role with a further 21% agreeing that it had been of *some help* in their mentoring role.

To date, typical examples of task activities have included:

- review and development of cluster plans and moderation across the cluster regarding 'Sciences Experiences and Outcomes';

- provision of lesson plans to support colleagues' teaching science and technology;
- improving and sustaining monitoring of needs and evaluation of impact regarding colleagues' Science and Technology teaching;
- supporting colleagues' development of appropriate assessment for Science and Technology;
- dissemination and sharing of quality CLPL, teaching ideas, videos, resources and experiences in science and technology with other teachers across the school and cluster;
- encouraging colleagues in school and across the cluster to participate in more science and technology teaching, including, for example, team teaching with colleagues at all stages;
- furthering CLPL access for staff within the cluster through twilight sessions, workshops, speakers and 'SSERC meet' sessions;
- promoting sustainable impact on teaching science and technology, increasing confidence and enthusiasm and stimulating new ideas in this area;
- introducing new methods of teaching and extended teaching (i.e.: with community education and University – Geo Sciences);
- winter Science, encompassing a range of stages across the cluster and a variety of Experiences and Outcomes;
- introducing thematic 'science area' with science vocabulary on display across school and classes for children that changes regularly to engage with and enthuse pupils.

4.3 Impact of the CLPL on mentors' own science and technology teaching

All responding mentors (295) at the initial CLPL event indicated that they were intending to introduce *new materials/resources* from the CLPL to their science teaching or practice while 95% also reported that they would be introducing *new methods* to their teaching of science and technology.

The overwhelming majority of mentors attending the follow-up CLPL session indicated that they had realised these intentions with, 94% introducing *new materials/resources* to their teaching and 88% introducing *new methods* to their science and technology teaching.

What was striking from the observation of the Part 2 events and discussions with participants was the amount of activity engaged in by mentors working in their cluster teams between the two CLPL residentials. At the same time there was a noticeable increase in their optimism and enthusiasm over the duration of the Programme. Participants in Part 1 of the Programme had been relatively cautious in their projected assessment of the likely progress of the Programme. However, Part 2 presentations of 'task' activities revealed considerable progress, a situation which appeared to be also reflected in mentors disposition towards and general enthusiasm for the work.

4.4 How had mentors spent their time since the initial CLPL?

Mentors most frequently (51%) indicated spending *a lot of their time* working in *group settings with colleagues from their cluster*. Indeed, they were more than twice as likely to report this than *working with colleagues* or *working with individuals in their own school*. See Table 9 for details. This finding alone suggests that mentors recognised and implemented a support and development role beyond their own establishment.

Table 9 – How were mentors spending their time?

Mentor activity	% indicating *a lot of time*
Working in group settings with colleagues from cluster (N=195)	51
Working on own (N=199)	36
Carrying out routine administrative tasks related to science and technology (N=197)	24
Working with individual colleagues from cluster (N=196)	21
Responding to colleagues requests for support with science and technology (N=199)	19
Working with individual colleagues from school (N=200)	17
Working in a group setting with colleagues from school (N=195)	15
Taking part in other science and technology CLPL (N=195)	9
Attending conferences related to science and technology (N=196)	6

4.5 Who have mentors been working with?

Almost all mentors (98%) indicated working directly with primary teachers and a clear majority had also worked with primary pupils (76%) and senior managers (69%) within their cluster. In addition 42% noted working with early years workers in their cluster or other cluster professionals (43%). Table 10 details responses. Given the cluster based approach to the CLPL it is encouraging to note that by the follow-up CLPL event substantial numbers of mentors had engaged with colleagues across different educational stages including secondary and early years.

Table 10 - Groups whom mentors have worked directly with

Group	% of mentors	Group	% of mentors
Primary teachers	98	Secondary teachers	42
Primary pupils	76	Local authority personnel	25
Senior managers (HTs, DHTs)	69	Children in early years centres	5
Other cluster professionals	43	Secondary pupils	2
Early years workers	42	**N = 201**	

4.6 What proportions of staff have mentors worked with?

Mentors were also asked to estimate the percentage of staff from different educational stages that they had worked directly with between the initial and follow-up CLPL. Table 11 summarises the results and clearly shows that mentors were most likely to have worked with primary staff in their cluster.

Table 11 - Percentage of staff by stage within the cluster that mentors had worked directly with

% of staff in the cluster that mentors worked with directly	% of mentors who had worked with this proportion of Early years staff	% of mentors who had worked with this proportion of Primary staff	% of mentors who had worked with this proportion of Secondary science staff
91-100%	10	52	5
76-90%	4	18	-
51-75%	2	9	2
26-50%	10	5	3
11-25%	8	7	4
Up to 10%	31	10	45
None	35	-	43
N=	**192**	**199**	**198**

4.7 Contact with other mentors

There was strong evidence to suggest that mentors had established and developed links with other mentors during the period between the first and second CLPL residential. For example, all but one respondent indicated having *been in contact with other mentors* or *having shared ideas/activities with them* while almost nine out of ten mentors reported collaborating on training events with other mentor colleagues. Table 12 summarises the findings.

Table 12 - Links with other mentors

Activity	% of Mentors
I have been in contact with other mentors (N=200)	99
I have shared ideas/activities with other mentors (N=200)	99
I have collaborated on other activities with other mentors (N=200)	93
I have talked over science and technology problems with other mentors (N=200)	92
I have collaborated on training programmes with other mentors (N=200)	87
I have been involved in additional CLPL training programmes with other mentors (N=199)	79
I have been involved in other ways with science and technology mentors (N=200)	32

4.8 Impact of science and technology mentoring on the cluster

Mentors were asked to indicate impact of their science and technology mentoring against a number of pre-set statements. Table 13 summarises the results in relation to the percentage of mentors who indicated either *to a large extent* or *to some extent*. Again these results are encouraging with two thirds of the mentors (67%) reporting that their mentoring had *increased collegiality between cluster schools* to a large extent. Moreover, just over half of the respondents (52%) had witnessed *increased pupil engagement in science and technology to a large extent* and just under half (45%) also noted *increased teacher confidence to teach science and technology to a large extent*. A further 39% reported an increase in teachers' knowledge to teach science and technology *to a large extent*.

Table 13 - Key impact and progress regarding mentors' activity

As a result of science and technology mentoring there has been…	% Indicating to a large extent	% indicating to some extent
Increased collegiality between cluster schools (N=192)	67	27
Increased pupil engagement in science and technology (N=193)	52	41
Greater knowledge about the work of SSERC and NSLC (N=193)	48	40
More opportunities for teachers to share their science and technology experiences in clusters (N=192)	47	38
Increase in teachers' confidence to teach science and technology (N=194)	45	51
More varied approaches to science and technology learning and teaching (N=193)	42	45
Increase in teachers' knowledge to teach science and technology (N=193)	39	53
Increased science and technology activities in the curriculum (N=193)	38	49
Increase in teachers' skills to teach science and technology (N=194)	36	58
Increased teacher networks to support their science teaching CLPL (N=189)	34	42
Increased interdisciplinary learning approach where science can be incorporated into a range of common primary topics (N=192)	22	58
Increased teachers' reflective practice and self-evaluation (N=192)	17	47
Increased pupil aspirations towards science and technology careers (N=190)	12	42
Increased capacity of classroom assistants to support the delivery of science in the primary curriculum (N=190)	7	18

4.9 Mentors' views on the most successful science and technology developments across the clusters

The qualitative findings illustrate the wide variety and nature of mentors' progress regarding their intended objectives for their respective clusters. Indeed, some participants' reported that their activity was already having an impact on pupils' learning and enthusiasm for science and technology. Instances of reported success to date included:

- Mentors working together as a regular, systematic team. In, for example, establishing a cluster working party whose plans were already felt to be demonstrating an impact. This includes the cluster science mentors meeting regularly to take forward the aims of their role and CLPL activities.

  ASG working together to design and carry out science challenges in all ASG schools

  Class teacher Hazlehead Cluster

- Review and development of cluster plans and moderation across the cluster of Sciences Experiences and Outcomes, including 'Moderation Days' that have promoted reporting consistency across the cluster and brought stage partners together and facilitated further sharing of good practice. In some cases developments such as 'enquiry and assessment' moderation approaches and lesson plans have been taken-up across local authorities;

  Across our cluster, every teacher has had an opportunity to discuss what he or she would consider developing, consolidating and secure piece of assessment in science.

  The moderation across the cluster also brought all teachers in the cluster together taking and sharing their teaching of science.

  Class teachers Boroughmuir Cluster

  Lesson plan made by the cluster is being used by every school in Perth and Kinross.

  Class teacher Perth and Kinross Cluster

- Raising the profile of science and technology in the cluster and enthusing children;

  Science masterclass approach to teaching science [has been effective] Children have been enthused and it has deepened their scientific knowledge.

  DHT St Luke's cluster

- Delivery of mentor led/organised CLPL within and across schools including inset and twilight sessions. This has included CLPL on a significant scale, for example, in the Mearns cluster, CLPL was delivered by mentors to 140 staff through four workshops;

- Innovative cross-sectoral work including HE involvement to support teachers' development in science and technology;

  Introduction of Edinburgh University Geo-science students to every school as it builds on the teachers' learning community promoted by SSERC

  Learning assistant Boroughmuir cluster

- Raising the profile of science and technology across the cluster;
- Making links with other cluster schools including the secondary school;
- Giving a focus for teachers to introduce and deliver science and technology in classes and finding that they were increasingly likely to take science ideas and implement them in class;

> *Cluster CLPL has had a huge impact on colleagues' confidence in delivering Science Es and Os.*
>
> DHT Williamwood cluster

> *Increasing other teachers' confidence in teaching science with super speakers and resources.*
>
> Class teacher Perth and Kinross Cluster

- Building colleagues' enthusiasm and confidence to teach science and technology;

> *Cluster CLPL in-service day. Staff greatly enjoyed the practical activities we provided; it made them realise the ease in teaching science.*
>
> DHT St Luke's cluster

> *Breaking down barriers, showing colleagues that it is not scary*
>
> DHT Hillfoot cluster

- Team teaching and supporting other staff in their school
- Promoting professional dialogue
- Arranging additional cluster meetings over and above those originally planned
- Developing sustainable 'in-school' CLPL provision by drawing on SSERC GLOW meets

> *The GLOW meet 'Fun with Forensics' was well organised and an exciting context. Staff liked doing this in their own schools...*
>
> *This was greatly enjoyed by staff in school and people were highly motivated to use this in school*
>
> Class teachers Perth and Kinross Cluster

- Sharing the cost of resources among schools in the cluster.

4.10 Factors influencing the work of the science and technology mentors in schools and clusters

School management (54%) and school colleagues (48%) were viewed by mentors as sources of *major support* in the development of science and technology education

within their school. Conversely [a lack of] time (39%) was reported as a *major hindrance* to the work while [a lack of] resources (20%) was seen as *something of a hindrance*.

At the cluster level, cluster management (51%) and school management (52%) were regarded as *major supports* for the development of the work, as were colleagues in other schools (41%). Again [a lack of] time (32%) and [a lack of] resources (19%) were viewed as a m*ajor hindrance* and *some hindrance* respectively.

Mentors' open comments also stressed the importance of time for their work and the challenge, that a lack of it could, present for mentors' proposed activities including, arranging CLPL opportunities for staff and attending to their 'task' activities. Mentors often reported being frustrated by a lack of time with some suggesting that they could have achieved even more in their cluster if they had had more time available for activity planning. In some cases, schools' planning timetable meant that available INSET time had already been allocated and it was therefore difficult to find a place for the science and technology CLPL. However, mentors demonstrated considerable creativity in their strategies to overcome such challenges including the adoption of twilight sessions and introducing class-time, team teaching approaches. It was hoped, however, that the success of their work as mentors would influence the next cycle of planning. Additionally, and in light of this finding, SSERC staff sought to engage cluster headteachers at an earlier stage in the cycle than had been the case with previous staff in the hope that INSET days could be set aside for science and technology.

Qualitative accounts also indicated that achieving uniform levels of support from teachers across the cluster and the slow uptake of activities among some school staff was also a challenge for some mentors. However, teachers explained that such a 'slow-burn' model was preferable to something that was seen to be a 'flash-in-the pan'. Mentors suggested that establishing a core of enthusiasts among their colleagues, and using this group as a basis for supporting development, could have a greater impact on science and technology teaching in the cluster. Mentors in one cluster suggested that more active involvement and support of school management would have increased the impact of their work.

In another cluster, mentors believed that a lack of headteacher support and not having a member of senior management as a mentor had limited their impact. As one mentor explained:

> *I have found the coordinator part of the role quite challenging due to the lack of support at HT/ cluster level… As a cluster we have not met regularly to plan and discuss Gap Task and CLPL activities…but we are still working towards organising and delivering cluster-wide CLPL events both at INSET and twilight.*
>
> *Class teacher*

During one focus group discussion mentors spoke about the challenge of getting High School colleagues involved in the initiative, however, one of the mentors also indicated that this situation was beginning to change. In another focus group, teachers discussed the role of their secondary colleagues and, while all thought that

their role as a mentor should include forging links with their secondary colleagues, there was some reticence about having secondary teachers attending the first SSERC CLPL session. Mentors believed the initial session was crucial in allowing primary teachers to develop their own priorities, vision and confidence. It was suggested by mentors that secondary colleagues might impose their own priorities at this stage, albeit well intentioned. However, mentors were clear that secondary colleagues had a role to play during Part 2 of the SSERC session when they could reflect on initial progress and explore ways of taking forward the plans as a community. Participants were beginning to use the range of additional external CLPL delivered by associated providers. With the exception of one provider, this CLPL had been highly valued.

> *One of the external CLPL events chosen for early level staff was not motivating, didn't leave them with ideas or promote their enthusiasm. This was unfortunate as we wanted to 'wow' staff and it was important to have them feeling positive about future CLPL events.*
>
> Acting DHT Hillfoots cluster

It is notable that SSERC continually monitors all of the non-SSERC external CLPL sessions provided within the Programme and, if necessary, acts to address concerns and teacher criticism.

4.11 Insights from mentors' reflective diaries

Sixty diaries were submitted by October 2015. These typically included commentary and on the mentor's activity with a reflective overview of a six-month period between the two SSERC CLPL residential events. While they often contained descriptive comments documenting weekly developments, the diaries also documented mentors' thoughts on the various challenges, achievements and impact of the Programme within and across their clusters. The diaries often detailed the complex measures that mentors adopted to promote the capacity of their cluster colleagues to provide more effective science and technology teaching. This included: adapting SSERC materials and advice to suit the local context; writing materials to link science with other topic areas; auditing and evaluating; planning and arranging division of tasks in collaboration with other mentors; being responsible for SSERC-related budget for external CLPL; arranging external SSERC accredited CLPL input, This is impressive given the relatively short period of time involved between the two residential CLPL events. The diaries, therefore, provide key insights regarding the processes underpinning the implementation and impact of Mentors' activities. Furthermore, the diary entries also indicate the wider recognition of their achievements such as reference to praise in HMIE reports for the teaching of Science and Technology.

Diary entries regularly indicated the commitment of mentors to their science and technology development roles and their strength of feeling regarding wanting to make a difference. Comments also revealed how mentors experience of the SSERC CLPL sessions had been directly applied to support school and cluster colleagues.

Diaries indicated the importance of having regular meetings and increased communication between mentors and between mentors and teachers across

clusters. This on-going collaboration appears crucial in driving forward science and technology developments across the schools.

These documents demonstrate the typical systematic and well-planned approach Mentors adopted in their work. Of particular note is the prevalence of collaborative action research (CAR) approaches with mentors gathering information and data to inform the focus of their work and later assess impact. This included auditing and base lining teachers' professional learning needs and status of Science and Technology in their clusters and then later data collection to assess shifts. In some cases mentors worked with teachers to evidence initial impact on learning outcomes. These were often used in the feedback demonstration presentations at the part two CLPL residential events.

Diary information, therefore, illustrated the scope of support provided by mentors, their impressions of impact and plans for sustaining and developing their work. For example:

- establishing cluster-wide systems to improve implementing science within the curriculum that are likely to be embedded and sustained across clusters

  Science is now a priority on our School Improvement Plan over the next three years. I have now established that we are going to gather, collate and create a database for our Science resources...Working as team we have embarked on a new approach to Science as facilitators and have made ourselves available to support colleagues.

  Class teacher Borders Cluster

  It [mentor activity] has fed into our cluster plans for next year and CLPL sessions. The collegiality and relationships it has built within the cluster will hopefully have a sustained impact for both science and other curricular areas.

  DHT Boroughmuir cluster

  I believe these inputs have given teachers many positive fresh ideas that they can take into the classroom, which was our overall aim from the beginning, Workshops were well received by almost all staff in the learning community and there has been evidence of them being used…I have also helped support staff in their planning in science and made suggestions to resources and activities…I feel we were very well supported during this time from SSERC, as questions and queries were answered very quickly through email. From my own personal professional development, I believe that I have grown markedly in confidence through the delivery of the workshops to my colleagues and when supporting staff in their planning. Also, my knowledge of teaching science has improved greatly assisted in planning using CfE Experiences and Outcomes. I believe that these developments will be sustained within my learning cluster, as there are discussions of developing and creating science planners and transition days between the primary and secondary schools.

  Class teacher St Mungo's Cluster

- arranging CLPL input including external experts from SSERC but also others who address science and technology practice but also relevant learning and teaching approaches
- specific information on practical experiments for colleagues

- raising colleagues' wider awareness of relevant CLPL opportunities
- Providing ongoing support and mentoring for individual and groups of colleagues.

> *This week during Curriculum Development, I worked with staff to look at the science milestones again. The staff are now more familiar with them but were still worried about the topics currently used for learning throughout the school. The staff are now more open to IDL approaches but recognise the importance of recording learning for transition purposes.*
>
> Depute Head Teacher Auchmuty Cluster

Such comments illustrated how mentors have combined advice on general good teaching and learning and assessment approaches as part of promoting effective Science and Technology teaching in a holistic fashion.

Diary comments also reinforced themes arising from other sources of the evaluation evidence. For example, mentors' comments included reference to the importance of having management support for their work.

> *This far into the year a lot of the time has already been allocated and has had to be reconsidered, which will in turn have an impact on our school/cluster improvement plan. Having a Depute Head Teacher on the team has probably made it easier to push for priority and time.*
>
> *It [mentor activity] has fed into our cluster plans for next year and CLPL sessions. The collegiality and relationships it has built within the cluster will hopefully have a sustained impact for both science and other curricular areas.*
>
> Mentors from the Boroughmuir cluster

Additional challenges were also evident from Mentors' diaries including, teaching of physical education, eco. school, Gaelic teaching etc. These diaries also revealed the often creative, approaches Mentors' adopted to finding time to support colleagues. This included talking to staff in the staffroom during lunchtime or after school.

Finally, the diaries gave valuable insights from the classroom on the impact of the Programme on pupils. Frequently, mentors' entries indicate that there has been a positive impact on learners with an improvement in their 'engagement and motivation' because of the approaches used.

> *I have been impressed by the investigative work and questioning that the pupils have engaged in when planning their learning. The active nature of the learning has meant that all pupils have been engaged in their learning.*
>
> Depute Head Teacher. Auchmuty Cluster
>
> *The children have responded with great enthusiasm to any science lesson I have delivered and they were keen to sign up for the lunchtime science club. They have been engaged in the lessons and the discussion generated has been excellent ... the children were able to respond well to the level of challenge and demonstrated a good understanding of the Experiences and Outcomes.*

Principal teacher. Eastbank Cluster

4.12 The views of senior management and other teaching staff on impact

In an attempt to collect the views of a wider audience on the impact of the Primary Cluster CLPL initiative the evaluation asked headteachers of all participating cluster primary schools to complete a postal questionnaire survey and also invited other teaching staff within the cluster to complete an online questionnaire. These surveys took place after the follow-up CLPL sessions for mentors.

4.12.1 Who responded to the senior management and teacher surveys?

Senior management

One hundred and forty-two schools returned questionnaires from either a headteacher, depute headteacher or another member of the senior management team. One hundred and twenty six respondents were female and 16 were male with the majority (85%) teaching for 16 years or more.

Other teaching staff

Ninety-three teachers, 82 female and 11 male, completed the online questionnaire with the majority (72%) having taught for six or more years. Ninety-eight percent of respondents were from primary schools while the small remainder were secondary teachers. Sixty-four percent of the teachers indicated being *very aware* of the SSERC Primary Cluster Programme while another 35% reported being *partly aware* of the initiative.

4.12.2 The introduction of new materials, resources and methods of teaching science and technology

There was good evidence to suggest that the impact of the Primary Cluster Programme had spread beyond the mentors' own teaching, to among other things, the introduction of new materials and ways of teaching science by other teachers in the clusters.

Almost all responding teachers (97%) reported that they had taken part in school/cluster-based science organised as part of the Primary Cluster Programme with a further 78% indicating working with their science and technology mentor. Seventy-four percent of responding teaching staff reported that *new materials/resources* from the CLPL had been introduced to their science and technology teaching or practice while 77% also reported adopting *new methods of teaching* science and technology.

At the senior management level 137 respondents (98%) indicated that *new materials/resources* from the CLPL had been introduced to their school's science and technology teaching or practice while 121 (86%) also reported that *new methods of teaching* science and technology had been introduced to the school.

4.12.3 Senior managers' views of mentors' impact on the role and profile of science and technology

Senior managers indicated substantial impact from the initiative on school and cluster developments in science and technology roles. For example, almost all senior management responses (92%) indicated that in their schools *staff had taken on a more significant role in science and technology developments* and a large majority (85%) also reported that their school had *taken on a greater role in science and technology developments within their cluster*. There was less evidence of impact at the local authority level or national level as a result of the initiative. This is hardly surprising since the initiative is designed primarily to foster developments at a school and cluster level. Table 14 summarises results.

Table 14 - Changing role of the school in science and technology developments

	% Has happened
Staff have taken on a more significant role in science and technology developments in the school (N=141)	92
The school has taken on a greater role in science and technology developments within our cluster (N=139)	83
The school has taken on a greater role in science and technology developments at local authority level (N=128)	28
The school has taken on a greater role in science and technology developments at national level (N=125)	6

Open comments from school managers were overwhelmingly positive and indicated that mentors were not only delivering CLPL for their cluster colleagues but that their input had impacted on cluster-wide collegiate working including:

- learning and teaching approaches in science and technology topics with some evidence of wider impact across curriculum
- greater and more systematic science and technology input in the curriculum
- science and technology included in school planning
- developing and sharing science and technology resources
- increased staff confidence to teach science and technology
- greater pupil engagement with science
- improved learning outcomes for pupils.

Overall, headteachers' comments revealed that the Programme has developed the capacity and capability of mentors and teachers within and across the clusters. The majority of comments indicated that the Programme has promoted and influenced the planning and practice of teaching science and technology. There were also accounts that the Programme had positively influenced pupils 'engagement and attainment'. (e.g. Glasgow St Mungo's Academy)

Headteachers reported that the collegiate and collaborative approach meant mentors have shared good practice and this networking had promoted collaborative working and sharing of other learning and teaching and assessment ideas and approaches.

Some headteachers highlighted work on skills progression, primary secondary transition and moderation had developed with closer and more systematic working with the colleagues in the science departments of their cluster secondary schools (e.g. Glasgow, East Dunbartonshire).

However, there were also accounts from the headteachers that some secondary schools were still difficult to engage and that this would require further work and some suggested more direction from their local authority (e.g. Edinburgh)

Headteachers comments revealed that the approach was fostering more systematic cross cluster collaboration that not only included a focus on science and technology but had extended to use the approach to develop other aspects of teachers' professional learning, assessment strategies and planning as well as sharing resources. This was particularly valued in clusters of smaller schools.

The enhanced collegiate working as a result of the Mentor Programme approach was particularly welcome in areas were schools were geographically spread out because it has reduced professional isolation and enabled sharing of resources and expertise. There was also evidence of mentors working at local authority level (e.g. Highland) to support science and technology education planning and developments.

The mentor role was seen as much more than a 'cascade model' where knowledge is simply transmitted via the person who has attended the CLPL. Headteachers stressed that the mentors had worked collaboratively in Cluster working parties across their cluster, using the knowledge and skills from their SSERC CLPL to enhance the science and technology learning and teaching capability of their peers. The mentors were reported to have delivered CLPL for colleagues that was based on their own SSERC experience but tailored to their own school and cluster context. They had also organised other professional development and learning opportunities provided by SSERC-accredited sources or via the SSERC glow meet courses.

Some headteachers made reference to attending the school-based CLPL delivered by the SSERC accredited providers and were able to experience first-hand the outcomes of the mentors' work. This appeared to further enthuse the headteachers and their staff, which supported building on the initial work of the mentors. In one cluster, a headteacher in the East Dunbartonshire had attended the 'Space' CLPL session. This had stimulated plans to undertake a whole school project on science that linked to the work of the British astronaut who will be visiting the International Space Station in December 2015.

Headteachers reported that the approach has developed mentors' leadership capacity working with SMT to support the planning of Science and Technology teaching in order to ensure longer-term impact (e.g. East Dunbartonshire Boclair Academy).

The following quotes typify headteachers' praise for the impact of the mentor for their school and cluster

> *…highlighted good practice, successful activities across the school…Children are enthusiastic about science. Staff are more confident teaching it. We have science club partnership with Satrosphere. We get involved in more external opportunities. We have 'Science Street' and all classes contribute to this.*

Headteacher. St Machar Cluster

There is science progression throughout school. Science is taught at all stages and staff expertise and confidence is increasing.

Headteacher. Forrester Cluster

One headteacher stated that there was particular value in having a class teacher as mentor because colleagues 'are more likely to take ideas on board and it gives staff ownership of leading learning'. School managers typically saw the mentor as a 'leader of learning', a catalyst and facilitator. Their activity in promoting networking and facilitating teacher skills and confidence to teach science and technology is having a positive impact across each cluster.

Mentors are dedicated leaders of this area of curriculum, so this is building capacity amongst staff. Their enthusiasm is infectious. Bringing ideas and resources to the school. Discussions between the Headteacher and mentor clarify thinking and enables schools to find a clear way forward. Discussions between the schools in the cluster enable the sharing of ideas.

HT Moray Lossiemouth Cluster

School managers' comments reiterated some of the challenges that mentors could face, including time pressures from other responsibilities. There was some indication from headteachers' comments that mentors were likely to be teachers who were highly motivated and willing to take on leadership and other duties. This led one headteacher to suggest that the Science Mentor role could be passed on or shared so that particular staff did not get 'pigeonholed' or overly burdened.

4.12.4 Impact of the Primary Cluster Programme on teaching staff

Senior managers and other teaching staff provided an indication of the extent to which the mentor developments in science and technology had impacted on a number of pre-determined areas. Results were generally positive and suggest that good progress has been made. Table 15 summarises the responses from the three stakeholder groups, mentors, senior managers and other teaching staff in relation to a number of variables designed to capture the range and depth of impact from the initiative. These findings also provide support for the view that mentors themselves have generally not over estimated the impact of the initiatives in their cluster. From the table it can be seen that, in a number of instances, senior managers and other teaching staff were more likely than mentors to suggest that the mentoring development had impacted *to a large extent*.

Table 15 - Impact of mentoring developments by stakeholder groups

As a result of science and technology mentoring…..	% Mentors indicating ***to a large extent***	% Senior management indicating ***to a large extent***	% Other teachers indicating ***to a large extent***
Increased collegiality between cluster schools	68	52	36
More varied approaches to science and technology learning and teaching	48	47	37
Greater knowledge about the work of SSERC and NSLC	50	23	26
More opportunities for teachers to share their science and technology experiences in clusters	47	45	39
Increased pupil engagement in science and technology	55	53	47
Increase in teachers' knowledge to teach science and technology	42	46	42
Increase in teachers' skills to teach science and technology	39	46	43
Increased science and technology activities in the curriculum	42	42	38
Increase in teachers' confidence to teach science and technology	47	55	41
Increased teacher networks to support their science teaching CLPL	36	24	25
Increased interdisciplinary learning approach where science can be incorporated into a range of common primary topics	29	26	26
Increased teachers' reflective practice and self-evaluation	21	18	21
Increased pupil aspirations towards science and technology careers	16	8	18
Increased capacity of classroom assistants to support the delivery of science in the primary curriculum	7	1	7

Headteachers' qualitative comments were unanimous in their praise for the Programme's impact on mentors' ability to promote the confidence and capacity of teachers' ability to teach quality Science and Technology topics. Typical quotes include:

> *Staff confidence in teaching science [has improved] so children are definitely getting more science of higher quality, more regularly. Working as a cluster has been very valuable for all staff, new relationships have been made, there's great sharing of expertise and resources.*
>
> Headteacher Fortrose Academy Cluster

> *The joint cluster in-service training has allowed teachers 'hands-on' experience of science activities and material. This has impacted on the confidence of teachers, with active science and technology taught across all stages of the school. Staff are now aware of resources available and can use the experiences and outcomes to plan confidently.*
>
> Depute Headteacher. Auchmuty Cluster

4.12.5 Most and least successful science and technology developments

Senior management were asked to provide examples of what they regarded as the most and least successful cluster developments in science and technology since their school became part of the Primary Science Cluster Programme.

One hundred and thirty-eight respondents provided details of what they regarded as the most successful science and technology development while 57 provided a response to the least successful development. However, the majority of responses to the least successful development merely reiterated that there has been no negatives or less successful aspects to the Programme.

Overwhelmingly, senior management believed that the Programme had been extremely successful and were able to highlight a range of key successes. These included:

- more systematic science and technology planning, guidelines and CLPL;
- introduction of regular master classes, cluster workshops, showcase events, twilight sessions and INSET days and school/ cluster organised science and technology CLPL;

  Implementation of 'science master classes' within the cluster, giving teachers the opportunity to team teach and develop their skills in teaching science. Science CLPL organised.

  DHT teacher

- greater interest in, and engagement with, science and technology by both teachers and children;

  There is a 'buzz' about science in the school and both staff and children love it!

- science and technology events that have facilitated parental and pupil involvement and engagement;

  We had a science showcase event for the parents. The event was led by pupils and gave the pupils a chance to display their learning in Science. The CLPL sessions (part of the primary cluster programme) helped increase confidence in staff to deliver certain topics. As a result the teachers planned interdisciplinary topics which enhanced the pupils learning experiences. Staff and pupils have had an enthusiastic approach to science because of the focus this year.

  SMT member

- staff confidence to teach science and technology has generally improved;

  CLPL in service training on energy and forces for all staff introducing new resources of a practical nature giving staff confidence in approaching scientific experiments in the primary curriculum.

  Headteacher

- increased cluster working, professional dialogue and sharing of practice;
- science and technology used to facilitate and enhance transition development: P7/S1;
- reports of pupils having much improved learning experiences and engagement with Science and Technology with some headteachers stressing an impact on attainment and learning outcomes.

Only one senior manager provided an example of something that worked less well in the Programme. This was that the timing of cluster events in one meant that staff had other pressures such as reports and sports days to address. It was thought that more staff would have become involved if the CLPL cluster twilight sessions had been conducted at another point in the year.

4.12.6 Advantages and disadvantages of the mentor approach for the development of teaching science and technology.

Senior management and other teaching staff were also asked to describe the advantages and disadvantages of the mentor approach for the development of teaching science and technology in their school. Both groups' comments clearly saw the initiative comprising more advantages than disadvantages.

Advantages

One hundred and twenty-eight senior managers provided comments on the advantages of the mentor model. Their comments stressed the value of having key staff available who could provide advice on science and technology and coordinate within their schools and across the cluster on a day-to-day basis. Senior managers saw the model as facilitating more effective links with other schools in their cluster. As a result the model was a driver for improved staff abilities and motivation.

Teachers' comments stressed that the mentor approach meant a rapid response to teachers' CLPL needs and their mentor had helped to tailor professional learning regarding Science and Technology to their specific needs and school context. In addition to this increasing teachers confidence to teach these topics, a notable theme in class teachers' open-ended comments was reference to the positive impact on pupils' learning outcomes.

Among the 40 teachers who commented on the advantages of the mentor approach, the most frequent themes were:

- having easy access to reliable advice and support regarding science and technology queries;
- having a colleague who can highlight relevant resources to use and other science CLPL opportunities;

- having a teacher as a mentor gives credibility and ownership to the science and technology developments introduced through the mentor's CLPL;
- greater awareness across teachers of developments in science and technology and how to reflect these in teaching;
- improvement in teachers' confidence to teach science and technology;
- contribution to school leadership development.

The mentor approach was especially valued by teachers as being helpful for less experienced staff and those who were less confident regarding science and technology and mentors were praised for their "patience, knowledge and scientific skills". Some quotes that demonstrate teachers' value and support for the mentor model include:

> *[it] Increases confidence in teaching science and provides good ideas to teach different parts of science*.
>
> *I believe the children and staff have benefited from a fantastic experience in science this year. Science areas are now set up in each class and are in the most changed on a fortnightly basis by the individual class teachers when they come to me for ideas of what can be put in.*
>
> *A huge support when delivering lessons, gathering resources and organising CLPL.*
>
> *Class teachers*

Disadvantages and challenges

Sixty-one senior managers made comments in the open-ended section regarding disadvantages associated with the mentor model. However, many of these text comments actually stressed the point that the initiative had no disadvantages.

While headteacher accounts were overwhelmingly positive about the impact of the SSERC CLPL Programme and the work of their mentors and most highlighted plans to build on this work, there were some who also stressed that there were certain challenges for the Primary CLPL project.

The most commonly reported types of challenge were time and cover constraints that were seen as potentially limiting covering classes of mentors when they were out of school but also limiting the scope of what mentors could do regarding embedding or extending the impact from the initial CLPL. Some headteachers stressed time constraints for science champions to meet and plan. Others stressed that they wanted to explore using mentors to work in classes to team teach and model approaches but staffing and cover issues meant that this was difficult to implement. Some of the headteachers also reported that staff changes across a cluster had presented challenges to maintaining coherence of the strategies the mentors had developed.

> *Since several schools have lost their mentors due to promotion and new jobs, it would be good to have a cluster mentor whose job is to oversee all of the schools*
>
> Dumbarton Academy Cluster

Some headteachers suggested having more teachers trained as mentors in each school to offset such challenges. In some cases where a mentor moved on to another area, headteachers and teachers were able to work with the other schools to continue with their plans. Headteachers noted that smaller schools are more vulnerable to such staff changes. While arranging for another teacher to take up the mentor role, one headteacher in the Moray Lossiemouth cluster had covered some of their mentor's activities to ensure the planned work did not falter.

Three headteachers referred to the science mentor being viewed by some staff as the 'expert' who will tell them exactly what they should be teaching. There were reports of some Glow meets experiencing technical issues but the teachers still managed to benefit and were enthused because of the high quality resources and advice provided for the meet.

One headteacher in Falkirk stressed the need to ensure what mentors did was aligned to local authority plans but also that mentors should be recognised by their local authority as having a key role in promoting effective science and technology.

Twenty-nine teachers provided comments in the survey on the disadvantages of the model. However, most of these comments merely sought to reiterate advantages of the initiative and only eight comments were identifiable as disadvantages.

While the issue of time constraints was mentioned again, only three teachers did so.

> *At times I feel that the time restrictions have hindered to some extent the development of science throughout the school.*
>
> Class teacher

Twelve other comments were provided. Two teachers reported that one issue with the approach was when a mentor had moved out of the cluster because of promotion etc. Teachers suggested that there should be a system for replacing mentors in such instances. One teacher thought that "ordering resources … was a bit troublesome" and another thought that it would be problematic if the Programme meant that, as a result of the focus on science and technology, other areas of the curriculum received less attention, time and resources.

Finally, one teacher highlighted the importance of getting non SSERC external CLPL input right as one such CLPL day session had almost "completely put staff off science!!" In this case the mentor had some reassuring and work to do to get colleagues back on board. Interestingly, such response was absent in the later questionnaires analysed indicating that SSERC's internal formative evaluation process had identified initial issues and that these were quickly addressed.

4.12.7 Developing the science and technology mentoring approach in schools

One hundred and twenty-two senior managers and 34 other teaching staff took the opportunity to suggest how the primary cluster initiative could be developed. Many of these responses included statements to the effect that the initiative should be continued and given time to embed the initial positive advances and keep up to date with relevant developments.

Other than stressing the need for the initiative to be continued, senior managers' comments regarding developing the National Programme included:

- Expand and enhance the model to increase the number and coverage of mentors supported by appropriate levels of funding
- Having more time to spend the funding provided
- Exploring ways to apply the model to develop other areas of the curriculum

There was a theme in headteacher accounts advocating using the mentors to work in classrooms to model effective approaches and working along side teachers and pupils in class (e.g. East Dunbartonshire, Turnbull High, Lornshill Academy Clackmannashire and Forres clusters). One barrier to this, however, was seen as having sufficient staff cover.

> *If I could arrange the time out of class for the Mentor, I would like her to team-teach as a way of supporting classes. Along with carrying out class monitoring*
>
> Headteacher Forres Academy Cluster

Senior managers also used this open question to describe how they were already building on the initial impact of the mentors developing the model in their own schools and clusters. Headteachers reported a wide range of developments that were underway or planned to enhance their schools science teaching that had emerged as a result of the CLPL Programme. Headteachers generally reported that the work of the mentors would continue to be reflected in their school planning and measures to promote effective science teaching.

> *The mentor will continue their work and will lead a school working party next year and develop progression of skills and ensure this is evaluated and monitored. The goal is to support staff to develop scientific strategies and skills that is planned and embedded as a scientific investigation approach…We now need to use the science mentors within a cluster development programme for improvement, This will involve planning, assessment, resourcing and further staff CLPL.*
>
> Headteacher Douglas Academy cluster

> *Staff training together, using GLOW meets has meant all staff have attended the training. This wouldn't usually happen. This will allow us to move on in a consistent way next session.*
>
> Headteacher Forres Academy Cluster

…To develop moderation and assessment of science within the school and across the learning community and appoint a PSA in charge of science resources.

Headteacher St Mungo's Academy cluster

In some cases these plans involved attempting to forge closer links with secondary colleagues.

Next session mentors across cluster will work with secondary colleagues to ensure consistent opportunities to ensure consistent approaches from feeder primaries to secondary to support transition

Headteacher Boclair Academy cluster

Headteachers generally reported that the impressive impact of the mentors had facilitated a capacity and a willingness in their clusters to continue to build on mentors' work. This included continuing to develop practical lessons with pupils, enhancing collegiate curriculum development and planning, assessment and lesson progression.

A complete overhaul of science progressions; planning various excellent resources alongside each other to support an interesting and new way to present science; staff more confident; staff thinking about how they can improve science developing this across the cluster.

Headteacher Lossiemouth cluster

[there will be] continued support in linking science and technology outcomes to other curricular areas

Headteacher Fortrose Academy cluster

We need to consider how we develop an appropriate tracking of skills document and tracking pupil progress through the levels.

Headteacher Castlehead cluster

There were also reports of mentors' work being used to reinforce wider developing strategies, including strategies linked with the Attainment Challenge.

Our science mentor attended a recent National Network event in Glasgow. we hope that involvement in this will allow us to continue to develop our approach to science

Headteacher Dunbartonshire cluster

There were also reports from headteachers of schools making and planning to make links with external agencies and companies that could have a role in supporting their science and technology education.

The teachers' comments on developments focused mainly on the need to build on progress to date including, further CLPL opportunities to 'maintain improvements',

safeguarding time for the mentors to continue with their activities and providing time for staff to access CLPL in science and technology. Some teachers, like headteachers, suggested that mentors should be able to go into classes and 'team-teach with the teacher to model approaches'. Here Lesson Study could be deployed as part of teachers' collaborative critical reflection could further enhance the impact of the mentors' work.

Insights from the mentor focus groups emphatically endorsed the survey findings and particularly confirmed findings regarding the quality of the SSERC training and how this had facilitated mentors' ability to make a difference in schools. The mentor focus group themes included the view that secondary cluster colleagues should be involved in the SSERC Primary Cluster Programme. However, mentors were cautious about how and when this should be done. Mentors suggested that secondary colleagues could be involved around the time of the second residential session when mentors had developed and implemented plans and measures and had generally increased their confidence. This would, they argued, allow them to negotiate and communicate more effectively with their secondary colleagues. There were reports from mentors that increased collaborative working with secondary colleagues was already beginning to occur in some of the clusters as mentors' plans had included transition activities and / or had reached out to the science departments of their cluster secondary school to enhance knowledge exchange.

One respondent stressed that there should be regular contact with appropriate secondary colleagues who should be involved in planning new developments. Teachers also suggested rolling out the mentor model to address other areas of the curriculum. They also highlighted the support from local authority for the Programme and stressed that this should continue including measures to ensure that good practice was shared across clusters.

One teacher believed that it would be beneficial to ensure that science and technology mentors were given a PT role within their school given their management role. Another drew attention to the need to address wider contextual issues such as promoting colleagues willingness to engage in new developments.

Section 5: Insights from Local Authority officers/ QIOs

The external evaluation included an additional strand towards the end of the project that aimed to elicit the views of local authority officers / QIOs responsible for science education in their councils. The main questions focused on eliciting the views of these stakeholders on the impact of the SSERC CLPL Programme, plans for sustaining and expanding the work of the mentors and whether there had been any challenges regarding the implementation of the Programme. At the time of writing, the research was able to gather information from 13 officers representing nine of the 16 Local Authorities involved in the Programme.

Aberdeen City (2)

Falkirk Council (2)

Fife Council (2)

Highland Council (2)

Moray Council (2)

North Lanarkshire

Scottish Borders Council

Stirling and Clackmannanshire.

All of the officers providing information had been involved in the initial stages of setting up the SSERC CLPL Programme and the selection of clusters. In Fife Local Authority, the selection of clusters had reflected schools in areas of higher deprivation. Two of those providing information reported that they had not been involved in the setting up of the clusters and two of the officers had not attended any the Programme's residential sessions or external SSERC accredited CLPL sessions in the schools. There was consensus that SSERC had worked collaboratively with stakeholders during the planning and setting-up phase in each local authority and took time to make presentations and discuss the approach with teachers in the clusters in order to inform but also reflect teachers' needs.

5.1 Local Authority officers' understanding of the aims of the Programme

There was consensus regarding the officers' understanding of the main aims of the CLPL Programme. Overall, they saw it as aiming to build the confidence and capability of practitioners regarding the delivery of science and technology within mentors' schools and across their primary clusters.

One officer also saw the Programme as aiming to develop the leadership of teachers regarding Science CLPL and learning and teaching. Another three reported that in their authority, the Programme aimed to build effective partnerships within the primary cluster in order to get clusters to work collaboratively on collegiate activities

to better support the needs of individual and teams of teachers so as to promote pupil outcomes.

Overall, the officers saw the aims of the Programme as closely aligned with their local authority plans and priorities for science and technology education and curriculum development. Indeed, one officer stressed that this had been designed into the Programme from the outset in the authority to ensure science was reflected in the School and Cluster Improvement Plans. In Stirling and Clackmannanshire the SSERC Programme was also seen as contributing to the *Developing the Young Workforce* agenda. In Fife local authority, there has been a move from 'STEM' to 'STEAM' to improve articulation of the science and arts topics across 3-18 curriculum and is developing its Skills Framework and SSERC is seen as a key partner in helping to promote the capacity of staff to develop this.

5.2 Local Authority officers' account of the impact of the Programme

All but one of the officers reported that the Programme had made a major impact regarding primary teachers' capability to teach quality science topics as part of the curriculum with one officer stating that it had met this aim to some extent. Officers typically highlighted mentors' impact on raising the profile of science and technology across the participating clusters and the capacity of their colleagues.

> *SSERC primary mentors are now delivering CLPL for all primary teachers across the local authority. There are 4 twilights across the year. Each twilight event is attracting around 45 teachers from across Moray. Glow is being used to share information.*
>
> Moray LA Officer

> *All involved have raised the profile of the delivery of science within their cluster. All clusters have continued to work together after being involved in this process. It has linked in with the local authority development of the primary science framework which supports all practitioners in the delivery of Science and technology Experiences and Outcomes*
>
> *There has been a clear impact on mentors' own skills in science education and as facilitators of CLPL in order to foster working in more collegiate ways across the clusters to help support other colleagues and improve their ability to teach science topics…it has met all of the [Programme] aims across all three of the clusters.*
>
> Highland LA Officers

Local authority officers often referred to their own verification visits, evaluations and HMIe inspections when evidencing the impact of the SSERC Cluster Programme. In one local authority, an evaluation of CLPL had found well over 90% of participants reported high levels of satisfaction with SSERC CLPL.

The impact is clear across the five clusters of school involved…the amount of science included in the curriculum has increased…teachers' confidence has increased…science is now written into school and cluster plans. There are other pockets of good practice elsewhere in the authority and other initiatives, but in the [SSERC] clusters, it has taken the whole area of STEAM forward, which is exactly what we had hoped for. SSERC is unique in that their CLPL is well thought through, is adapted to suit our needs and is of an extremely high quality

Fife LA Officer

Overall, the officers reported that the Programme had made a positive difference to collaborative working and professional dialogue across those primary schools in the participating clusters. In some cases, specific working groups have been established as a result of mentors' activity and this has helped to take forward and sustain their work.

The Lossiemouth cluster has created a working group that is providing excellent CLPL and leadership.

Moray LA Officer

All clusters have continued to work together after being involved in this process in other science developments, supporting each other and providing further CLPL for their colleagues to attend.

Highland LA Officer

The design of the Programme was highlighted by most of those officers providing evidence as being key to the successful impact and they made reference its practical nature and residential approach as well as the setting of collaborative developmental tasks. Indeed, the officers, like other stakeholders, highlighted the importance of the collaborative developmental activity that was developed at the initial residential event, implemented across the cluster and then reported and reflected upon at the second residential event eight months later. Some officers were looking at ways to draw on this reflective collaborative model to inform school and cluster CLPL strategies.

Local authority officers saw the residential aspect of the Programme as an important factor in its success because it allowed time away from school distractions and facilitated professional dialogue and building social relationships that helped to bond mentors and strengthen their networking. For this reason, local authority officers often stressed the importance of the SSERC Cluster model which appeared to require a substantial investment of time and resources, was seen as having a substantial and sustained impact.

It's important that the CLPL is face-to- face. We don't want to see the main form of CLPL as something that is virtual…the human interaction builds the cluster and it becomes a unit that will work together. There is a place for on-line CLPL support but this should be supplemental.

Fife LA Officer

> *The residential approach has facilitated the creation of a very effective development group that can work with a high level of leadership and autonomy.*
>
> Stirling and Clackmannanshire LA Officer

This meant that the participating local authorities were willing to invest in the Programme and its approach. In one local authority, the officer reported that the SSERC Primary Cluster Programme is so highly valued that mentors and headteachers found ways to ensure mentors can attend the SSERC Programme's residential events. In Fife, for example, funding has been allocated for cover for the weekdays (Thursday and Friday for part of residential and Friday for part 2 residential) with staff giving up their free time to attend the Saturday of the part 1 and 2 residentials.

In one local authority, the officer reported that the positive impact of the Programme and experiences of participating staff was disseminated via headteacher meetings and this promoted an increase in teachers in other clusters signing up for SSERC CLPL courses.

While not an aim of the SSERC Primary Cluster CLPL Programme, officers' comments illustrated examples where the mentors' work had contributed to closer partnership working between primary and secondary schools in their clusters.

> *There has been some increase in closer collaboration between primary and secondary colleagues within in the clusters. We will have to see whether this is sustained. It needs commitment from both primary and secondary teachers to maintain and develop the dialogue. This also needs time.*
>
> *Highland LA Officer*

In Fife, examples were provided of the SSERC programme fostering useful collegiate working between primary schools and their associated secondary schools. For example, Inverkeithing Cluster had a secondary colleague working with primary colleagues to help develop joint plans and transitional activities. In Stirling and Clackmannanshire, particularly in the Wallace Cluster, the SSERC Programme had been very influential in promoting collaboration between primary and associated secondary schools. The impact of this work had extended beyond science and technology to other transitional opportunities and contributed to the *Developing the Young Workforce* activities. In Moray such developments were seen as being at 'a very early stage' but it was expected that there would be a significant increase on cross sector working in the coming year.

In Highland and Borders there was close working between the primary and secondary schools in the participating clusters and the mentors had helped maintain these good links and were looking to explore transition activity. Another officer stated that impact on promoting cluster links with secondary schools varied and highlighted

that this was an issue beyond the SSERC Programme and clusters involved and was a common issue across Scotland.

One officer stressed that there was a need at national level to promote secondary teachers' engagement with primary colleagues. One suggested that local authorities could focus on encouraging relevant secondary teachers to join their primary colleagues on the SSERC Cluster programme. However, the challenges of finding appropriate time and cover would have to be addressed.

5.3 Local Authority officer's views on challenges when applying the Programme to practice?

While officers reported that there had been no challenges regarding applying what had been learned from the Programme to practice in the clusters, they did highlight challenges regarding sustaining the focus of mentors' planned science and technology activity across their clusters in the future. This included pressure on teachers' planning and development time to address other competing priorities and issues for their Associated Schools Groups (ASGs). These priorities included the National and local government focus on Literacy, Numeracy and Health and Wellbeing in Primary schools. While some officers stressed that within CfE, science and technology could make cross-curricular contributions to these learning areas these priorities had displaced some planned science CPL in schools.

Certain external factors, mainly changes in key staff and other demands on teachers' time were seen as limiting the impact of some mentors to extend their impact.

> *The second cluster, Forres, has struggled with staffing issues that have impacted on their ability to lead on CLPL across the ASG.*
>
> *Moray LA Officer*

> *Success was limited to the period of training which made a big impact on the primary schools involved. Demands and other initiatives have diminished the provision for science IS*
>
> Scottish Borders *LA Officer*

Two officers highlighted a particular challenge regarding applying the CLPL to practice that was more to do with ensuring that all teachers in their local authorities could benefit from the SSERC Primary CLPL Programme given the limits of time, cover and resources. However, in such cases, measures were being applied to try and maximise the impact of the mentors' work more widely across the local authority.

> *Only 2 out of 8 ASGs in Moray were chosen to be part of the SSERC Programme. This has led to an inequality of experience across the authority. All ASGs would have benefitted greatly from this Programme. This is why we have begun the twilight CLPL sessions, delivered by the SSERC primary mentors. We are*

currently exploring how to make the CLPL, professional sharing and transition experience sustainable across the authority.

Moray LA Officer

The challenge which was envisaged from the outset was in terms of equity and allowing the other 21 clusters in North Lanarkshire to gain the same opportunities as the two involved in the SSERC Programme.

North Lanarkshire LA Officer

Another officer stressed that the main challenge was how best to 'extend this excellent professional learning' across the other seven clusters given the limited resources available.

5.4 Local Authority officer's views on sustaining and extending the mentor approach across their authority

The officers reported that mentors' work in their respective clusters has been sustained and developed since their involvement in the SSERC Programme and was continuing to positively influence the teaching of science and technology in those schools already involved with the Programme.

There was evident momentum during the Programme and the mentors have continued to work together systematically after their involvement in the main Programme.

Highland LA Officer

Sustaining and building on the work of the mentors was strongly facilitated where local authority officers and headteachers had agreed that the mentors' plans and activity would be written into the school and cluster plans. Again, officers emphasised the need to systematically embed the learning from the SSERC CLPL into school and cluster planning in order to sustain the impact of the Programme and offset any original mentors moving on.

However, the local authority officers' comments emphasised that there were substantial barriers to extending the approach beyond the clusters and across their authorities without additional resources. A common theme in the officers' comments regarding difficulties in co-ordinating further development of the mentors' work was the diminishing level of local authority personnel to support CLPL activity across schools. Officers argued that given this situation, that there would be far more onus on schools and clusters to build their own capacity to provide CLPL. Some local authority officers stated that this emphasised the need to ensure SSERC was able to provide continued support to local authorities to help support schools to build their CLPL capacity and capability regarding science and technology education.

One officer recommended that at the very least, there should be provision at local authority level for a person with a clear coordinating role for science and who had some time allocated to this strategic activity. This was seen as key in fostering primary and secondary collaboration.

Other approaches were being considered to further build on the SSERC Cluster Programme impact. For example, in Fife other sources of funding were being used to develop the CLPL infrastructure.

> *We're working with SSERC to explore using some funding from the Primary Science Teaching Trust (PSTT) to support the deployment of a teacher who will facilitate expanding and extending the mentors' work across the local authority.*
>
> Fife LA Officer

5.5 Local Authority officer's views on the need for further support in sustaining and extending the Programme across their Authority

There was consensus from local authority officers regarding the need for continued support from SSERC to support and extend the developments that had been evident as a result of the initial clusters' involvement. The lack of dedicated officer to support science and technology developments which could was frequently seen as a strong rationale for continued and more support from SSERC. Suggestions for further support included ideas and case studies on how Science education CLPL could best address the challenges faced by rural and remote schools to ways to build on the impressive impact from the SSERC training. As highlighted in Section 5.4, the picture emerging from the local authority officers was one where there was a diminishing ability to support and co-ordinate science education CLPL particularly because of reduced staffing. Officers again drew attention to the limited resources and lack of funding to provide local authority staff to help take forward ideas from the Programme as one officer stated 'no one is in post now so there is no support available within the authority to help sustain the process' and stressed the need for continued SSERC CLPL opportunities to be provided to the other clusters who had yet to participate in the local authority.

In addition to requesting on-going provision of the Primary Cluster Programme, officers also highlighted the need for SSERC's support through their wider range CLPL courses and general advice via phone and on-line newsletters and information.

Section 6: Conclusion and commentary

The findings from this evaluation demonstrate that the SSERC Primary Cluster CLPL Programme is producing a growing body of highly motivated mentors who are promoting the skills and confidence of their cluster colleagues to teach science and technology. The mentors, their senior management and other teacher colleagues report an improvement in the scale and quality of science and technology teaching across participating schools. Furthermore, there is evidence from headteachers, other teaching staff and from mentors' own diaries that the Programme is increasing pupil engagement with Science and Technology. Headteacher and local authority officers' accounts and comments in mentor diaries also demonstrate that HMIE inspections are recognising the success of the SSERC mentoring Programme and its contribution to developing schools' ability to provide quality learning and teaching regarding Science and Technology.

The findings highlight particular benefits from the Programme that include: improving teaching and learning approaches, moderation approaches, collegiate working and professional dialogue and leadership across the clusters. Senior managers' accounts reveal how the SSERC cluster and mentor model have also acted as a catalyst to promote schools reviewing their capacity to teach science and technology. There are indications from headteachers' comments that those who take up mentor roles are more likely to go onto leadership roles, highlighting further the capacity building and wider impact of the SSERC Programme.

It is important to note that these positive findings are in line with those contained in the first two interim reports but are now based on an increased evidence base including a greater number of respondents (mentors, headteachers and other teachers). This provides added confidence in the findings. The findings also reiterate those of other highly rated research, including reviews of evidence of what works in professional development for teachers, such as CUREE (2011) that has highlighted the importance of collaboration between staff and the key role of effective mentoring and coaching in this process.

The range of data collected also reveals the key factors and processes that are responsible for such impact. Of particular note here are the skills, expertise and credibility of the SSERC CLPL team. The willingness of the SSERC team to support mentors during and after their CLPL events is also of particular importance and key to mentors' confidence to engage with promoting CLPL in their clusters following their initial involvement in the Programme. Mentors have also used the in-school CLPL events they organised as opportunities to update their knowledge and liaise with colleagues to ensure that progress is being made and to address any queries or issues colleagues had regarding their science and technology teaching. The CLPL Programme has clearly helped mentors to develop a strong rapport with cluster colleagues and foster a sense of community.

Another key factor in the mentors' success has been the inter-residential collaborative developmental activity approach. This is a key feature of most SSERC CLPL programmes. Mentors found that this focused their efforts and provided a structure for the work across their clusters. This approach provided a systematic plan

and evidence base, without which mentors believed their efforts would have become diverted by other commitments.

Mentors' comments stressed that the SSERC Cluster Programme has encouraged and enhanced their systematic enquiry and collaborative working. The findings reveal the importance of mentors conducting collaborative research to identify colleagues' needs and then assessing the impact of their CLPL activity. This collaborative action research, often given the acronym CAR, and enquiry-based practice is particularly noteworthy. Collaborative Action Research (CAR) is a core element for working to improve educational and public services and is a key component of a model for improvement for Scotland's Public Services. It uses focused systematic practitioner enquiry / research to critically examine current arrangements, make changes based on evidence, monitor the impact of these changes and refine and adapt them as appropriate. CAR has particular value for practitioners in order to improve education through:

- improving student learning
- improving individual professional practice and wider professional development
- combatting professional isolation and lifting the burden of improvement from the shoulders of individual teachers
- enabling teachers to tap into the collective knowledge and experience of a broader group of practitioners.

Such collaborative improvement strategies are supported by a body of international research that confirms the value of school-to-school networking as key levers of innovation and system improvement (e.g. Fullan 2013, Chapman *et al*. 2012, Chapman and Hadfield 2010, Donaldson 2012, Ainscow et al., 2012, OFSTED, 2000; Harris *et al*, 2005, Harrison, *et al* 2008, Cochran-Smith and Lytle 2009, Wohlstetter *et al* 2003). Most recently, the School Improvement Partnership Programme (SIPP) has used collaborative action research and partnership working, that is similar to the SSERC model, to promote positive educational change including impacts on learner outcomes and tackling educational inequity (Chapman *et al* 2015). Indeed, the SSERC Programme is in line with research that indicates that raising educational outcomes, especially in disadvantaged communities, requires the alignment of change processes in curriculum development, teacher development and school self-evaluation (Menter et al., 2010: 26).

The findings demonstrate the importance of having the support of senior management for the mentors' activities. In one cluster which had no senior management representation, securing time to plan and provide CLPL has been particularly difficult. It is notable that senior SSERC Programme managers have invested considerable time liaising with local authority officers and headteachers to ensure that there is adequate support and commitment to providing the time for staff to plan and participate in CLPL activity.

It is clear from this evaluation then, that the activity and impact of the mentors across the participating clusters align strongly with the aims and aspirations of the Scottish

Government and Education Scotland regarding learning in the sciences within Curriculum for Excellence. Indeed, the evaluation evidence reported here provides numerous examples of how the SSERC Cluster Programme is promoting teachers' learning and teaching capacity, confidence and competence regarding assessment, progression and connections with other areas of the curriculum as detailed in Education Scotland's Principles and Practice paper[3]. There is clear linkage with the Education Scotland Corporate plan 2013-2016[4] specifically, Strategic Objective 2 and Strategic Objective 3.

SSERC's Primary Programme is addressing key objectives congruent with The *Sciences 3-18 curriculum impact report 2013 update*[5]. In particular, the Programme effectively addresses certain *Aspects for Development* set out in the report, namely; a) concerns over the quality, breadth and progression of primary school science education and b) fostering stronger curricular links between pre-school centres and primary schools and between primary and secondary schools to ensure continuity in learning. (Education Scotland 2013 p48),

In addition, the Education Scotland impact report stressed that 'while staff are increasingly sharing and developing good practice by visiting colleagues in other schools, this was not a consistent feature of good practice across schools' (Education Scotland 2013 p42). The mentoring approach at the heart of the SSERC Cluster Programme directly facilitates cross-school and increasingly cross-sectoral professional collaboration regarding good practice in science teaching.

The Programme's integrated opportunities to access the SSERC GLOW meets echo recommendation 40 of the Donaldson review (Scottish Government 2011) that 'Online CPD should be part of the blended, tailored approach to CPD for all teachers.' Furthermore, the SSERC Primary Programme is providing opportunities for Masters Level accreditation in association with Strathclyde University which again echoes the recommendation of Donaldson who states that teachers should have wider access to Masters level accredited continuing professional development (Recommendation 44).

The Donaldson report also states that, 'All teachers should see themselves as teacher educators and should be trained in mentoring' (Recommendation 39). Indeed, Donaldson goes on to argue that mentoring is central to professional development at all stages in a teacher's career. The value and relevance of the SSERC Primary Programme to this goal is clear.

The evaluation findings also demonstrate that the SSERC Programme supports the General Teaching Council for Scotland (GTCS) measures to address the professional learning needs of teachers particularly in their standards to support self-evaluation within professional learning.

Against the very positive evaluation findings of the SSERC Primary CLPL Programme is a concern highlighted by information gathered from a sample of local

[3] http://www.educationscotland.gov.uk/Images/sciences_principles_practice_tcm4-540396.pdf
[4] http://www.educationscotland.gov.uk/Images/ESCorporatePlan_tcm4-816614.pdf
[5] http://www.educationscotland.gov.uk/Images/Sciences3to182013Update_tcm4-817013.pdf

authority officers across the participating councils. This reveals that central support for professional development and learning is being diminished because of funding cuts that reduce key personnel. As some officers stressed, this makes the work of SSERC all the more important and the need to build capacity across the clusters.

Section 7: Recommendations

Given the volume and scope of the evaluation findings and the marked consistency in the outcomes, we are now in a position to make recommendations regarding the SSERC Primary Cluster Programme.

7.1 Sustaining and expanding the Programme

This evaluation has demonstrated that participants were very positive in their responses to the CLPL, indicated a high level of enthusiasm for the Programme and suggested that the work was impacting positively in their own schools and clusters. In light of these findings, we would suggest that appropriate funding and resources be allocated to sustain and expand the Programme to reach those Local Authorities not yet involved and to allow SSERC to support Local Authorities to extend the Programme into new clusters.

7.2 Building on the initial impact of the Programme within and across Local Authorities

There is a need to explore how to maintain impact and momentum of the SSERC Primary Programme in those clusters already participating. One option would be to consider how a cadre of volunteer mentors could work within and beyond their clusters to facilitate wider impact and contribute to the efforts of SSERC to promote effective science and technology teaching. This team could develop resources with SSERC's assistance to support each other and within their own local authority to replicate aspects of the SSERC model but without the residential component.

7.3 Enhancing primary and secondary partnerships

There is scope for greater potential for primary and secondary schools in the clusters to work more extensively on transition programmes. However, relationships between secondary schools and their associated primaries vary across the country; in some instances there is a lack of contact between primary and secondary schools while in other areas, primary and secondary schools are involved in detailed collaborative programmes.

Findings from the evaluation indicate that involving secondary school teachers in joint programmes with their primary colleagues may be problematic. For example, unless secondary staff feel secure in their immediate concerns (such as new Higher and Advanced Higher Qualifications) they may be reluctant to engage with new ideas and new methods of working.

7.4 Exploring ways to enhance Early Years – Primary transition across the clusters

The Programme has already demonstrated that primary schools are developing stronger links with Early Years providers in their clusters. This is another transition area that could be explored more systematically. If possible, SSERC should consider the possibility of conducting an Early Years/nursery and Primary conference to generate interest and explore demand.

7.5 Extending the SSERC Primary mentor model to the secondary sector

Given the success of the mentor model, it is recommended that SSERC and its partners look at ways to extend the SSERC Primary Programme approach to facilitate collaborative networks across secondary schools and communities of practice. This could help alleviate science teachers' concerns regarding the new qualifications at senior phase.

7.6 SSERC's role regarding informing the focus of national science CLPL and models for its delivery

Taking into account stakeholders' comments and key themes across the evaluation findings, the importance of having SSERC at the centre of national efforts to promote teachers' ability to effectively teach science topics and subjects has been highlighted. Indeed, given the organisation's expertise and high standing in science education networks, it has a key role regarding informing the focus of national science CLPL and models for its delivery.

7.7 Developing SSERC's strategic partnership with Education Scotland

SSERC's Primary Cluster Programme and its other CLPL activity and programmes support Education Scotland's strategy to promote teachers' professional learning in the area of science and technology. SSERC has a unique position regarding their expertise in delivering high quality and relevant science education CLPL and has a close relationship with schools and networks of key partners, professional bodies and associations within and beyond Scotland. This makes a compelling case for a stronger collaborative partnership with Education Scotland within which SSERC continues to develop its experiential and on-line programmes. Education Scotland and the Scottish Government should ensure that SSERC has maximum opportunity to extend the Primary Cluster Programme with its local authority partners.

7.8 Further research on the longer-term impact of the SSERC Primary Programme

The current findings strongly indicate that the Programme is having a very positive impact on pupils' engagement with science and technology. Therefore, research to assess the impact on pupils' science and technology achievement, scientific literacy and aspirations as they progress into secondary school is warranted.

Research should also assess the longer-term impact of the Primary Programme on cluster secondary schools' teaching and learning approaches and impact on their science and technology curriculum. There is already some indication from the current evaluation that secondary schools are reviewing their teaching to ensure better alignment with the knowledge and understanding of science and technology demonstrated by new S1 pupils.

There is also scope for working even more closely with PSTT initiatives to research and explore ways to enhance the impact and capacity of SSERC mentors in their local authorities and promote the impact of those teachers involved in PSTT programmes.

7.9 Developing international perspectives and links with other similar programmes

The success of the SSERC Primary Programme could be further enhanced by linking with similar national and international programmes of collaborative enquiry and mentoring. For example, at a national level, there are possible synergies in looking at the Education Scotland School Improvement Partnership Programme (SIPP) which facilitates interschool and local authority partnerships to develop teacher-led innovation to tackle educational inequality. The SIPP could benefit from exploring how collaborative mentor-driven science education approaches could be used to promote educational achievement and engagement for target groups of pupils. Similarly, the SSERC model could benefit from exploring the cross-local authority model adopted by many of the SIPP projects.

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Appendices

Appendix 1: Annotated Part 1 questionnaire from Mentors who have completed both parts of the CLPL

Appendix 2: Annotated Part 2 questionnaire from Mentors who have completed both parts of the CLPL

Appendix 3: Annotated Headteacher questionnaire (completed after Part 2 events)

Appendix 4: Survey Monkey report of teacher survey (completed after Part 2 events)

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Appendix 1

SSERC Primary Cluster Programme in Science and Technology: Evaluation

Annotated Part 1 questionnaire from Mentors who have completed both parts of the CLPL

Based on 296 mentor responses across 21 local authorities

NB - Due to the effects of rounding percentages may not always add to 100%

Section 1 – About you

1. Are you ….? *(tick one box)* ***N= 294***

Male 16% Female 84%

2. Age group….? *(tick one box)* ***N=294***

21–25	7%	26–30	18%	31–35	15%	36–40	17%
41–45	14%	46–50	13%	51–55	11%	56–60	4%
61+	1%						

3. Do you work….? *(tick one box)* ***N=294***

Full-time 93% Part-time 7%

4. What is your role within the school? Are you: ***N=294***

Headteacher	3%	DHT/AHT	11%	Principal teacher	18%
Class teacher	66%	Other	2%		

5. For how many years have you been a teacher? *(tick one box)* ***N=293***

I am a probationer	<1%
I am fully qualified and have been teaching for up to 5 years	25%
I have been teaching for between 6 to 15 years	47%
I have been teaching for 16 or more years	27%

6. Which cluster do you teach in? *(tick one box)* ***N=294***

Local Authority	Cluster	% of total
Aberdeen	Hazledean	1%
	St Machar	2%
Clackmannanshire	Alva (Hillfoots)	2%
	Alloa	1%
	Lornshill	2%
Easy Ayrshire	Doon	1%
East Dunbartonshire	Boclair	1%
	Douglas	1%
	Turnbull	1%
Edinburgh	Boroughmuir	3%
	Forrester	2%
	James Gillespie	1%
Falkirk	Falkirk	2%
Fife	Auchmuty	3%
	Buckhaven	2%
	Dunfermline	2%
	Inverkeithing	2%
East Renfrewshire	Barrhead	1%
	Eastwood	1%
	Mearns	1%
	St Luke's	1%
	St Ninian's	2%
	Williamwood	2%
	Woodfarm	1%
	Eastwood and Mear	1%
Glasgow	Eastbank	2%
	St Andrew's	3%
	St Mungo's	2%
Highland	Fortrose	1%
	Lochaber	2%
	Nairn	1%
Inverclyde	Clydeview	2%
	Inverclyde	2%

Moray	Forres	2%
	Lossiemouth	2%
North Ayrshire	Garnock	2%
	St Mathew's	3%
North Lanarkshire	Calderhead	2%
	Cardinal Newman	1%
	Coatbridge	3%
	St Aidan's	<1%
Perth & Kinross	Perth High	4%
Renfrew	Castlehead	1%
	Trinity	1%
Scottish Borders	Eildon East	2%
	Eildon West	1%
	Cheviot	1%
	Unknown	1%
South Ayrshire	Belmont	2%
	Carrick	2%
South Lanarkshire	Carluke	1%
	Hamilton	2%
	Holy Cross	1%
Stirling	Bannockburn	2%
	Wallace	2%
West Dunbartonshire	Dumbarton	2%
	Vale of Leven	2%

Section 2 – Involvement in other SSERC sponsored events

7. Which of the following SSERC CPD events have you have taken part in since August 2005? *Tick all that apply* ***N=295***

Format of CPD	Attended
PGDE workshop other than residential / SUSS	2%
Summer school (residential)	6%
Single day workshops (other than as part of a PGDE course)	6%
Glow meets	6%
School based CPD	5%
Other SSERC CPD	2%

Section 3 – Involvement in the SSERC Primary Cluster CPD

8. Thinking about your experience at this CPD event, please indicate the extent to which you agree with the following statements. *Tick one box on each line*

The CPD event …	Completely agree	Mostly agree	Not sure either way	Mostly disagree	Completely disagree
Was conducted in a professional manner **N=294**	98%	2%	-	-	-
Comprised presentations of a high standard **N=294**	96%	4%	-	-	-
Gave access to quality support materials **N=292**	98%	2%	-	-	-
Encouraged networking with other colleagues **N=291**	96%	4%	<1%	-	-
Increased my knowledge of science and technology **N=293**	89%	11%	-	<1%	-
Increased my enthusiasm for science and technology **N=294**	91%	9%	<1%	-	-
Increased my confidence for teaching science and technology **N=294**	85%	14%	1%	-	-
Was relevant to my science and technology teaching **N=293**	88%	12%	<1%	-	-
Provided support for my development as a school mentor in science and technology **N=291**	90%	10%	<1%	-	-
Provided support for my development as a cluster mentor in science and technology **N=289**	86%	14%	<1%	-	-
Provided support for my leadership development **N=293**	64%	28%	8%	1%	-
Provided support for developing science and technology education in my cluster **N=292**	88%	11%	<1%	-	-
Provided a number of useful ideas for teaching **N=293**	97%	2%	1%	-	-
Encouraged me to try new ideas **N=293**	96%	4%	<1%	-	-
Increased my awareness of sources of support for teaching science **N=290**	91%	9%	-	-	-
Highlighted the importance of science and technology education for pupils **N=293**	88%	11%	<1%	-	-
Left me with a desire to attend similar CPD **N=293**	82%	15%	2%	<1%	-
Underlined the importance of CPD for my professional development **N=290**	79%	17%	5%	-	<1%
Encouraged me to be more positive about my career prospects **N=290**	48%	28%	21%	2%	<1%
Will help me enthuse pupils about science and technology **N=293**	90%	9%	<1%	<1%	-
Will mean I'm better able to meet the range of pupil needs in teaching science	86%	13%	1%	-	-

and technology **N=293**					
Improved my pedagogic skills in science and technology **N=293**	83%	16%	1%	<1%	-
Improved my reflective practice skills in science and technology **N=291**	61%	28%	10%	1%	1%
Left me with a better understanding of what SSERC offers **N=293**	92%	8%	1%	-	-

Thinking ahead now…

9. How likely is it that the following will happen as a result of your involvement in the Primary Cluster initiative? *(tick one box on each line)*

	Very likely	Quite likely	Unsure	Unlikely	Very unlikely
I will take on a more significant role in science development in my school **N=295**	90%	9%	1%	1%	-
I will take on a greater role in science development in my cluster **N=295**	81%	17%	2%	<1%	-
I will take on a greater role in science development at local authority level **N=295**	20%	24%	44%	11%	1%
I will take on a greater role in science development at national level **N=293**	8%	4%	45%	31%	12%

10. To what extent has the CPD prepared you for the following? *(please tick one box on each line)*

	Well prepared	Prepared	Unprepared	No at all prepared
Planning for your mentor role **N=294**	62%	37%	<1%	-
Carrying out a gap task **N=290**	70%	29%	1%	-
Reporting on these activities **N=289**	57%	42%	2%	-

11. Which of the following statements best reflects how you feel about becoming a science mentor/champion? *(Tick one box only)* ***N=292***

I am looking forward to becoming a mentor and feel confident at the prospect	83%
I am a bit nervous at the prospect of becoming a mentor and I'm not too confide	18%
I am fairly nervous at the prospect of becoming a mentor and lack confidence	-

12. How do you think you can spend your time most productively as a Science mentor/champion? Please say why you think this.

284 responses

13. What do you see as the priorities for your role as a science mentor/champion in your cluster? *(tick one box on each line)*

Priority	High priority	Middle priority	Low priority	Unsure
Support colleagues' science teaching approaches generally **N=294**	81%	17%	1%	<1%
Support teachers' ability to conduct practical work **N=291**	68%	31%	<1%	1%
Support teachers knowledge of science topics in the curriculum **N=287**	54%	41%	5%	<1%
Help teachers to understand how they can address the primary science experiences and outcomes in their practice **N=293**	75%	24%	<1%	1%
Help build teachers' confidence and expertise to deliver science topics **N=293**	86%	13%	<1%	<1%
Promoting an interdisciplinary learning approach where science can be incorporated into a range of common primary topics **N=293**	44%	44%	10%	2%
Supporting teachers' reflective practice and self-evaluation **N=293**	27%	49%	22%	3%
Promoting teacher networks to support their science teaching CPD **N=292**	56%	36%	5%	2%
Promoting the capacity of classroom assistants to support the delivery of science in the primary curriculum **N=293**	18%	42%	32%	9%

14. What support from SSERC would best help you to address these priorities?

240 responses

15. How can you spend your time most productively as a Science mentor/ champion? Please say why you think this.

70 responses

(This question was omitted from later batches of questionnaires)

16. Speculating a little now, how likely is it that is that you will spend your time as a science mentor/champion on the following activities? *(Tick one box on each line)*

	Very likely	Likely	Unlikely	Very unlikely	Unsure
Working in group settings with colleagues from school **N=295**	71%	27%	1%	<1%	1%
Working with individual colleagues from school **N=293**	46%	43%	9%	1%	1%
Working in group settings with colleagues from the cluster **N=295**	73%	25%	1%	-	1%
Working with individual cluster colleagues **N=295**	38%	34%	23%	1%	4%
Carrying out routine administrative tasks related to science and technology **N=294**	29%	53%	11%	2%	6%
Responding to colleagues requests for support with science and technology **N=294**	57%	42%	<1%	-	<1%
Attending conferences related to science and technology **N=295**	23%	50%	14%	1%	12%
Taking part in other science and technology CPD **N=295**	48%	45%	4%	-	3%
Working on your own **N=292**	39%	33%	21%	5%	3%

17. Do you expect to introduce anything from the SSERC CPD to your science teaching or practice? *(Tick all that apply)*

I intend to introduce **new materials/resources N=295**	100%
I intend to introduce **new methods of teaching N=294**	95%
I expect to make **no changes** to my practice	**-**

18. <u>On balance</u>, to what extent do you see the following factors supporting or hindering the development of science education within <u>your school</u>?
(Tick one box on each line)

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management **N=292**	26%	52%	16%	6%	1%
School management **N=294**	62%	32%	1%	5%	-
Colleagues **N=293**	38%	52%	4%	6%	-
Resources **N=293**	35%	29%	3%	31%	3%
Time **N=294**	16%	14%	1%	48%	21%

19. <u>On balance</u>, to what extent do you see the following factors supporting or hindering the development of science education within <u>your cluster</u>?
(Tick one box on each line)

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management **N=287**	31%	50%	13%	6%	1%
Cluster management **N=287**	56%	38%	1%	5%	<1%
School management **N=286**	58%	36%	1%	5%	-
Own school colleagues **N=286**	28%	57%	11%	4%	-
Colleagues in other schools **N=285**	26%	58%	12%	4%	-
Resources **N=286**	31%	32%	3%	33%	2%
Time **N=286**	15%	18%	2%	44%	21%

20. How do you expect the resources you received at the event to be used? *(Tick as many boxes as apply on each line)*

	In my own classroom only	Available to my school and/or cluster colleagues	Didn't receive this	Unsure
Digital video camera **N=111**	4%	54%	42%	-
It's not fair… - book **N=292**	1%	98%	<1%	<1%
UV beads **N=111**	3%	56%	41%	1%
UV discussion pack **N=111**	2%	57%	40%	2%
Universals (bottles) **N=293**	1%	97%	1%	1%
Digital thermometers **N=225**	1%	97%	1%	<1%
Thermochromic paper **N=225**	3%	95%	<1%	2%
Citric acid **N=293**	4%	93%	1%	2%
Digital microscope **N=294**	2%	96%	1%	1%
USB memory stick **N=294**	7%	93%	-	<1%
Bouncy balls **N=178**	2%	80%	17%	1%
Tennis balls **N=178**	2%	80%	17%	1%
Plants for primary **N=211**	5%	90%	-	5%
Electricity resource box **N=180**	2%	97%	-	1%
Field study guides **N=70**	3%	93%	3%	1%
Pipettes **N=69**	4%	96%	-	-
Renewable energy starter pack **N=69**	3%	97%	-	-

Section 5 – Part two of the CPD

As you are aware SSERC will be hosting the second part of this CPD in a few months time. We would be interested in any suggestions you have for content of this event.

21. Please use this space to make suggestions for what you would like to see included in the second part of this CPD.

178 responses

Section 6 – Other CPD you might have been involved in

(Q22 and 23 were only asked of a subgroup of clusters in Aberdeen, Perth and Kinross and Edinburgh).

We are interested in whether you have participated in any non-SSERC CPD regarding science and technology in the past 3 years and your views on this. . For example this includes the recent Primary Science Quality Mark scheme for Aberdeen teachers and the Science Ambassador initiative for teachers in Perth and Kinross Schools

22. Please indicate whether, over the past 3 years, you have been involved in any of the following non-SSERC science and technology CPD and how useful it was to your teaching: *(Tick one box on each line)*

Non-SSERC Science and Technology CPD	Very useful	Somewhat useful	Of little use	Of no use	Didn't attend
Primary Science quality mark scheme (Aberdeen Teachers) **N=15**	47%		-	-	53%
The science ambassador initiative for teachers in Perth & Kinross schools **N=21**	52%	5%	-	-	43%
In school CPD organised by teachers or local authority **N=88**	21%	23%	2%	-	55%
Other externally provided science CPD **N=84**	21%	10%	-	-	69%

23. If you have participated in any Non-SSERC CPD regarding science and technology in the past three years, please briefly provide further details on whether this has helped you.

45 responses

Section 7 Final Comments

23. Please use this space to make any final comments

234 responses

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Appendix 2

SSERC Primary Cluster Programme in Science and Technology: Evaluation

Annotated Part 2 questionnaire from Mentors who have completed both parts of the CLPL

Based on 203 mentor responses across 16 local authorities

NB - Due to the effects of rounding percentages may not always add to 100%

Section 1 - About You

1. Are you ….? *(tick one box)* ***N=200***

Male 16% Female 84%

2. Age group….? *(tick one box)* ***N=201***

21–25	2%	26–30	18%	31–35	17%	36–40	14%
41–45	16%	46–50	12%	51–55	13%	56–60	7%
61+	<1%						

3. Do you work….? *(tick one box)* ***N=200***

Full-time 94% Part-time 6%

4. What is your role within the school? Are you: *(tick one box)* ***N=200***

Headteacher	4%	DHT/AHT	14%	Principal teacher	19%
Class teacher	61%	Other	3%		

5. For how many years have you been a teacher? *(tick one box)* ***N=201***

I am a probationer	<1%
I am fully qualified and have been teaching for up to 5 years	18%
I have been teaching for between 6 to 15 years	48%
I have been teaching for 16 or more years	33%

6. Which cluster do you teach in? *(tick one box)* ***N=203***

Local Authority	Cluster	% of total
Aberdeen	Hazledean	2%
	St Machar	2%
Clackmannanshire	Alva (Hillfoots)	2%
	Alloa	2%
	Lornshill	3%
East Dunbartonshire	Boclair	2%
	Douglas	2%
	Turnbull	2%
Edinburgh	Boroughmuir	4%
	Forrester	3%
	James Gillespie	3%
Falkirk	Falkirk	2%
Fife	Auchmuty	3%
	Buckhaven	3%
	Dunfermline	3%
East Renfrewshire	Barrhead	2%
	Eastwood	2%
	Mearns	3%
	St Luke's	2%
	St Ninian's	3%
	Williamwood	3%
	Woodfarm	2%
Glasgow	Eastbank	3%
	St Andrew's	4%
	St Mungo's	2%
Highland	Fortrose	3%
	Lochaber	3%
	Nairn	2%
Moray	Forres	3%
	Lossiemouth	3%
North Lanarkshire	Cardinal Newman	2%
	Coatbridge	5%
Perth & Kinross	Perth High	6%
Renfrew	Castlehead	2%
Scottish Borders	Eildon East	3%
	Eildon West	3%
	Cheviot	3%
South Lanarkshire	Hamilton	3%
West Dunbartonshire	Dumbarton	2%
	Vale of Leven	3%

Section 2 – About the SSERC CPD

7. Thinking about your experience at this CPD event, please indicate the extent to which you agree with the following statements. *(Tick one box on each line)*

The CPD event …	Completely agree	Mostly agree	Not sure either way	Mostly disagree	Completely disagree
Was conducted in a professional manner **N=202**	97%	3%	-	-	-
Comprised presentations of a high standard **N=201**	92%	8%	<1%	-	-
Gave access to quality support materials **N=201**	94%	5%	1%	-	-
Encouraged networking with other colleagues **N=201**	91%	9%	<1%		-
Increased my knowledge of science **N=202**	85%	14%	1%	-	-
Increased my enthusiasm for science **N=201**	91%	9%	<1%	-	-
Increased my confidence for teaching science **N=201**	84%	14%	2%	-	-
Was relevant to my science teaching **N=201**	83%	16%	<1%	<1%	-
Provided support for my development as a school mentor in science **N=201**	78%	20%	2%	-	-
Provided support for my development as a cluster mentor in science **N=201**	74%	23%	3%	-	-
Provided support for my leadership development **N=201**	52%	36%	10%	3%	-
Provided support for developing science education in my cluster **N=200**	74%	24%	3%	-	-
Provided a number of useful ideas for teaching **N=202**	92%	8%	-	<1%	-
Encouraged me to try new ideas **N=202**	91%	8%	<1%	-	-
Increased my awareness of sources of support for teaching science **N=202**	81%	18%	1%	-	-
Highlighted the importance of science education for pupils **N=202**	80%	17%	3%	-	-
Left me with a desire to attend similar CPD **N=201**	80%	17%	3%	<1%	-
Underlined the importance of CPD for my professional development **N=200**	77%	21%	2%	<1%	-
Encouraged me to be more positive about my career prospects **N=202**	36%	34%	27%	3%	<1%
Will help me enthuse pupils about science **N=202**	89%	10%	1%	-	-
Will mean I'm better able to meet the range of pupil needs in teaching science **N=201**	72%	24%	4%	-	-
Improved my pedagogic skills in science **N=202**	70%	26%	4%	-	-
Improved my reflective practice skills in science and technology **N=202**	63%	31%	5%	1%	-
Left me with a better understanding of what SSERC offers **N=202**	80%	20%	<1%	-	-

Section 3 - Impact of the Primary Cluster Initiative

8. Have you introduced anything from the SSERC CPD to your science and technology teaching or practice? *(Tick all that apply)*

Yes, I have introduced **new materials/resources** ***N=203***	95%
Yes, I have introduced **new methods of teaching** ***N=203***	86%
No, I have made no changes to my practice	1%

9. Which of the following statements best reflects how you feel about becoming a science and technology mentor/champion? *(Tick one box)* ***N=203***

I have completely enjoyed the experience	65%	I have mostly enjoyed the experience	35%	I have mostly disliked the experience	-	I have completely disliked the experience	-

Please explain your response to Q9

183 responses

10. Which of the following have happened as a result of your involvement in the Primary Cluster initiative? *(tick one box on each line)*

	Has happened	Not yet happened, still plan to do so	Has not happened
I have take on a more significant role in science and technology developments in my school **N=202**	93%	7%	-
I have taken on a greater role in science and technology developments in my cluster **N=203**	90%	8%	2%
I have taken on a greater role in science and technology developments at Local Authority level **N=195**	16%	30%	53%
I have taken on a greater role in science and technology developments at national level **N=196**	8%	10%	82%

11. Thinking back, to what extent did the CPD prepare you for the following?

(tick one box on each line)

	Well prepared	Prepared	Unprepared	Not at all prepared
Planning for your mentor/champion role **N=196**	59%	39%	3%	-
Carrying out gap-task activities **N=195**	60%	38%	2%	-
Reporting on these activities **N=195**	54%	43%	3%	-

12. What has been the principal focus of your Gap Task?

193 Responses

13. To what extent has your Gap Task influenced your work as a science and technology mentor/champion? *(tick one box)* ***N=191***

It has been a major help in my mentor role	It has been of some help in my mentor role	It has had no real influence on my mentor role	It has been a bit of a distraction from my mentor role	It has been a major distraction from my mentor role
78%	21%	1%	-	<1%

14. A number of schools have accessed additional CPD since Part 1 of the SSERC CPD. We are keen to know about your experience of this CPD. From the following list please indicate how helpful the ones you have experienced have been in supporting technology and science teaching in your cluster? *(Tick one box on each line)*

CPD - Provider	Very helpful	Mostly helpful	Mostly unhelpful	Very unhelpful
Forces – Tom Clark **N=114**	99%	1%	-	-
Ice Ice baby – SSERC **N=10**	90%	10%	-	-
Animals…. Invented by plants – Nicky Souter **N=7**	14%	29%	43%	14%
Rocket science – SSERC **N=6**	67%	33%	-	-
Outdoor Learning (via Glow) – SSERC **N=18**	72%	22%	6%	-
Kitchen Chemistry – Satrosphere **N=2**	-	100%	-	-
Using puppets to get children talking and thinking- Millgate House **N=5**	20%	80%	-	-
Concept cartoons - switching learners on to science – Millgate House **N=5**	20%	80%	-	-
Electricity, Energy, Forces – Paul Chambers **N=11**	82%	18%	-	-
Sound/Sound waves – Jon Davies **N=6**	83%	17%	-	-
Understanding electricity – Brian Redman **N=47**	96%	4%	-	-
Creative science – Our Dynamic Earth **N=6**	67%	33%	-	-
Everyday chemistry – Douglas Buchanan **N=6**	17%	83%	-	-
Water – Douglas Buchanan **N=13**	8%	62%	23%	8%
Plants – Royal Botanic Garden Edinburgh **N=6**	67%	33%	-	-
Inheritance – SSERC **N=7**	57%	43%	-	-
Promoting Active Learning/Developing Children's Skills of Scientific Enquiry – Millgate House **N=5**	60%	40%	-	-

Microscopy – SSERC **N=2**	-	100%	-	-
Fun with forensics – SSERC **N=86**	80%	20%	-	-
Sound advice – SSERC **N=3**	33%	67%	-	-
Vibration and waves – SSERC **N=7**	57%	43%	-	-
Its not fair – Millgate House **N=3**	33%	67%	-	-
Using assessment to make better learning – Millgate house **N=4**	75%	25%	-	-
Owls – Elite falconry N=11	64%	36%	-	-
Science enquiry skills – Rick Swan **N=5**	20%	80%	-	-
Biodiversity – Nicky Souter **N=12**	8%	33%	15%	38%
Sound and waves – Tom Clark **N=12**	83%	17%	-	-
Electricity and magnetism – Brian Redman **N=3**	67%	33%	-	-
Science enquiry and assessment – Millgate house N=8	75%	25%	-	-
Science enquiry into enquiring scientists – Dundee SC **N=11**	82%	18%		
Engaging with science - Millgate house **N=5**	40%	60%	-	-
Earth science - SRESU **N=1**	-	100%	-	-
Electricity – Brian Redman **N=6**	83%	17%	-	-
Forces and Buoyancy – Tom Clark **N=10**	100%	-	-	-
Further fun with forensics – SSERC **N=20**	95%	5%	-	-
Developing children's skills of science enquiry – Millgate house **N=10**	70%	30%	-	-
Sound and waves – Think science **N=3**	100%	-	-	-
Inheritance genes and life – Nicky Souter **N=4**	-	50%	25%	25%
Classification – Edinburgh zoo **N=5**	60%	40%	-	-
Making sense of electrical circuits (second level) – Brian Redman **N=5**	100%	-	-	-
Cluster mentor training – mentors **N=95**	92%	8%	-	-

15. What do you regard as the most successful science/technology development in your cluster since you became a mentor/champion? Please tell us why you view this as successful.

197 responses

16. What do you regard as the least successful science/technology development in your cluster since you became a mentor/champion? Please tell us why you view this as unsuccessful.

112 responses

17. How do you spend your time in your role as science/technology mentor/champion? *(Tick one box on each line)*

	A lot of the time	Some of the time	Little or none of the time
Working in group settings with colleagues from school **N=195**	15%	70%	15%
Working with individual colleagues from school **N=200**	17%	70%	14%
Working in group settings with colleagues from the cluster **N=195**	51%	47%	3%
Working with individual cluster colleagues **N=196**	21%	49%	30%
Carrying out routine administrative tasks related to science and technology **N=197**	24%	60%	16%
Responding to colleagues' requests for support with science and technology **N=199**	19%	71%	10%
Attending conferences related to science and technology **N=196**	6%	44%	50%
Taking part in other science and technology CPD **N=195**	9%	69%	23%
Working on your own **N=199**	36%	56%	8%

18. <u>On balance</u>, to what extent have the following factors supported or hindered the development of science and technology education within <u>your school</u>? *(Tick one box on each line)*

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management **N=198**	14%	41%	39%	6%	-
School management **N=200**	54%	39%	6%	2%	<1%
Colleagues **N=201**	48%	42%	9%	1%	-
Resources **N=201**	31%	36%	5%	25%	3%
Time **N=200**	5%	15%	5%	37%	39%

19. <u>On balance</u>, to what extent have the following factors supported or hindered the development of science and technology education within <u>your cluster</u>? *(Tick one box on each line)*

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management **N=197**	15%	44%	33%	6%	2%
Cluster management **N=198**	51%	36%	7%	5%	2%
School management **N=193**	52%	41%	6%	1%	-
Own school colleagues **N=199**	33%	49%	17%	1%	-
Colleagues in other schools **N=199**	41%	44%	14%	1%	-
Resources **N=197**	34%	36%	10%	19%	1%
Time **N=199**	6%	17%	5%	40%	32%

20. Which of the following groups have you worked directly with on technology and science developments within your cluster since becoming a mentor/champion? *(Tick one box)* ***N=201***

Senior managers (HTs DHTs, OICs)	69%	Secondary teachers	42%	Primary teachers	98%
Early years workers	42%	Secondary pupils	2%	Primary pupils	76%
Children in early years centres	5%	Other professionals in the cluster	43%	Local authority personnel	25%

21. What percentage of <u>early years workers</u> in <u>the cluster</u> have you worked directly with as a science technology champion? *(Tick one box)* ***N=192***

None	35%	26-50%	10%	91-100%	10%
Up to 10%	31%	51-75%	2%		

11-25%	8%	76-90%	4%

22. What percentage of primary teachers in the cluster have you worked directly with as a science/technology champion? *(Tick one box)* ***N=199***

None	<1%	26-50%	5%	91-100%	51%
Up to 10%	10%	51-75%	8%		
11-25%	7%	76-90%	18%		

23. What percentage of teachers in your own school have you worked directly with as a science/technology champion? *(Tick one box)* ***N=192***

None	2%	26-50%	4%	91-100%	72%
Up to 10%	3%	51-75%	10%		
11-25%	3%	76-90%	7%		

24. What percentage of secondary science teachers in the cluster have you worked directly with as a science/technology champion? *(Tick one box)* ***N=198***

None	43%	26-50%	3%	91-100%	4%
Up to 10%	45%	51-75%	1%		
11-25%	4%	76-90%	-		

25. Which of the following statements about contact with other science and technology mentors applies to you? *(Tick all that apply)*

I have been in contact with other mentors **N=200**	99%
I have shared ideas/activities with other mentors **N=200**	100%
I have been involved in additional technology/science CPD with other mentors **N=199**	79%
I have collaborated on training programmes with other mentors **N=200**	87%
I have collaborated on activities with other mentors **N=200**	93%
I have talked over science and technology problems with other mentors **N=200**	92%
I have been involved in other ways with science and technology mentors **N= 200** (Please say how you have been involved with them)	32%

50 responses

26. To what extent have you seen the following happening in the cluster <u>as a result of your science/technology mentoring</u> work? *(Tick one box on each line)*

	To a large extent	To some extent	A little	No change	Don't know
Increase in teachers' confidence to teach science and technology **N=194**	45%	51%	4%	<1%	<1%
Increase in teachers' knowledge to teach science and technology **N=193**	39%	53%	6%	<1%	<1%
Increase in teachers' skills to teach science and technology **N=194**	36%	58%	6%	<1%	<1%
Increased pupil engagement in science and technology **N=193**	52%	41%	3%	1%	3%
Increased pupil aspirations towards science and technology careers **N=190**	12%	42%	18%	4%	25%
Increased science and technology activities in the curriculum **N=193**	38%	49%	9%	3%	1%
More varied approaches to science and technology learning and teaching **N=193**	42%	45%	11%	<1%	2%
More opportunities for teachers to share their science and technology experiences in clusters **N=192**	47%	38%	12%	3%	1%
Increased collegiality between cluster schools **N=192**	67%	27%	6%	1%	-
Increased interdisciplinary learning approach where science can be incorporated into a range of common primary topics **N=192**	22%	58%	14%	4%	2%
Increased teachers' reflective practice and self-evaluation **N=192**	17%	47%	20%	5%	11%
Increased teacher networks to support their science teaching CPD **N=189**	34%	42%	16%	4%	3%
Increased capacity of classroom assistants to support the delivery of science in the primary curriculum **N=190**	7%	18%	17%	48%	9%
Greater knowledge about the work of SSERC and NSLC **N=193**	48%	40%	9%	<1%	2%

27. Please use this space to make any final comments

90 responses

University of Glasgow | Robert Owen Centre for Educational Change

SSERC Primary Cluster Programme in Science and Technology: Evaluation

Annotated Headteacher/ Heads of Centre questionnaire (completed after Part 2 events)

Based on 142 responses across 16 local authorities

NB - Due to the effects of rounding percentages may not always add to 100%

Section 1 - About You

1. Are you ….? *(tick one box)* ***N=142***

Male	11%	Female	89%

2. Age group….? *(tick one box)* ***N=142***

21–25	-	26–30	3%	31–35	5%	36–40	6%
41–45	16%	46–50	17%	51–55	19%	56–60	30%
61+	5%						

3. Do you work….? *(tick one box)* ***N=142***

Full-time	99%	Part-time	1%

4. What is your role within the school? Are you: *(tick one box)* ***N=142***

Headteacher/Head of Centre	82%	DHT/Depute	11%	Other SMT member	5%
Other	1%				

5. For how many years have you been a teacher? *(tick one box)* ***N=142***

I am fully qualified and have been teaching for up to 5 years	3%
I have been teaching for between 6 to 15 years	12%
I have been teaching for 16 or more years	85%

6. Which cluster do you work in? *(tick one box)* ***N=135***

Local Authority	Cluster	% of total
Aberdeen	Hazledean	2%
	St Machar	2%
Clackmannanshire	Alva (Hillfoots)	2%
	Lornshill	4%
East Dunbartonshire	Boclair	2%
	Douglas	4%
	Turnbull	2%
Edinburgh	Forrester	1%
	James Gilespie	2%
Falkirk	Falkirk	3%
Fife	Auchmuty	3%
	Buckhaven	2%
	Dunfermline	2%
East Renfrewshire	Barrhead	2%
	Eastwood	3%
	Mearns	2%
	St Luke's	2%
	St Ninian's	2%
	Williamwood	2%
	Woodfarm	3%
Glasgow	Eastbank	2%
	St Andrew's	6%
	St Mungo's	2%
Highland	Fortrose	4%
	Lochaber	2%
	Nairn	2%
Moray	Forres	4%
	Lossiemouth	2%
North Lanarkshire	Cardinal Newman	2%
	Coatbridge	4%
Perth & Kinross	Perth High	7%
Renfrew	Castlehead	2%
Scottish Borders	Eildon East	2%
	Eildon West	4%
	Cheviot	3%
South Lanarkshire	Hamilton	3%
West Dunbartonshire	Dumbarton	3%
	Vale of Leven	3%

7. Is your establishment? *(tick one box)* ***N=142***

Early years centre	Primary school	More than one
1%	97%	3%

Section 2 - Impact of the Primary Cluster Initiative

This section of the questionnaire is about the impact of the SSERC Primary Cluster Programme and the work of the Science and Technology Champions/Mentors.

8. Has anything from the Primary Cluster Mentor/Champion CPD been introduced to your establishment's science and technology teaching or practice? *(Tick all that apply)*

Yes, we have introduced **new materials/resources** ***N=140***	98%
Yes, we have introduced **new methods of teaching** ***N=140***	86%
No, we have made no changes to our practice	-
I'm not aware of any changes	-

9. Which of the following have happened as a result of your establishment's involvement in the Primary Cluster Programme? *(tick one box on each line)*

	Has happened	Not yet happened, still plan to do so	Has not happened
Staff have take on a more significant role in science and technology developments in the establishment ***N=141***	92%	9%	-
The school has taken on a greater role in science and technology developments within our cluster ***N=139***	83%	12%	6%
The school has taken on a greater role in science and technology developments at Local Authority level ***N=128***	28%	27%	45%
The school has taken on a greater role in science and technology developments at national level ***N=125***	6%	16%	78%

10. What do you regard as the most successful science/technology development to have taken place in your establishment since you became part of the Primary Cluster Programme? Please tell us why you view this as successful.

138 responses

11. What do you regard as the <u>least successful</u> science/technology development to have taken place in your establishment since you became part of the Primary Cluster Programme? Please tell us why you view this as unsuccessful.

57 responses

12. <u>On balance</u>, to what extent have the following factors supported or hindered the development of science and technology education within <u>your establishment</u>? *(Tick one box on each line)*

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management ***N=136***	21%	46%	31%	2%	1%
Colleagues ***N=139***	66%	30%	4%	1%	-
Resources ***N=138***	51%	41%	2%	5%	-
Time ***N=133***	23%	36%	8%	26%	7%
Science and Technology Mentor /Champion ***N=137***	81%	16%	3%	-	-

13. <u>On balance</u>, to what extent have the following factors supported or hindered the development of science and technology education within <u>your cluster</u>? *(Tick one box on each line)*

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management ***N=138***	23%	46%	28%	2%	1%
Cluster management ***N=135***	52%	40%	7%	1%	-
Own school colleagues ***N=139***	60%	35%	5%	-	1%
Colleagues in other schools ***N=138***	41%	52%	7%	-	-
Resources ***N=139***	45%	40%	12%	2%	-
Time ***N=137***	22%	37%	15%	22%	5%
Science and Technology Mentor /Champion ***N=138***	78%	17%	5%	-	-

14. What percentage of staff (teaching or childcare) in your establishment have worked directly with a science/technology mentor/champion? *(Tick one box)* ***N=140***

None	2%	26-50%	9%	91-100%	67%
Up to 10%	4%	51-75%	5%		
11-25%	3%	76-90%	10%		

15. What percentage of staff (teaching or childcare) in your establishment have attended other non-residential and/or school based science CPD organised as part of the Primary Cluster Programme? *(Tick one box)* ***N=27***

None	4%	26-50%	7%	91-100%	78%
Up to 10%	-	51-75%	-		
11-25%	-	76-90%	11%		

16. To what extent have you witnessed the following happening in your establishment as a result of staff involvement with the science/technology mentoring/championing work? *(Tick one box on each line)*

	To a large extent	To some extent	A little	No change	Don't know
Increase in staff confidence to teach science and technology ***N=141***	55%	41%	4%	-	-
Increase in staff knowledge to teach science and technology ***N=141***	46%	51%	3%	-	-
Increase in staff skills to teach science and technology ***N=139***	46%	48%	7%	-	-
Increased pupil engagement in science and technology ***N=141***	53%	38%	7%	2%	1%
Increased pupil aspirations towards science and technology careers ***N=138***	8%	40%	17%	8%	28%
Increased science and technology activities in the curriculum ***N=140***	42%	46%	10%	1%	1%
More varied approaches to science and technology learning and teaching ***N=141***	47%	45%	8%	-	1%
More opportunities for staff to share their science and technology experiences in clusters ***N=141***	45%	43%	10%	3%	-
Increased collegiality between cluster schools ***N=140***	51%	40%	5%	4%	-
Increased interdisciplinary learning approach where science can be incorporated into a range of common primary topics ***N=141***	26%	50%	21%	1%	2%
Increased reflective practice and self-evaluation among staff ***N=141***	18%	62%	16%	3%	1%
Increased staff networks to support their science teaching CPD ***N=141***	24%	60%	15%	1%	-

Increased capacity of classroom assistants to support the delivery of science in the primary curriculum ***N=140***	1%	19%	30%	44%	6%
Greater knowledge about the work of SSERC and NSLC ***N=140***	23%	60%	16%	1%	-

17. What, if any, advantages does the mentor/champion approach bring to the development of science and technology teaching in your establishment?

128 responses

18. What, if any, disadvantages does the mentor/champion approach bring to the development of science and technology teaching in your establishment?

61 responses

19. In what ways would you like to see the science mentor/champion approach to science and technology education developed in your establishment?

122 responses

20. Please use this space to make any final comments

60 responses

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Appendix 4

SSERC Primary Cluster Programme in Science and Technology: Evaluation

Annotated Survey Monkey teacher survey (completed after Part 2 events)

Based on 93 responses across 8 local authorities

NB - Due to the effects of rounding percentages may not always add to 100%

Section 1 - About You

1. Are you ….? *(tick one box)* ***N=93***

Male	12%	Female	88%

2. Age group….? *(tick one box)* ***N=92***

21–25	7%	26–30	13%	31–35	10%	36–40	17%
41–45	13%	46–50	7%	51–55	21%	56–60	13%

3. Do you work….? *(tick one box)* ***N=92***

Full-time	87%	Part-time	13%

4. What is your role within the school? Are you: *(tick one box)* ***N=93***

DHT/Depute	8%	Principal teacher	15%	Class teacher	68%
Early years officer	-	Other	10%		

5. For how many years have you been a teacher? *(tick one box)* ***N=90***

I am a probationer	8%
I am fully qualified and have been teaching for up to 5 years	21%
I have been teaching for between 6 to 15 years	32%
I have been teaching for 16 or more years	39%

6. Which cluster do you teach in? *(tick one box)* ***N=88***

Local Authority	Cluster	% of total
Aberdeen	Hazledean	11%
	St Machar	5%
Clackmannanshire	Alloa	3%
Fife	Auchmuty	13%
Glasgow	Eastbank	9%
	St Andrew's	3%
Highland	Lochaber	6%
North Lanarkshire	Coatbridge	7%
Perth & Kinross	Perth High	36%
Scottish Borders	Eildon East	1%
	Eildon West	6%

7. Is your establishment? *(tick one box)* ***N=92***

Early years centre	Primary school	Secondary school
-	98%	2%

Section 2 - Impact of the Primary Cluster Initiative

This section of the questionnaire is about the impact of the SSERC Primary Cluster Programme and the work of the Science and Technology Champions/Mentors.

8. To what extent are you aware of the SSERC Primary Cluster Programme? *(tick one box)* ***N=69***

Very aware – I have a good grasp of what it is about	64%
Partly aware – I have some idea of what it is about	35%
Not aware – This is the first time I have heard of it	1%

If you replied 'Not aware' of the SSERC Primary Cluster Programme then please go to the final question.

9. Please indicate which of the following activities you have engaged in or changes you have introduced to your practice? *(tick one box on each line)* ***N=73***

I have worked with my Science and Technology Champion/Mentor	78%
I have taken part in school/cluster based science CPD organised as part of the Primary Cluster Programme	97%
I have introduced new materials/resources to my science and technology teaching or practice from the Programme	74%
I have introduced new methods to my science and technology teaching or practice from the Programme	77%
I have taken on a more significant role in science and technology developments in the establishment	46%
I have taken on a greater role in science and technology developments within our cluster	31%

10. <u>On balance</u>, to what extent have the following factors supported or hindered the development of science and technology education within <u>your establishment</u>? *(Tick one box on each line)*

	Major support	Some support	Little or no influence	Some hindrance	Major hindrance
Local Authority management ***N=71***	13%	51%	34%	3%	-
School management ***N=70***	50%	41%	7%	1%	-
Colleagues ***N=70***	51%	41%	7%	-	-
Resources ***N=71***	35%	38%	7%	17%	3%
Time ***N=70***	11%	36%	21%	17%	14%
Science and Technology Mentor /Champion ***N=69***	55%	33%	12%	-	-

11. To what extent has the following happened <u>as a result of your involvement with the science/technology mentoring/championing</u> work?

(Tick one box on each line) ***N=71***

	To a large extent	To some extent	A little	No change	Don't know
Increase in my confidence to teach science and technology ***N=71***	41%	37%	14%	9%	-
Increase in my knowledge to teach science and technology ***N=71***	42%	34%	16%	9%	-
Increase in my skills to teach science and technology ***N=71***	43%	36%	14%	7%	-
Increased pupil engagement in science and technology ***N=71***	47%	34%	10%	9%	1%
Increased pupil aspirations towards science and technology careers ***N=71***	18%	34%	20%	17%	11%
Increased science and technology activities in the curriculum ***N=71***	38%	39%	16%	7%	-
More varied approaches to science and technology learning and teaching ***N=71***	37%	48%	9%	7%	-
More opportunities for staff to share their science and technology experiences in clusters ***N=71***	40%	34%	18%	7%	1%
Increased collegiality between cluster schools ***N=69***	36%	35%	19%	10%	-
Increased interdisciplinary learning approach where science can be incorporated into a range of common primary topics ***N=70***	26%	46%	23%	4%	1%
Increased reflective practice and self-evaluation among staff ***N=71***	21%	45%	27%	7%	-
Increased staff networks to support their science teaching CPD ***N=68***	25%	44%	18%	13%	-
Increased capacity of classroom assistants to support the delivery of science in the primary curriculum ***N=71***	7%	18%	23%	39%	13%
Greater knowledge about the work of SSERC and NSLC ***N=69***	26%	38%	23%	9%	4%

12. What, if any, <u>advantages</u> does the mentor/champion approach bring to the development of science and technology teaching in your establishment?

40 responses

13. What, if any, <u>disadvantages</u> does the mentor/champion approach bring to the development of science and technology teaching in your

establishment?

9 responses (some just reaffirmed no disadvantages)

14. In what ways would you like to see the science mentor/champion approach to science and technology education developed in your establishment?

32 responses

15. Please use this space to make any final comments

12 responses