Mentoring for Early Career Chemistry Teachers (MECCT)

Pilot Report

November 2020

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NFER
National Foundation for Educational Research

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Executive summary

The intervention

This project was part of a co-funded round on science teacher retention with the Wellcome Trust. Mentoring for Early Career Chemistry Teachers (MECCT) was a mentoring intervention developed by the Royal Society of Chemistry (RSC) to improve early career teachers' (ECTs) retention by supporting them with their teaching. The intervention specifically aimed to help participating ECTs feel more supported by:

- boosting their confidence;
- expanding their chemistry specific pedagogical knowledge;
- helping them to manage their workload and stress; and
- supporting them to stay in teaching.
- It also aimed to provide mentors with the skills required to implement flexible and personalised mentoring.

The MECCT pilot was delivered over one year in the East of England and the Midlands, pairing 40 early career chemistry teachers (with between one and five years of teaching experience) with 39 external subject-specialist mentors (one mentor was paired with two mentees).

The key activities of the programme included the matching of ECTs to mentors, an initial training event for mentors and ECTs, mentoring sessions for ECTs, and support from the RSC—including access to RSC resources, three check-ins with ECTs and mentors via email every term, and a follow-up webinar for mentors.

The aim of this pilot was to assess MECCT's evidence of promise, feasibility, and readiness for trial. The evaluation, which was conducted by the National Foundation for Educational Research (NFER) between October 2018 and March 2020, used mixed methods, including observations of two of the initial training events, a baseline survey of ECTs, an end-point survey of ECTs, the analysis of mentoring logs, telephone interviews with 12 ECTs, 10 mentors, and one ECT's line manager, and interviews with four different members of the RSC delivery team.

Research Question	Finding
Is there evidence to support the theory of change?	The evaluation found that some participating ECTs reported increases in their confidence, knowledge, and pedagogical skills, and in feeling supported. However, there was limited evidence to suggest the programme had impacted on ECTs' ability to manage their workload or their intentions to stay in teaching. Given the mixed findings of the evaluation, and the low fidelity of some of the key implementation measures (such as the number of meetings between ECTs and mentors), it is difficult to fully validate the Theory of Change developed by the RSC team.
Is the approach feasible to deliver?	The evaluation found that it was feasible to deliver the MECCT programme and most of the ECTs who participated in the programme were positive about their experiences. However, key aspects of the MECCT programme need to be strengthened. For example, the recruitment process for mentors and ECTs needs to be improved to enable more effective matching between mentors and mentees, perhaps with a longer lead-in time or an increased pool of mentors and ECTs.
Is the intervention ready for scaling up?	The MECCT intervention is not ready for trial and a number of formative suggestions have been made for how it could be improved. This includes more active monitoring of the relationships between ECTs and mentors and whether meetings are taking place. In addition, more evidence should be gathered on the intervention's potential, or otherwise, to address and impact on the key needs of ECTs- workload and stress – as a precursor to improving retention.

Additional findings

The ultimate aim of this intervention was to improve retention of ECTs in the profession. Whilst the pilot was not designed to assess this, there did not seem to be clear evidence suggesting any positive changes in ECTs' satisfaction with teaching, nor in their plans to stay in teaching.

According to the programme's Theory of Change, ECTs' increased ability to manage their workload and stress would influence their intention to stay in the profession. However, the programme did not appear to have made a difference to ECTs' abilities to manage their workload. It is unclear why this may have been the case. It could be that external mentoring has limited impact on the teacher's experience of workload, or that the effects of the intervention were reduced by the fact that most ECTs met their mentors less than six times (which was the expected minimum number of sessions). It is also possible that ECTs' workloads increased during the period of the intervention. This was not explored as part of the small-scale survey and would be better measured in a trial or quasi-experimental design with a control or comparison group.

The qualitative findings indicated that mentoring worked most effectively where mentors were well-matched to their ECTs, had similar teaching styles, and the necessary knowledge to meet their needs. The ability to meet face-to-face and the proactiveness of mentors in developing the relationship with their ECTs and in arranging meetings also seemed to influence the effectiveness of the intervention.

These findings suggest that, in future iterations of this pilot, there should be more active and regular monitoring of the mentoring relationships to assess if ECTs and mentors are well matched, regular meetings are taking place, and the mentoring is working effectively.

Future pilots could also consider involving schools further in identifying ECT participants and to better understand school cultures and processes. This would not only help in the understanding of schools' approaches in key areas, such as management of teachers' workload, but would also help with fidelity of delivery and enable mentors to provide more tailored and impactful guidance. This approach would need to be handled sensitively, ensuring it did not impinge on the confidentiality of the discussions between the ECT and their external mentor, which is one of the main reasons why ECTs were attracted to the intervention.

In addition, more attention could be placed on targeting ECTs based in schools in challenging circumstances where there may be more significant need for external mentoring and stronger impacts may be realised. It will be key, however, to ensure that external mentoring does not displace in-school support.

Introduction

1. Brief name

Mentoring for Early Career Chemistry Teachers (MECCT).

2. Why (rationale/theory)

Research has shown that mentored teachers are less likely to leave the profession (Ingersoll and Kralik, 2004). Based on mentoring best practice identified by the Gatsby Foundation (Hobson et al., 2012), the aim of MECCT was to pair early career chemistry teachers with specialist external mentors to boost teachers' confidence, expand their chemistry pedagogical content knowledge, and help teachers of chemistry feel more supported. The programme aimed to improve the retention of ECTs by giving them a sense of success (Johnson and Birkeland, 2003) as well as improving their ability to manage workload and stress, which are main causes of teachers leaving the profession. The RSC ran a pilot of a chemistry mentoring programme in Scotland with 30 probationer teachers (equivalent to NQTs in England) of chemistry, which was evaluated by the Robert Owen Centre for Educational Change (Hall et al., 2018). Of the 24 mentees that returned an end-point questionnaire, more than half reported that the programme had positively impacted on their subject confidence, improved their teaching skills, and helped them identify development needs, while just under half (n = 11) indicated that the scheme had encouraged them to stay in teaching. That project provided a basis for this pilot study, but its findings also prompted some changes to the design of the intervention and evaluation, as summarised below. Some additional changes to the design were also made for pragmatic reasons and to ensure that the pilot was feasible to deliver within the planned timescale.

Table 1: Changes to the design of the Mentoring for Early Career Chemistry Teachers (MECCT) programme delivery and evaluation

Stage	Previous practice (Scottish pilot)	Change	Reason
Measurement of impact	Pre- and post-intervention questionnaires were sent to mentors and mentees by the RSC. In some cases, the same data was also collected by the evaluator.	Some of the information on effectiveness and outcomes previously collected by the RSC was collected and tracked by NFER, as it formed part of the evaluation research questions.	The aim of the change was to reduce the burden on participants. Information was only gathered once—either by the developer or the evaluator.
Participant (mentor and mentee) contact with RSC	Limited support provided to mentors and mentees.	RSC Education Coordinators received mentoring training to enable them to effectively support mentors and mentees. A dedicated shared inbox was set up to act as single point of enquiry for ECTs.	To ensure participants (mentors and mentees) received appropriate and effective support by trained mentoring coordinators.
In-person training	Training day was run over one day. However, mentors and mentees were involved in separate classes and were only together during breaks in the proceedings. Mentors and mentees were paired after the initial training day.	Mentors attended initial training events, with mentees joining them in the afternoon. The aim was for all pairs to be introduced to each other at the initial training days and for a back-up training day to be arranged if necessary.	In response to evaluation of Scotland mentoring 2017/2018, it was decided that to help facilitate the mentoring relationships, mentors would meet their mentees during the initial training day.
Further training	Ad hoc support from RSC on ongoing basis.	As well as ad hoc support, a follow-up webinar was planned for mentors in Oct/Nov 2019.	To offer additional support and encourage further mentoring and help with closing down the relationship.

Monitoring mentoring	Self-reporting of mentoring sessions at the end of the mentoring project.	A fidelity log was provided on an online portal where mentors uploaded records of mentoring sessions.	More reliable as it was filled out after each session.

3. Who (recipients)

The programme was targeted at teachers teaching chemistry at Key Stage 3 and/or Key Stage 4 who had achieved qualified teacher status (QTS). It operated in the East of England and in the Midlands and was open to both subject specialist and non-specialist teachers of chemistry in years one to five of their teaching career.1 Mentees were required to be teaching at least five hours of chemistry in an average school week. Mentors were required to be subject specialist teachers of chemistry with five or more years' teaching experience and it was expected that they would also benefit from participation in the programme, for example in terms of the development of knowledge and skills and improved progression opportunities.

4. What (materials)

Mentors were provided with a 'support for mentors' handbook to support individual mentoring sessions. This 22-page document covered eleven key areas identified by the RSC as important to early career teachers of chemistry.2 Guidance on teacher mentoring was to be provided to mentors at an initial training session led by a mentoring professional, as well as through the private mentor forum on MyRSC (online portal) and a second training event or webinar. The aim was for the RSC to proactively support mentors and mentees in the eleven areas mentioned above while also supporting mentoring pairs to explore other issues that emerged. Where practical materials (materials for use in school) were required by mentees, mentors were encouraged to direct mentees to existing RSC materials rather than develop their own.

Mentors and mentees were able to apply to the RSC for reimbursement of up to £300 to cover costs associated with mentoring (such as supply cover). This was for teacher attendance at mentoring sessions, not teacher attendance at training.

5. What (procedures)

The aim of the training sessions organised at the start of the programme year (February 2019) was for the RSC to provide mentors with the skills required to implement flexible and personalised mentoring. At these initial training events, mentors were also provided with a copy of the slide pack, a 'support for mentors' handbook, and a document which detailed example questions and exercises that mentors could carry out with their ECT. The sessions included guidance on how mentors could effectively build rapport with their ECTs, an introduction to key mentoring skills (such as listening, questioning, and being non-judgemental), a description of the mentoring process, goal setting, and guidance on planning each stage of the mentoring cycle from initiation to close. A second, optional training session or webinar was planned for October or November 2019 with the aim of supporting and monitoring the mentoring programme, refreshing questioning techniques, and guidance on closing the relationship. Mentees also attended the initial training day to enable them to gain an understanding of the mentoring process, meet their mentor, network with their peers, and receive the same resource materials as mentors. In addition to the two training days, the plan was for the Education Coordinators (see below) to check-in with the mentees and mentors via email every term (three times in total) to ensure everything was running smoothly and that they were happy with the support being provided. The Education Coordinators were also able to direct mentees to resources, including RSC resources, on request. Mentors

1 The original intention was that ECTs would be in years two to five of teaching but, due to early recruitment difficulties, it was decided that newly qualified teachers (NQTs) in year one of teaching would also be eligible. The original hesitation regarding including NQTs related to the fact that they already receive induction support. There were concerns about (1) NQTs' capacity to engage in the programme and (2) the ability of the pilot to differentiate between the effects of induction support and the MECCT intervention.

2 These areas are (1) the role of a mentor, (2) classroom and behaviour management, (3) time and workload management, (4) lesson planning, paperwork, and bureaucracy, (5) pedagogical approaches, (6) assessment approaches, (7) career progression, (8) day-to-day teacher experiences, (9) pastoral support, (10) interacting with other stakeholders, and (11) chemistry practicals.

were given access to other support materials including access to a mentors' forum on the online platform MyRSC. A mailbox was also set up by the RSC for ad hoc queries and support which was managed by the central RSC team.

The mentoring sessions were arranged by each mentor-mentee pair. There was an expectation that each pair completed at least one, one-hour face-to-face session per half term (minimum of six over the course of the intervention). The content, delivery, and style of the sessions was unique to each pair and stage of their mentorship.

6. Who (implementers)

Mentoring was delivered by subject specialist teachers of chemistry with five or more years' experience. Mentors could be serving or former teachers.

The intervention followed a 'train-the trainer' model whereby mentors were trained and supported by a mentoring professional and their local RSC Education Coordinator.

The mentoring professional, who was employed by the RSC, used their experience of setting up mentoring relationships to (1) design and produce appropriate training and ongoing support for participating ECTs and mentors and (2) ensure that recruitment materials were consistent with the planned training and support. Their role also included producing webinars to provide an overview of the mentoring scheme prior to participants signing up, pairing participants into mentee-mentor pairs, scheduling, arranging and delivering training days for mentors and mentees, and addressing issues with the mentoring scheme or individual mentoring relationships as they arose, for example, re-pairing.

ECTs and mentors were supported by two Education Coordinators employed by the RSC. One was based in the East of England and one in the Midlands. Using their relative proximity to schools in their region, as well as their knowledge and contacts with educational stakeholders, their role involved helping to deliver several key aspects of the mentoring scheme, particularly (1) recruiting mentors and mentees by promoting the mentoring scheme and (2) providing ongoing support to mentors and mentees.

7. How (mode of delivery)

The aim was for teachers to be recruited by advertising through the RSC's local network of teachers using the RSC's regular newsletter as well as by proactively approaching teachers known to the Education Coordinators via the Learn Chemistry Partnership (approximately 60% of schools in any area are involved).

When signing up to the intervention, ECTs and mentors were each be asked to sign a Memorandum of Understanding (MoU). A signature was also required from their respective school leaders (see MoU template in Appendix 4). The MoU explained the aims and expectations for participants of both the intervention and the evaluation.

Both mentors and mentees were asked to complete an online questionnaire including questions about their mentoring (or teaching) experience, expectation of the scheme, and personality and interests. Survey responses were reviewed by an experienced RSC mentoring professional with the plan being that the RSC would conduct phone interviews with any teachers where they had questions around their motivations or commitment to the programme. Teachers were then manually matched with the plan being that matching would be based on factors including personalities and interests, geographical proximity, years in teaching, age, and experience. It was hoped that a successful pairing would lead to excellent rapport and progress towards the personalised objectives set by the mentee.

The first training sessions with mentors were face-to-face whilst the second, optional training session was run as a webinar. The RSC trained mentors to be non-directive and focused on career support rather than being instructive or directive, or solely offering emotional support.

As mentioned above, the plan for monitoring was that the RSC would monitor the relationships through personal check-ins with mentees and mentors by email every term and through monitoring a mailbox set up for ad hoc queries and support.

The local Education Coordinator's role was to advise mentees and mentors and to help resolve issues if they arose. They received mentorship training themselves (distinct from the mentoring training provided to mentors in this programme) in order to do so, and were also supported by mentoring professional colleagues at the RSC's head office. The plan was that they would also integrate the participants into the existing network of regional teachers and chemistry-teaching events taking place throughout the academic year. Mentees and mentors were to organise their mentoring to suit their schedules and mentees' needs alongside their routine teaching throughout the year.

8. Where (setting)

The two initial training sessions were due to take place in February 2019 at Murray Edwards College, Cambridge and College Court Conference Centre, Leicester. A third training day for those who could not make the first two sessions was scheduled to take place in central London in April 2019.

Mentoring sessions could take place inside and outside of school, ideally face-to-face (the first training session was face-to-face), but also via Skype, phone, email, and other forms of social media.

9. When and how much (dosage)

The programme was planned to run from February 2019 to March 2020. The RSC expected mentor pairs to meet six times over the course of the year for up to an hour each time. The exact number of meetings was expected to vary depending on the mentees' preferences. It was expected that communication would ideally take place face-to-face, but it could also take place via Skype, phone, email, and other forms of social media. Some interactions were expected to be scheduled while others would be ad hoc.

10. Tailoring

Beyond the minimum expectation of six interactions over the year, it was expected that each mentoring pair would tailor the intensity and content of their mentoring to match the mentees' needs.

11. How well (planned)

Planned strategies to maximise implementation effectiveness were approximately five hours of initial training for mentors and two hours for mentees in February 2019. A second, optional training session (face-to-face or via webinar) was planned for mentors in October or November 2019 for up to three hours. These sessions were to be supplemented by a rolling programme of support and assistance for mentors and mentees delivered by the two Education Coordinators. It was intended that this support would include termly email contact, the monitoring of a mentoring inbox for mentees, and ad hoc support.

Background evidence

England's secondary schools face a significant teacher supply challenge over the next decade. The Department for Education (DfE) forecasts that secondary schools will need 15,000 more teachers between 2018 and 2025 to meet a 15% rise in pupil numbers. However, secondary teacher numbers have been falling since 2010 due to increasing numbers of teachers leaving the state sector and insufficient numbers entering (Worth and Van den Brande, 2019a). The teacher supply challenge is particularly acute in chemistry where the recruitment of new trainees has been consistently below target for several years and retaining teachers is a particular challenge (Worth and Van den Brande, 2019b). Data from the DfE suggests that of those chemistry ECTs that started teaching in 2016, only 82% were still in service one year later, while of those who started in 2012, only 63% were still in teaching five years later (DfE, 2018).

Retaining teachers that join the profession is a crucial element of the government's Teacher Recruitment and Retention Strategy (DfE, 2019). At the heart of the strategy is the Early Career Framework (ECF). This underpins an entitlement to a fully funded, two-year package of structured support for all ECTs, including funded time off timetable in

the second year of teaching and additional support from school-based mentors. Indeed, mentoring will form a key part of the new support arrangements for ECTs. Prior to the early roll-out of the ECF in September 2020, the EEF funded pilots to consider how to effectively train mentors, which will be followed by further trialling to support national roll-out.

There are many reasons why ECTs leave teaching. While not specific to chemistry teachers, new teachers commonly experience 'practice shock' when faced with the reality of having their own classes, getting to grips with practice, curriculum, assessments, student behaviour, teaching pedagogy, and intensive workload (Walker et al., 2018; Perryman and Calvert, 2019; Sims and Jerrim, 2020). In the most recent survey of newly qualified teachers, almost three in ten (28%) reported that, after qualifying, workload was greater than they had expected, and around half did not feel supported by their school to manage their workload (Ginnis et al., 2018).

Another reason teachers leave the profession early is due to a lack of collegiality and support that can leave them feeling isolated and dissatisfied (Buchanan et al., 2013). Conversely, where this support is in place—through mentoring, for example—this is likely to boost morale and satisfaction, and may bolster retention (Walker et al., 2018). Research has shown that support, guidance, and orientation programmes (induction) targeted at beginning teachers have a positive impact on teachers' commitment and retention and classroom practice, as well on student achievement (Ingersoll and Kralik, 2004; Ingersoll and Strong, 2011). Spooner-Lane (2017) distinguished between induction and mentoring suggesting that mentoring extends beyond induction and includes two key stages. These are the development of a respectful and trusting relationship between the experienced teacher and the beginning teacher and the mentor (through collaborative and reflective conversations over one to three years) and assisting the beginning teacher to establish clear; professional development goals and progress towards becoming an effective teacher.

The MECCT programme drew on mentoring best practice, primarily that identified by the Gatsby Foundation (Hobson et al., 2012). They found that the following factors influenced the impact of external mentoring:

- teachers' openness to mentoring and willingness/ability to learn and change;
- mentors' ability to build relationships and trust;
- mentors' independence from mentees' schools;
- mentors being on the teacher's side and not involved in their assessment or appraisal;
- mentors being empathetic, encouraging, supportive, and positive;
- opportunities for one-to-one, face-to-face interaction;
- teachers' willingness and ability to find time to engage with the mentor and protect agreed meeting times;
- mentors having sufficient time to engage with teachers and the flexibility to be able to respond swiftly to requests for support;
- mentors' geographical proximity to mentees;
- mentors' ability and willingness to tailor support to individual needs;
- mentors having credibility with mentees as passionate, subject-specialist teachers;
- mentors' ability to facilitate and help mentees appreciate the significance of investing in peer networking and support;
- mentors' ability to facilitate mentees' access to a bank of appropriate resources for teaching;
- mentors' willingness and ability to be pro-active in establishing and maintaining contact with mentees;
- the provision of appropriate opportunities for the preparation and support of mentors;
- consistency and cooperation between external mentors and other providers of support for mentees' professional development;
- mentors being able to work with both individual teachers and departments; and
- mentors having a sufficient degree of autonomy.

The aim of the programme was to pair early career chemistry teachers with specialist external mentors to boost ECTs' confidence, expand their chemistry-specific pedagogical knowledge, and help them feel more supported. The programme aimed to improve ECTs' retention directly by giving teachers a sense of success (Johnson and Birkeland, 2003) as well as improving their ability to manage workload and stress, which, as detailed above, are amongst the main causes of teachers leaving the profession. The RSC ran a pilot of a similar scheme in Scotland, which was

evaluated by the Robert Owen Centre for Educational Change (Hall et al., 2018). Thirty probationer teachers (NQTs) of chemistry who were taking part in a Career Long Professional Learning (CLPL) course run by Scottish Schools Education Research Centre (SSERC) were paired with a similar number of experienced chemistry teachers who were acting as mentors over the academic year 2017/2018. The evaluation found indicative evidence of a positive impact on some teachers, including on their subject confidence, teaching skills, and intentions to remain in the profession.

The MECCT programme represented an opportunity to further refine the RSC's mentoring model, to trial it with early career chemistry teachers in England, and to contribute to the wider body of knowledge on how mentoring can support teacher retention. The evaluation's aims were to explore:

- evidence of promise—including what needs the project addresses, the quality of mentoring provided, and perceived outcomes;
- feasibility to deliver—including whether the right mentees were reached, the suitability of the mentor/mentee matching and delivery approaches, areas for improvement, and scalability; and
- readiness to be evaluated in a trial—including what factors would support or hinder a successful trial and how it should be administered.

Research questions

The evaluation addresses the following research questions:

1. Evidence to support the Theory of Change[3]

a) Is there a need for the intervention and does it focus on the right areas of support (for example, the eleven areas identified by the RSC)?

b) Is there preliminary evidence that the intervention has impacted positively on ECTs and perceptional evidence as to whether these outcomes have occurred in the absence of the intervention (additionality)? Is there preliminary evidence that the intervention has impacted positively on ECTs' pedagogical knowledge, access to resources and support, confidence, behaviour management, subject knowledge, progression, assessment and feedback, student progress, workload and stress, and intentions to remain in teaching over the next three years?[4]

c) How do outcomes vary by ECTs' characteristics and geographical area?

d) Is there preliminary evidence that the intervention has impacted positively on mentors and would outcomes have occurred in the absence of the intervention (additionality)?

e) Were there any unintended consequences or negative effects of the intervention?

f) Is there evidence to support the intervention's Theory of Change?

2. Feasibility

a) Is the intervention feasible to deliver? For example, can the RSC recruit the target number of mentors and ECTs, effectively match mentors and ECTs, deliver training and provide support materials, and support the successful delivery of mentoring (i.e. to achieve the intended outcomes) within the time allotted?

3 For added clarity, there was some minor rewording of these questions from the protocol but all of the intended areas of questioning were retained.

4 To help make the findings more accessible and to cut down on repetition, research question 1b from the protocol (https://tinyurl.com/y6ugehqj) was revised during the report drafting process to amalgamate the sub items included in the original question. This is purely a presentational matter; the original question and its sub items are all answered as part of the findings presented under question 1b.

b) Has the matching process been successful? What are the key success factors? What could be improved?

c) What type and level of support to ECTs has been most effective? Have mentors undertaken the minimum recommendation of six interactions with their mentees over the year? Is this level of support appropriate? What other support has been provided? What types, levels, and combinations of support have been the most effective? How could support be improved?

d) Has the mentor/mentee training been effective in developing a mentoring approach and helping mentors understand how to facilitate sessions? How effective was the first training session? How effective was the second, optional session? What proportion of mentors attended the second session face-to-face and via webinar? What were the pros and cons of attending the second session face-to-face or via webinar?

e) Is the intervention reaching its intended target population (i.e. both specialist and non-specialist chemistry teachers in the first to fifth year of teaching)?

f) Were all recipients engaged during the delivery of the intervention? Were there any barriers to engagement (for example, relating to senior leader support, workload, or time)? How, if at all, have these been overcome?

3. Readiness for trial

a) What can be learned from the above to take the intervention to the next stage of evaluation? For example, do changes need to be made to recruitment, matching, training, implementation (for example, content, delivery mode, and level of support provided to ECTs), project management, and the intervention theory?

b) Are there any key contextual factors that appear to facilitate or impede successful implementation (e.g. related to mentors, ECTs, and schools' characteristics/circumstances)?

c) Is the intervention considered to be affordable by schools? Do schools give mentees and mentors dedicated time to meet with or speak to one another? To what extent do schools feel it is feasible to provide such opportunities?

d) Is the intervention sufficiently well manualised such that it can be readily scaled up into a larger trial if required?

Ethical review

The research was approved by NFER's Code of Practice Committee and conducted in line with the ethical guidelines of NFER's Code of Practice. The RSC was responsible for ensuring that all participating ECTs and mentors signed a Memorandum of Understanding (MoU) which set out the roles of the participants, their schools, the RSC delivery team, and the programme evaluators (Appendix 4). In addition, opt-in consent was gained directly from all interviewees by the evaluators. Due to the nature of the programme, it is possible that research participants at the RSC may be identifiable to those familiar with the programme even though all data has been anonymised. All participants were alerted to this possibility and provided consent on this basis. In addition, the evaluation team made some minor alterations to reported quotations to protect the anonymity of participants, such as removing gender identifiers and omitting individual and school identifiers for ECTs and mentors in the report.

Data protection

The legal basis for processing personal data was GDPR Article 6 (1) (f) which states that 'processing is necessary for the purposes of the legitimate interests pursued by the controller or by a third party except where such interest are overridden by the interests or fundamental rights and freedoms of the data subject which require protection of the personal data'. The RSC's and NFER's legitimate interest for processing personal data for this project was to deliver and evaluate the programme, respectively. Research participants' personal data, in the form of school, mentor, and ECT/mentee contact details, together with selected background characteristics, were shared securely between the RSC and the NFER using NFER's Secure Portal. The RSC and the NFER will delete any personal data within one

year of the publication of the evaluation report. No personal data collected by NFER was stored or transferred outside of the European Economic Area. NFER and the RSC were the joint Data Controllers and Processors for the evaluation, which meant they jointly decided on the means and purposes of processing personal data in order to effectively deliver and evaluate the programme. Full details about how NFER processed and stored participants' data, including details of how participants could withdraw their data from the programme or correct errors in it, were documented in a Privacy Notice (see Appendix 5), a link to which was emailed to all research participants prior to any evaluation-related data collection activity.

Project team

The principal investigator for this evaluation was Suzanne Straw, Deputy Head of NFER's Centre for Policy and Practice Research. The day-to-day evaluation manager was Matt Walker, Research Manager from NFER's Centre for Policy and Practice Research. They were supported by NFER research associate Peter Binfield, and statistician Jenna Julius. The ECT survey and associated communications with ECTs were managed by Keren Beddow and Kathryn Hurd from NFER's Research and Product Operations Department.

The intervention was developed and delivered by the team at the RSC, which was led by Luke Blackburn until late 2019. After this point, the delivery team was led by Paul Andrews. Other key RSC staff included Mark Jordan (Lead Developer) and Laura Woodward (careers specialist and trainer).

NFER was responsible for the evaluation design, data collected as part of the evaluation, analysis, and reporting of the independent evaluation.

The project was supported and guided by EEF staff Guillermo Rodriguez-Guzmán and Igraine Rhodes, and, from late 2019 onwards, Camilla Nevill and Emily Yeomans.

Methods

This chapter first provides an overview of the number of ECTs and mentors that started and finished the programme before moving on to discuss the programme's Theory of Change and the methods used to evaluate the pilot.

Recruitment

This section describes the recruitment of ECTs and mentors to the intervention. It also provides an overview of the training that was offered to mentors and ECTs and highlights important differences between what was intended to happen, as specified in the intervention design, and what actually happened.

The recruitment target set out in the pilot study protocol was for 40 ECT/mentor pairs. In terms of eligibility criteria, ECTs/mentees had to be:

- teaching at least five hours of chemistry in an average school week at Key Stage 3 or Key Stage 4, and have qualified teacher status (QTS);
- subject specialists or non-specialist teachers of chemistry;
- in years one to five of their teaching career; and
- based in the East of England or in the Midlands.

Mentors had to be:

- subject specialist teachers of chemistry with five or more years' experience; and
- based in the East of England or in the Midlands.

Recruitment was undertaken by the RSC between November 2018 and May 2019. As planned, the RSC advertised through its local network of teachers using its regular newsletter as well as proactively approaching teachers known to the two Education Coordinators. The original intention was to exclude newly qualified teachers (NQTs) as it was thought that, as many already received in-school mentoring as part of their school's induction arrangements, there would be a greater gap in support for recently qualified teachers (RQTs). However, due to challenges in recruiting ECTs, and a number of early expressions of interest from teachers in their first year of teaching, a few weeks into the recruitment process, a decision was made to include NQTs. This decision was initiated by the developer and agreed with the evaluator.
RSC data suggests that a total of 40 ECTs were recruited of which 21 were located in the Midlands and 19 in the East of England. They were supported by 39 mentors (one of these mentors was allocated to two ECTs)[5] of which 22 were located in the Midlands and 17 in the East of England. The programme start date covered a range of dates as the first mentors and mentees were paired on 12 February 2019 and the last mentor and mentee were paired on 7 May 2019. This had implications for the time available for mentoring.

Training

The original intention was for all 40 ECT/mentor pairs to be recruited in time to attend one of two initial training days, the first being held in Cambridge on 12 February 2019 and the second in Leicester on 26 February 2019. However, as the RSC was not able to recruit everyone in time to attend these sessions, a third training day was delivered on 6 April 2019 in London, in addition to four one-off, one-to-one training days that were held between April and early May 2019. The one-off training days were run by the Education Coordinator and just targeted at mentees (as their mentors had already been trained). However, mentees were introduced to their mentor at the end of the session. A discussion of the effectiveness of both the initial training events and the follow-up webinar is provided in the Findings section.

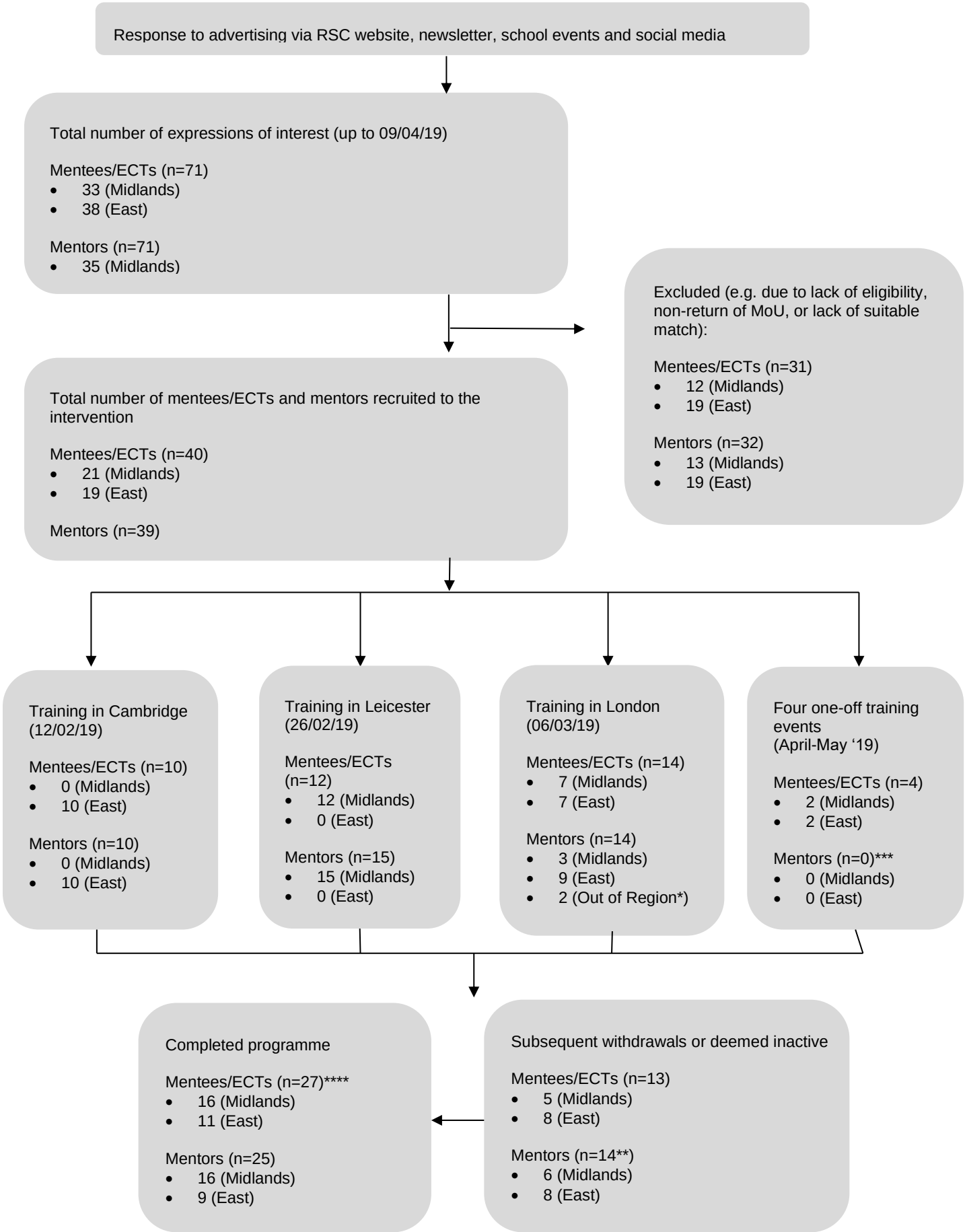
5 The TIDieR framework did not stipulate how many mentees would be matched with mentors but mentors having more than one mentee is likely to be standard practice in a scaled-up intervention.

Retention during the intervention

One finding from the evaluation is that the RSC found it difficult to track the ongoing participation of ECT/mentor pairs during the intervention. This was due to their light-touch approach which primarily included catch-up emails with mentees and mentors every term with the assumption that no response meant that the mentoring was proceeding as planned. In reality, some mentoring stopped early and was not picked up by this approach.

RSC data suggests that by the end of the programme there had been one ECT/mentor pair withdrawal from the Midlands, one ECT was reassigned to a different mentor, and six pairs withdrew (or were deemed inactive as contact could not be established) from the East of England. This suggests seven pairs withdrew or were deemed inactive in total, resulting in 33 ECTs completing the pilot (with 20 in the Midlands, and 13 in the East), together with 31 mentors (with 20 in the Midlands and 11 in the East). However, NFER communications with ECTs/mentors suggests drop-out was higher, with eight ECT/mentor pairs from the East and five from the Midlands dropping out since the start of the programme. This resulted in 27 ECTs completing the programme (16 in the Midlands and 11 in the East) together with 25 mentors (16 in the Midlands and nine in the East). Two of these mentors completing the programme had two mentees. **Error! Reference source not found.** provides a detailed recruitment flowchart drawing on the best available data from the RSC and NFER. However, this should be viewed as indicative given the uncertainties around the data that has been collected. Further details on the characteristics of participating ECTs and their schools, together with a discussion of the issues relating to recruitment and tracking, are presented in the Findings se

Figure 1: ECT and mentor recruitment flowchart (n = number of ECTs/mentors)



ECTs/mentors are shown as being in the East or Midlands based on the region of their assigned Education Coordinator.

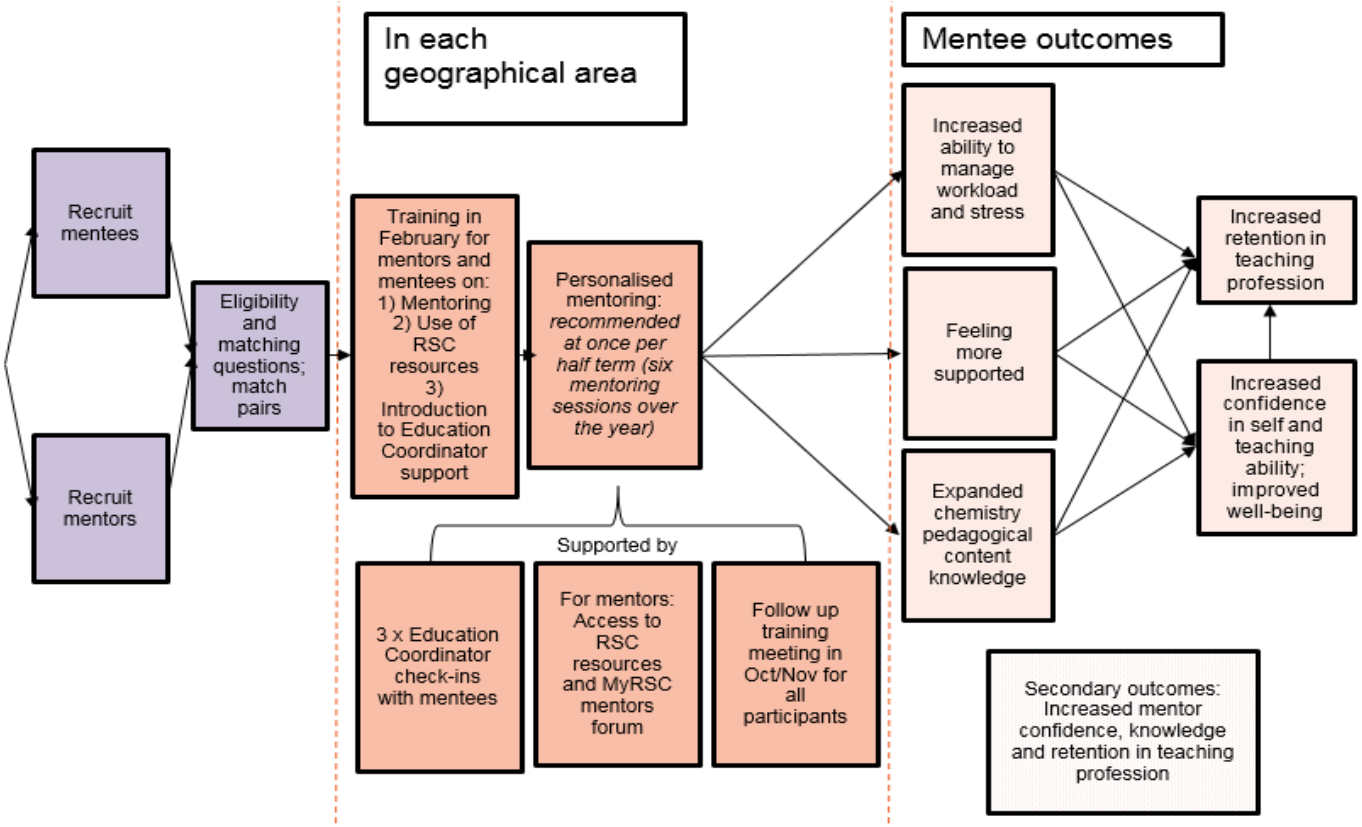
*Two mentors were located outside of both the Midlands and the East of England; one was assigned to the Midlands, and the other to the East. **One ECT was reassigned to a different mentor, which resulted in the ECT's original mentor having to withdraw from the pilot. This explains why there was one additional mentor drop out (n = 14) compared to the number of ECTs (n = 13). *** These four mentees also met their (already trained) mentors during their one-off training sessions.****Two of the mentors completing the programme had two mentees.

Theory of Change

In autumn 2018, NFER attended two set-up meetings and then held an IDEA workshop with the RSC to complete the TIDieR framework and discuss and agree the Theory of Change (ToC). This aimed to clarify the intervention's aims, target group, proposed content and delivery mechanisms, and intended outcomes. Created by the RSC at the start of the programme, with input from the NFER, the ToC outlines what was intended in terms of delivery in each geographical area and the ECT outcomes. The programme inputs (recruitment and matching) lead, in the first instance, to the programme outputs: the initial training and mentoring support. These in turn are supported by three check-ins with participants, conducted by the Education Coordinators in each region, together with access to additional RSC resources and a follow-up webinar for mentors. These then lead to a set of anticipated interrelated intermediate outcomes for ECTs, which include an increased ability to manage workload and stress, feeling more supported, expanded subject and pedagogical knowledge, and increased confidence. Improvements in these areas are then expected to support, both directly and cumulatively, the achievement of the ultimate aim of the programme, which was to increase the retention of early career chemistry teachers within the profession.

Inevitably, reducing complex change to a ToC format over-simplifies the sequence of changes and does not take account of the complex inter-relationships between the programme and outcomes and connections between different outcomes. Nonetheless, it provides a useful framework for organising and interpreting the evaluation findings.

Figure 2: MECCT programme Theory of Change, as conceptualised by the RSC



The primary aim of the MECCT programme was to increase the number of participating chemistry ECTs staying within the profession. However, the pilot evaluation was not designed to robustly assess this outcome due to the relatively small number of ECTs involved and the short period over which any assessments of teacher retention could be made. Instead, evidence of promise was assessed by using measures relating to the outputs and intermediate outcomes for mentees/ECTs set out in the programme ToC. The underpinning assumption was that if these outputs and intermediate outcomes were achieved, it is possible that these could, over time, eventually lead to the intended final outcomes.

These measures were assessed using a variety of data collection methods which comprised:

- baseline and endpoint ECT surveys (see Appendices 6 and 7);
- telephone interviews with ECTs, mentors, and line managers;
- telephone interviews with RSC staff;
- observations of initial training events (see Appendix 8); and
- use of fidelity logs to explore the nature of the interactions between ECTs and mentors (see Appendix 9).

As it was a small-scale pilot evaluation, a comparison group was not included.

Each data collection method is discussed in turn in the sections below.

Baseline and endpoint ECT surveys

A baseline survey was administered to ECTs by the evaluation team in February 2019. It was in a paper format and was distributed to ECTs during the initial training events held in Cambridge and Leicester. The completed questionnaires were collected in on the same day. As not all of the ECTs were recruited by this time, the RSC distributed further questionnaires to ECTs at a training event in London in April 2019 and at four one-off training days held between April and early May 2019. These additional completed questionnaires were sent to NFER for analysis by secure postal delivery. A completed baseline questionnaire was received from all 40 ECT participants. The baseline survey was aligned to the programme theory of change and developed in consultation with the EEF and the RSC. It explored:

- how ECTs came to be involved in the pilot study;
- why they applied, and how they viewed the support being provided by the MECCT programme relative to the support they already had available in their schools;
- their views on their current skills and abilities in teaching chemistry; and
- their satisfaction with teaching and future plans.

At the end of the pilot study, an online end-point questionnaire, which contained many of the same questions as those asked in the first survey, was sent to 37 ECTs in February 2020 using email addresses provided by the RSC. The survey was sent to 37 rather than 40 ECTs as the RSC reported that, at that time, three ECTs had left the programme and had requested not to be contacted further. For the end-point survey, an online instrument was favoured over a postal one as it was easier to administer and, due to online routing, was easier for ECTs to complete. Also, there were no face-to-face events scheduled at the end of the pilot that would have allowed for a paper questionnaire to be handed out and collected in. In an effort to secure a good response rate, ECTs were offered a £10 Amazon voucher for completing the end-point survey. This was offered after non-respondents were sent two reminder emails and had also received a telephone reminder. In total, 30 responses were received. Of these, four respondents reported they had not received any mentoring support since their first meeting with their mentor during the initial training day. As a result, they were asked a follow-up question about why they had dropped out of the pilot early, before being routed out of the questionnaire. The remaining 26 respondents, who indicated they had attended two or more sessions with their mentor over the course of the pilot, were judged to have had sufficient contact with their mentor that the intervention may have had a detectable impact on them. Consequently, these respondents were routed through the rest of the questionnaire. It is the responses from these 26 individuals that form the basis of the analysis of the survey data on the impact of the intervention on ECTs' intermediate outcomes. A summary of the response rates to the two surveys is provided in Table 2 below.

Table 2: Survey response rates

	Dispatched to (N)	Responses received (N)	Response rate (%)
Baseline survey (February to May 2019)	40	40	100
End-point survey (February 2020)	37	30	81

Telephone interviews with ECTs, mentors and line managers

In total, 23 semi-structured telephone interviews were conducted with ECTs, mentors, and a line manager. These comprised:

- 12 interviews with different ECTs;
- ten interviews with mentors; and
- an interview with one ECT's line manager.

The interview schedules were developed in consultation with the RSC and the EEF. The interviews with the ECTs and mentors were designed to explore the types and frequency of contact they had had with one another, and their views on any impacts the programme had resulted in. The interview with the line manager explored their views on, and awareness of, the pilot and perceptions of its impact. These interviews were conducted between November 2019 and January 2020. All of the interviews lasted for between 45 minutes and one hour and were recorded with the permission of the interviewees.

To ensure a representative range of views were collected, the ECT/mentor pairs were initially randomly selected but with the aim of achieving a response from a sample that included ECTs/mentors in the East of England and in the Midlands, those from schools with different characteristics (in terms of attainment and the proportion of pupils eligible for free school meals—'FSM'), as well as those with different years of teaching experience. However, in the end, all participating ECTs and mentors were contacted and it is possible that those ECTs who took part in an interview were the ones that had a more positive view of the intervention. A summary of the key characteristics of those interviewed as part of the telephone case studies is provided in Table 3 below.

The original intention was to conduct ten telephone case studies involving separate interviews with matched ECT/mentor pairs together with the ECT's line manager. However, on the advice of the RSC, the interview with a line manager was made optional and at the discretion of the ECT. This was due to concerns about sensitivity of the intervention and the different motivations that ECTs may have had for joining the pilot (for example, some may have embarked on the programme owing to a lack of perceived support from their line manager). In the end, the evaluation team only interviewed one ECT's line manager. This was because most ECTs reported that they did not think it was suitable or appropriate for the research team to speak to somebody in that role, although their concerns were mainly expressed in terms of the additional burden this interview would place on their colleagues. The importance of speaking to an ECT's line manager and the methods for gaining access should be considered in any future evaluation design.

To increase the likelihood of speaking to an ECT and their paired mentor, when trying to set up these interviews, the mentor and ECT were approached by email at the same time. This often resulted in a response from the mentor first of all who then followed-up with the ECT on the evaluator's behalf.

Table 3: Details of who was interviewed as part of each telephone case study, together with selected ECT and school characteristics

Case study number	ECT	Mentor	Region of ECT and mentor	ECTs' years in teaching (at start of intervention)	ECTs' school characteristics*	
					Ever 6 FSM quintile	Attainment 8 quintile
Case study 1	✓	✓	East	1	Quartile 4 or 5	Quartile 1 or 2
Case study 2	✓	✓	Midlands	1	Quartile 3 or 4	Quartile 1 or 2
Case study 3	✓	✓	East	2	Quartile 1 or 2	Quartile 4 or 5
Case study 4	✓	✓	Midlands	3	Quartile 1 or 2	Quartile 4 or 5
Case study 5	✓	✓	Midlands	4	Not known	Quartile 1 or 2
Case study 6	✓	✓	East	3	Quartile 1 or 2	Quartile 4 or 5
Case study 7	✓	✓	Midlands	1	Quartile 4 or 5	Quartile 1 or 2
Case study 8	✓	✓	East	1	Quartile 4 or 5	Quartile 4 or 5
Case study 9	✓	✓	Midlands	1	Quartile 1 or 2	Quartile 4 or 5
Case study 10	✓	✓	East	2	Quartile 1 or 2	Not known
Case study 11	✓	✓	East	4	Quartile 1 or 2	Quartile 4 or 5
Case study 12	✓		East	1	Quartile 1 or 2	Quartile 4 or 5

*To protect the identity of ECTs, quartiles have been combined. Quartile 1 is the lowest and quartile 5 is highest.

One of the mentors interviewed was mentoring two ECTs. A line manager was also interviewed. It is also interesting to note that, while the RSC originally intended for paired ECTs and their mentors to be based in the same region (to increase the likelihood of them being able to meet face-to-face), this was not always the case, and in two of our case studies, the ECT and mentor were located in different regions. Indeed, one of the mentors we spoke to was not based in either the Midlands or the East of England. These location details have not been added to the table for identification reasons. A discussion of the impact of ECTs and their mentors sometimes being in different locations can be found later in the Findings section.

Telephone interviews with RSC staff

In total, five semi-structured telephone interviews were conducted with key RSC staff involved in the design or delivery of the MECCT programme. These comprised:

- two interviews with the RSC trainer;
- one interview with each of the two RSC Education Coordinators; and
- an interview with the RSC project manager.

The interview schedules were developed in consultation with the RSC and the EEF and were designed to provide insights into fidelity of delivery and perceptions of the effectiveness with which the programme was delivered.

Interviews with the RSC trainer were conducted in April and November 2019. The first interview explored their views on the effectiveness of the initial training days and matching process. The second interview explored their perceptions on the follow-up training webinar.

The *two Education Coordinators* were interviewed separately in October 2019. These interviews explored their views on the recruitment and retention of pilot participants in their region, the support they had provided to participants, and their perceptions of the impact of the programme.

Meetings were held with the *RSC project manager* throughout the pilot, including a final exit interview in October 2019, just prior to the project manager leaving the RSC. This interview was wide ranging and explored the project manager's reflections on recruitment, training, delivery, and the impact of the programme. All of the interviews lasted for between 45 minutes and one hour and were recorded with the permission of the interviewees.

Observations

The evaluation team attended both the Cambridge and Leicester training events in February 2019. As part of the sessions, researchers used an observation schedule, developed in consultation with the RSC and the EEF, which captured the main aims and objectives of the events, resources that were provided to participants, activities that were delivered during the day, and ECT, mentor, and trainer reactions on the day. The baseline paper questionnaires were also administered during the sessions. The observations were used to inform the development of interview questions and to capture data on participants' engagement and the quality of delivery.

Fidelity logs

The final data collection activity involved collecting information from 'fidelity' or 'mentoring logs'. This involved asking mentors to complete a regular half-termly log, which was in Excel format, and which captured the number of interactions mentors had had with their ECTs, date of each interaction, approximate duration of each interaction, the mode of interaction (whether face-to-face, telephone, or via video), and the main topics of discussion. Each mentor was asked to upload their log to a password-protected portal at the end of each half term. Following five email reminders, mentors were reminded again by telephone and offered the incentive of receiving a £10 Amazon voucher for a completed log. A total of 28 logs were received (out of a total of 40), each for a different ECT. Of these, 25 were fully completed and analysed as part of the evaluation. Incomplete logs were not analysed as they did not include time series data and it was not possible to know if gaps meant activity had not happened or if the log had not been completed accurately.

Data analysis

Given the small number of ECTs in the evaluation, analysis of the quantitative data from the baseline and endpoint ECT surveys and fidelity logs was restricted to descriptive statistics. Both frequencies and percentages are presented within the report to help provide insights into changes during the programme while reminding the reader of the small underlying numbers of pilot participants. In order to provide an assessment of the extent to which the intended intermediate ECT outcomes were achieved (that is, on workload and wellbeing, subject knowledge, pedagogical skills, confidence, satisfaction with teaching, and future plans), the survey data was analysed in two different ways.

First, a matched analysis of ECTs' responses to self-reported baseline (paper) and end-point (online) questionnaires was used to measure the average change in individual mean scores between items in the Likert scale. This involved asking the same questions at both time points and assigning a positive or negative number to each response option, such as -0.2 to 'strongly disagree' and +2 to 'strongly agree'. This allowed for mean scores to be constructed and change-over-time analysis to be undertaken.

Second, the end-point survey included a series of statements relating to each of the intended outcome measures and asked ECT respondents to what extent, if at all, they had experienced an improvement in each area. Where improvements were reported, ECTs were asked whether this was 'partly' or 'largely' as a result of the MECCT, or not at all. This question therefore allowed for some assessment of the counterfactual (that is, whether some of the impacts would have occurred in the absence of the intervention due to the natural maturation of teachers).

The qualitative data gathered from the interviews was analysed in qualitative data analysis package MAXQDA and was used to build a picture of the success of the intervention from different viewpoints. The interviews with ECTs, mentors, and the line manager were analysed thematically to explore different stakeholders' views on the different elements of the intervention (for example, matching, training, and mentoring). Given the small number of participants, it has not been possible to robustly evaluate whether views differ according to the different teacher and school-level characteristics.

A summary of how the different data collection strands were used to address each of the research questions is provided in Table 4.

Table 4: How data collections methods address different research questions

Data collection method	Research Question	Indicator
Baseline and end-point surveys	1a, c, f, 2e, 3a, b, d	Mentees identified areas of need/improvement
	1b, c, e, f, 2c, 3a, b	Qualitative change in self-reported confidence levels
	1b, c, e, f, 2c, 3a, b	Self-reported intention to remain in teaching
Telephone interviews with ECTs, mentors and line managers and RSC staff	1b, c, d, e, f, 2c, 3a, b	Self-reported change in confidence levels
	1a, c, e, 2b, c, d, f, 3a, b	Description of sessions
	1b, e, 2c, f, 3a, b	Descriptions of other interventions participants have been involved in
	3a, b, c	Perspective of ECT's line managers
Observation of training	1e, f, 2a, b, d, e, 3a, d	Report on content and delivery
Fidelity log	1e, f, 2a, b, d, e, 3a, d	Report on content and delivery

Timeline

A timeline of activities related to the evaluation and intervention delivery including recruitment period, outcome collection and delivery schedule, is provided in **Error! Reference source not found.** below.

Date	Activity
October–December 2018	Programme development; interviews with RSC programme manager and delivery team; development of Theory of Change
November 2018–May 2019	Recruitment and matching of ECTs and mentors
February 2019	Initial training events in Cambridge and Leicester and completion of ECT baseline survey
February 2019–March 2020	Delivery of mentoring support
March–April 2019	First Education Coordinator check-in with mentors/ECTs
April–May 2019	Additional initial training event in London (April) and four additional one-off training days (April-May) and completion of ECT baseline survey (April-May); first interview with RSC trainer (April)
June 2019	Second Education Coordinator check-in with mentors/ECTs
October 2019	Interviews with two Education Coordinators; end-point interview with RSC programme manager
November 2019	Third Education Coordinator check-in with mentors/ECTs; follow-up webinar for mentors; second interview with RSC trainer
December 2019–February 2020	Telephone interviews with ECTs, mentors and one line manager
February–March 2020	ECT end-point survey; final collection of mentoring logs
April 2020	Presentation of findings to the EEF and the RSC
May 2020	Draft final report

Findings

Participants

The target of 40 ECTs was achieved for the MECCT programme and the profile of participating ECTs at the start of the programme, together with the selected characteristics of their schools, is summarised in Table 5 below. It shows that ECTs were fairly evenly split between the East of England (n = 19) and the Midlands (n = 21). For those ECTs for whom we have the relevant data, most were in their first year of teaching (n = 24). This suggests that opening up the intervention to ECTs in their first year of teaching was a positive step in terms of supporting recruitment to the intervention. However, the original intention was to exclude NQTs on various grounds. This was because they may already be receiving in-school mentoring and may therefore not have the time to participate in the programme or may find it less useful than ECTs who are not receiving any mentoring support. In addition, it was felt that it would be difficult for the pilot evaluation to separate the impacts of this intervention from the in-school support being received by ECTs. Due to these factors, careful consideration should be given to whether NQTs should be included in a future intervention. However, if clear criteria on need is set and NQTs meet the criteria and have the appetite to participate, then these would be acceptable reasons to include them.

Twenty-eight ECTs were chemistry subject specialists. Regarding school-level characteristics, ECTs were recruited from schools from a range of Attainment 8 and Ever 6 free school meal (FSM) quintiles. Most ECTS were from schools rated ‘good’ by Ofsted (n = 23) or ‘outstanding’ (n = 14). Just three ECTs were from schools ‘requiring improvement’ and none were from schools categorised as ‘inadequate’.

Table 5: Selected characteristics of participating ECTs and their schools

Location	N	%
East	19	48
Midlands	21	53
Total	40	100
Years in teaching		
One	24	63
Two or three	8	21
Four or five	6	16
Total	38	100
Subject specialist		
Not a chemistry specialist	12	30
Chemistry specialist	28	70
Total	40	100
Attainment 8 quintiles	N	%
Quintile 1 (lowest)	3	8
Quintile 2	9	24
Quintile 3	10	26
Quintile 4	4	11
Quintile 5 (highest)	12	32
Total	38	100

Ever 6 FSM quintiles		
Quintile 1 (lowest)	9	23
Quintile 2	12	31
Quintile 3	7	18
Quintile 4	9	23
Quintile 5 (highest)	2	5
Total	39	100
Ofsted rating		
Outstanding	14	35
Good	23	58
Requires improvement	3	8
Total	40	100

Source: NFER baseline survey of ECTs, February–May 2019.

Percentages may not sum to 100 due to rounding.

Evidence to support the Theory of Change

The following sections assess the strength of the evaluation evidence that has been collected to support the intervention's ToC. The findings are presented against each of the key research questions.

Q1a: Is there a need for the intervention?

The evidence on whether the intervention is needed is mixed.

As part of the baseline survey, ECTs were asked why they had joined the pilot. As shown in Table 6 below, of the 40 ECTs who started the programme, 12 (30%) reported that they currently had no access to mentoring support, with an additional five respondents reporting that they were receiving mentoring support but it was ineffective. Nearly all of the ECTs without access to mentoring support were located in the East of England. A third were in their first year and the remainder were in their second or fourth year. Twenty-two respondents (55%) reported they had access to effective mentoring support in their schools but that they also wanted external support.

Table 6: The reasons why ECTs applied to join the MECCT programme

Statement	N	%
I have access to mentoring support in my school which is effective, but I would like external support	22	55
I do not have access to mentoring support in my school	12	30
I have access to mentoring support in school, but it is not effective	5	13
Other	1	3
Total	40	100

Source: NFER baseline survey of ECTs, February–May 2019.

Further evidence of the need for the intervention was that *30 of the ECTs (75%) volunteered to take part, underlining their perceived need for the programme.* By contrast, 10 (25%) reported they were asked to take part by their school.

However, as shown in Table 7, other evidence on the need for the intervention was mixed. For example, *30 ECTs (75%) reported that they were well supported by their head of department.* Seventeen ECTs (42%) agreed/strongly agreed that their school leadership team was committed to developing ECTs, while 11 (28%) reported they were not, and 12 (30%) were ambivalent to this statement. *Lack of support for managing workload was raised as a key issue.* Sixteen ECTs (40%) strongly disagreed or disagreed that their school had helpful policies for managing workload and 14 (35%) neither agreed nor disagreed with this statement.

Table 7: ECTs' views on in-school support

Statement	Strongly disagree/Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
The school has helpful policies for managing workload	16	40	14	35	10	25	40
The school leadership team is committed to developing early career teachers	11	28	12	30	17	42	40
I feel well supported by my head of department	6	15	4	10	30	75	40
The school has helpful policies for managing workload	16	40	14	35	10	25	40

Source: NFER baseline survey of ECTs, February-May 2019.

There is evidence that ECTs needed support in a number of key areas. Responses to the baseline survey provided an indication of the main areas in which ECTs self-reported that they were lacking in skills or confidence. It is therefore reasonable to assume that they might have benefited from additional support in these areas.

Confidence in applying for new roles and negotiating pay and conditions was the area in which the largest proportion of ECTs appeared to need additional support. Twenty-one ECTs (52%) strongly disagreed/disagreed that they were confident in applying for new roles and negotiating pay and conditions. Other areas in which a fifth or more of the ECTs strongly disagreed or disagreed that they had understanding, skills, resources, or support included subject knowledge:

- having the required subject knowledge to effectively teach chemistry at KS5 (n = 13; 33%);
- managing workload and stress:
- achieving a sustainable work/life balance (n = 11; 28%); and
- drawing on a range of strategies for managing stress at work (n = 8; 20%);
- pedagogical knowledge:
- their repertoire of teaching approaches in chemistry (n = 8; 20%);
- access to resources and support:
- access to a wide range of materials and resources (n = 11; 28%); and
- feeling well supported (n = 8; 20%).

It is worth noting that more than three quarters of ECTs recruited were already confident in teaching chemistry, had the required subject knowledge to effectively teach chemistry at KS3 and KS4, had a good understanding of chemistry theory, could provide clear feedback to the pupils, and felt that their pupils were making good progress.

Collectively, these findings raise questions about whether the programme was effectively reaching the group most in need of support—those who feel unsupported or lacking in confidence.

Additional analysis from the baseline survey of ECTs' support needs—including their views on progression, subject and pedagogical knowledge, managing workload and stress, access to resources and support, confidence, behaviour management, assessment, and student progress—are provided in Appendix 1.

Q1a (continued): Does the intervention focus on the right areas of support?

Not all of the 11 key areas of support that were originally identified by the RSC appeared to be equally valued by ECTs and their mentors.

The RSC identified 11 key areas of support which could be covered as part of the mentoring sessions and which were included in a 'support for mentors' handbook. These areas were (1) the role of a mentor, (2) classroom and behaviour management, (3) time and workload management, (4) lesson planning, paperwork, and bureaucracy, (5) pedagogical approaches, (6) assessment approaches, (7) career progression, (8) day-to-day teacher experiences, (9) pastoral support, (10) interacting with other stakeholders, and (11) chemistry practicals. While not intended as a definitive list of topic areas for discussion, these topics were considered to be the most likely areas of support required by ECTs.

As can be seen in
Table 8 below, the findings from the end-point survey suggest that the topics more commonly covered as part of the mentoring discussions, reported by half or more of the ECTs, were:

- classroom and behaviour management (support area 2);
- lesson planning, paperwork, and bureaucracy (support area 4);
- day-to-day teacher experiences (support area 8); and
- time and workload management (support area 3).

Many of these topics are related to school culture and ethos.

Assessment approaches and pastoral support were discussed less frequently and the role of the mentor (support area 1) was covered in the first meeting.

In general, the topics most frequently covered in the mentoring sessions related to areas in which ECTs self-reported that they had less confidence, knowledge, or expertise. For example, larger proportions of ECTs tended to perceive themselves to be already skilled in formative assessment, pedagogical approaches, and chemistry practicals, which were also covered less frequently.

Table 8: Mentoring topics ECTs reported were discussed with their mentor

Mentoring topic	N	%
Classroom and behaviour management (support area 2)	15	58
Lesson planning, paperwork, and bureaucracy (support area 4)	14	54
Day-to-day teacher experiences (support area 8)	14	54
Time and workload management (support area 3)	13	50
Career progression (support area 7)	11	42

Chemistry practicals (support area 11)	10	38
Pedagogical approaches (support area 5)	9	35
Assessment approaches (support area 6)	6	23
Pastoral support (support area 9)	3	12
Interacting with other stakeholders (support area 10)	0	0
		N = 26

Source: NFER end-point survey of ECTs, February–March 2020.

Support area 1, 'the role of a mentor', was not included in the list of response options.

The evidence collected from the telephone interviews broadly reflected these findings, with lesson planning, paperwork, and bureaucracy (support area 4), pedagogical approaches (support area 5), and career progression (support area 7) being most often mentioned and assessment approaches (support area 6), pastoral support (support area 9), and stakeholder interactions (support area 10) being mentioned by only one ECT.

ECTs also discussed having received mentoring support to teach A-level chemistry, which was not one of the identified areas. This was also evidenced by the fact that, at baseline, 13 ECTs (33%) reported that they did not have the required subject knowledge to effectively teach chemistry at KS5 and 11 (28%) did not have access to a wide range of resources.

Q1b: Is there preliminary evidence that the intervention has impacted positively on ECTs, and would these outcomes have occurred in the absence of the intervention (additionality)?

Improvements in confidence, knowledge, skills, support, workload, and stress

Comparing ECTs' responses to the baseline and end-point survey suggested that ECTs' confidence, knowledge, skills, and support had improved in a range of areas over the duration of the intervention. In particular, areas in which around half or more ECTs experienced an improvement between the baseline and endpoint (that is, they responded more positively at endpoint than at baseline) were as follows.

Pedagogical knowledge:

- drawing on a wide repertoire of teaching approaches in chemistry (n = 21; 81%);
- effectively teaching students with different abilities (n = 18; 69%);
- ability to pitch my lessons at the right level (n = 14; 54%);
- differentiating planning to meet the needs of different students (n = 13; 50%); and
- teaching chemistry in an engaging way (n = 12; 50%).

In the interviews, ECTs and mentors reported impacts from the programme on subject knowledge less frequently, partly due to them already feeling that their subject knowledge was good. However, some noted impacts on their pedagogy as a key impact:

> *'I think in terms of Key Stage 3 and 4 teaching, I was quite confident anyway, but Key Stage 5, 90% of [my improvement] has been down to the support [from my mentor]' (ECT 8).*

> *'It's made me use methods that I wouldn't have used before … made me be a bit more experimental in how I deliver things … there hasn't been particular areas of subject knowledge that I've felt were a weakness … it's more how I might deliver some of the tricky content' (ECT 4).*

> *'We've shared ideas on curriculum, that's been the biggest impact … it's another source, another way of doing things' (Mentor 7).*

'I'd like to think she's improved her A-level chemistry teaching, which is what she wanted help with … how to approach it, where to look and what to do' (Mentor 2).

'I think the programme has helped focus that progression and that development' (ECT 4).

Access to resources and support:

- knowing where to go for information and advice (n = 16; 62%);
- access to a wide range of materials and resources (n = 15; 60%); and
- feeling well supported (n = 13; 50%).

The telephone interviews with ECTs and mentors supported the survey findings, and suggested that the following aspects of the MECCT programme contributed to ECTs' feelings of being better supported:

- gaining a perspective of the wider world of teaching and gaining an understanding of how other school cultures may be different from their own:

  '*You can really feel closed in in your school and you can't see outside your school … even the people I trained with, yes, we work in different schools, but they're in different subjects, it's really good to have someone outside your school but in the same subject' (ECT 6);*

- being able to confide in an external, trusted mentor who provides non-judgemental and, where needed, emotional support to tackle workload and day-to-day challenges;
- validation that you are doing the right things or that you are not the only one facing challenges; and
- the mentor compensating for, or supplementing, school-based support.

The following quotations illustrate some of these points:

'Having that emotional support I think has been really important. It's meant that I haven't felt like I'm alone or being swallowed up by the system … It has reduced my workload because I've not had to come up with new worksheets or new things to do, and he's provided me with resources that I can adapt into my lessons and into my teaching' (ECT 3).

'You want to know that you aren't the only person that thinks the same way as you … it's good to have an outside person to tell you and validate what you've got going on' (ECT 6);

'Sometimes NQTs and young teachers can't … talk to you about something they're struggling with or have got a concern with because you're too busy, or they don't want to bother you, or they might think it might affect their appraisal… [That's where the external mentoring can really add value as] it's completely non-judgemental' (Mentor 1).

Confidence:

- in managing students' behaviour (n = 15; 58%);
- in teaching chemistry (n = 15; 58%); and
- in teaching practical lessons (n = 13; 50%).

Data from the interviews suggested that improvement in ECTs' confidence was one of the main impacts of the programme as these quotations exemplify:

'The biggest [impact] has probably been confidence in terms of [my mentor] just listening and helping me figure out solutions to things … that ties into everything else … Helping me feel confident in my job, in my teaching, and in my subject knowledge … in turn that improves my teaching and my leadership' (ECT 8).

> *'For me it's been a boost of confidence. If I compare interviews I had before the programme and interviews after I'd had [my mentor's help] I think I was much more confident' (ECT 11).*

Behaviour management:

- using a variety of techniques to effectively manage the behaviour of students (n = 13; 50%).

The telephone interviews revealed that many ECTs felt they did not need support with behaviour management as this quotation demonstrates:

> *'We haven't really done much on behaviour management and lesson planning because these were two things that I felt were already strengths of mine' (ECT 4).*

However, a minority had gained suggestions of useful strategies for behaviour management from their mentor:

> *'I'm not a person where I come in and students just shut up because of my authority. So I need to find ways that I can manage without that, [my mentor showed me] more positive approaches to behaviour management … like rewards and de-escalation … she gave me examples of how to engage with students' (ECT 11).*

While the findings above highlight the improvements experienced by some ECTs during the intervention, it is perhaps disappointing that these improvements were not experienced by a larger proportion of participants. In addition, a range of factors could have led to these improvements, such as natural maturation and in-school support provided to ECTs. However, while the evaluation did not include a control or comparison group, which would have more effectively assessed additionality, data from the surveys suggested that some of these improvements were 'partly' or 'largely' related to ECTs' participation in the intervention. The improvement that the largest proportion of ECTs attributed 'partly' or 'largely' to the programme (69%) was 'feelings of being better supported'.

It is worth noting that, in a number of areas, many ECTs reported they were already competent prior to starting the intervention, which left little room for improvement. This included subject knowledge at KS3 and KS4 and understanding of chemistry theory.

There were, however, a number of areas in which limited or no improvement was seen but in which ECTs reported a significant need for support. In particular, workload, stress, and work/life balance were areas in which ECTs saw little improvement. This included the ability of ECTs:

- to manage their workload effectively (n = 7; 28%);
- to draw on a range of strategies for managing stress at work (n = 6; 23%);
- to manage paperwork and bureaucracy (n = 5; 20%); and
- to achieve a sustainable work/life balance (n = 4; 16%).

This is not to say that these things were not discussed as part of the mentoring sessions; indeed, survey data suggests that 'time and workload management' was discussed by 13 ECTs (50%) with their mentors. In addition, while some ECTs interviewed by telephone reported they found these conversations useful, it does not appear to have made a difference to their abilities to manage their workload. It could have been, however, that ECTs' workload increased during the duration of the intervention, which might have been a barrier to improvements in this area. This was not explored as part of the small-scale survey and would be better measured in a trial or quasi-experimental design with a control or comparison group.

Related to this, the proportion who reported they were satisfied with their job reduced slightly between the baseline and end-point surveys. This could have been a reflection of their growing workload as a developing teacher, and there was no evidence to suggest this was a direct consequence of their participation in the MECCT programme.

It is also worth noting that there was evidence that 13 ECTs dropped-out between the start and end of the intervention. Those completing the end-point survey and taking part in interviews are likely to have presented a more positive picture of the intervention and its outcomes than those who did not stay the course.

Additional analysis of the improvements that occurred in ECTs' confidence, knowledge, skills, and support between the baseline and end-point survey are presented in Appendix 2.

Improvements in teacher retention

Overall, there was no evidence from the survey to suggest there had been a change in ECTs' plans to stay in teaching, including in their current school, nor in their satisfaction with teaching. Similar proportions of ECTs experienced an improvement or a negative change in these areas, with the situation for many being the same at the beginning and end of the pilot. For more details see Table 9 below. These findings are important for schools. They suggest that there is a significant need for support to retain ECTs, particularly in their current schools, and that in many cases it needs to go beyond the support provided by this intervention.

Table 9: Changes in ECTs' plans to stay in teaching

Statement	Change in mean		Experiencing improvement		Rating stayed same		Rating worsened	Total (N)
	N	%	N	%	N	%		
I plan to stay in the teaching profession for at least the next three years.	-0.1	6	23	14	54	6	23	26
I plan to stay teaching at this school for at least the next three years.	-0.3	5	19	9	35	12	46	26
All in all I am satisfied with my job.	-0.1	6	23	13	50	7	27	26

Source: NFER end-point survey of ECTs, February–March 2020.

Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: 'strongly disagree', -2; 'disagree', -1; 'neither agree nor disagree', 0; 'agree', +1; 'strongly agree', +2. 'N/A' responses would be excluded from the mean score calculations. None of the changes were statistically significant.

In terms of the direct impact of the MECCT programme, 11 ECTs (42%) reported that their intention to remain in teaching had improved 'largely' or 'partly' due to MECCT, as shown in Table 10. This finding is perhaps more positive than the table above indicates, but is still low given that retaining more early career chemistry teachers in the profession was the primary aim of the intervention. In a future iteration of the intervention, a comparison or control group design would allow for more robust analysis of retention and other outcomes.

Table 10: ECTs' perceptions on the extent to which any changes in their intention to remain in teaching were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Intention to remain in teaching	10	38	5	19	9	35	2	8	26

Source: NFER end-point survey of ECTs, February–March 2020.

The telephone interviews with ECTs and mentors suggested that the pilot had impacted moderately on some participants' intentions to stay in teaching. In some cases, it had made no difference, while in others it was about helping ECTs to survive the challenging early stages of teaching:

> *'If I'm honest it's not made any difference to whether I'll stay in teaching or not' (ECT 5).*

> *'I'd like to think [it has helped him stay in teaching]. I think it's that idea … that they have to be perfect from day one … that's not necessarily the case … you don't have to be perfect, a lot of the time it is about surviving … I think it's having someone who's experienced … I'd like to think it might help, but it might not help for everybody' (Mentor 7).*

In other cases, the mentoring had helped ECTs realise that some of the issues they were facing were related to their particular school and not teaching in general, and that they should stay in teaching but move school:

> *'It's been a tough year and I could easily have left to be honest … when she [my mentor] came in that time and I was able to talk her through everything that had been going on and everything that was challenging going forward, having that made me stay because it made me realise it's not right and I can look elsewhere and it won't be like that elsewhere' (ECT 9).*

> *'I guess … I was kind of on the fence about teaching I guess in general … I thought before I leave the profession, I'll leave my school and see what happens. Because [the programme] gave me that initial push, I guess it kind of helped' (ECT 6).*

> *'I'm not particularly thinking about leaving, but I can see that if I was a person that was struggling and I didn't like my department and didn't feel supported in my department, I could imagine having a mentor that would possibly help me stick around a bit longer' (ECT 10).*

These comments may have been more common if ECTs had come from a broader range of schools, including those with a lower Ofsted rating and based in more challenging circumstances (see Table 5).

One interviewee reported that their mentor had pushed them to be more innovative and creative and that this had led to them teaching better lessons, which in turn had increased their job satisfaction:

> *'When I first met with [my mentor] I was in a bit of a rut and I didn't know whether my future lay in teaching … It's revolutionised my teaching and pushed me outside of my comfort box which has helped me make things a bit more interesting which has helped me enjoy things a bit more' (ECT 4).*

Not all ECTs were close to leaving teaching but, in some cases, the support had reinforced an existing desire to stay in teaching:

> *'I love to teach and I think it's what I'm supposed to do, but having someone that reminds you that you love it and having conversations that are positive and constructive to your practice gives you less reason to consider throwing in the towel'* (ECT 2).

Mentors and ECTs suggested that the pilot might help to retain some ECTs but accepted that not all ECTs would remain in teaching as a result of support as there were many factors affecting their decisions:

> *'There's so many reasons people leave, you can stop people leaving by helping them find a different school with a different workload, you can stop people leaving by sparking their interest' (Mentor 6).*

'You have to try something like this, and if you keep some chemistry teachers as a result of it then it's a win' (Mentor 10).

'I not sure if it [the programme] came to me when I was thinking about leaving that it would sway me either way … I think it's much bigger factors and although having the support is great, I don't think it's just not feeling supported that would make someone leave' (ECT 8).

Q1c: How do outcomes vary by ECTs' characteristics and geographical area?

Due to the small sample sizes, particularly in response to the end-point survey, it is not possible to robustly assess any differences in outcomes by ECTs' characteristics and geographical area. Any differences that are observed should be regarded as tentative and treated with caution.

In terms of different outcomes for ECTs who were chemistry specialists versus non-specialists, the findings are inconclusive as the majority of end-point survey respondents were subject specialists (n = 20 out of 26).
In terms of differences in outcomes between NQTs and second to fifth year teachers, there seemed to be a few differences:

- NQTs reported greater outcomes, on average, than second to fifth year teachers in relation to the following statements: 'I have the required subject knowledge to effectively teach chemistry at KS5' and 'I can draw on a wide repertoire of teaching approaches in chemistry'. It is likely that more experienced teachers tended to have less need for support in these areas.
- Second to fifth year teachers reported greater impacts in regards to these statements: 'I feel well supported' and 'I plan to stay teaching at this school for at least the next three years'. For example, one commented:

  'The main impact has been the security of knowing that I've got an expert there that I can talk to … that has been very useful … if I'm honest it's not made a difference on whether or not I'll stay in teaching, if there was anybody who was less set on [teaching] … it [the intervention] could make a difference' (ECT 5, in fifth year of teaching).

In terms of differences by region, there were few notable differences. However, ECTs in the East of England reported greater impacts, on average, than those in the Midlands relating to 'I feel well supported' (change in mean +1.3 and +0.4 respectively) and 'I plan to stay in teaching at this school for at least the next three years' (change in mean +0.5 and -0.8 respectively). The data behind these findings is presented in Appendix 3.

Q1d: Is there preliminary evidence that the intervention has impacted positively on mentors and would these outcomes have occurred in the absence of the intervention (additionality)?

While recognising that the intervention was primarily designed to benefit ECTs, all but one of the mentors interviewed by telephone found the programme enjoyable and rewarding. They also reported a range of impacts on themselves which they did not feel would have occurred if they had not taken part in the programme.

Specific impacts that mentors felt had been realised through their involvement in the intervention included:

- increased enthusiasm for teaching as a result of their work being more interesting and stretching which, for one, led to them staying in teaching:

  'It's changed my life basically … I think I was disillusioned. I'd been teaching for a long time. I was struggling a little bit … my work-life balance wasn't right … I'd made the decision I had to leave for my own sanity. But when I did the mentoring with [my mentee] I just thought, when I'm with the right people who are really enthusiastic it was just brilliant. I realised that I was still really interested in teaching' (Mentor 2);

- opportunities for reflection on how their teaching had developed over the years:

'You don't realise over nine years actually how much I've come across … I've come across lots of different ways of delivering things and lots of different students and had to work with lots of different staff. Until this year I haven't really realised that, it's been quite nice!' (Mentor 7);

- learning up to date teaching techniques and new ideas from their ECTs:

  'There's always a benefit to going out and seeing other schools. There's always a benefit of making connections. There's always a trade-off, she's shared a few resources they got with me, seeing how other schools do things is quite interesting' (Mentor 1);

  'It's not only him learning from me, I'm learning from him … I've learned the different style of resources he uses … I've learned about the different syllabuses and books they use in their school and what's good and bad about them' (Mentor 3); and

- for less experienced mentors, involvement in the intervention led to improvement in their mentoring skills:

  'I think I'm a better mentor [now] ... in terms of impact on my practice, probably not … I definitely feel more confident in offering to help and mentoring, and definitely I would feel more confident going into a new pair and offering to be a mentor in the future' (Mentor 4).

One mentor had limited contact with their ECT and, while they had a positive view of the programme overall, they felt that they did not get as much out of it as they might had the ECT been more engaged.

The vast majority of mentors did not see the programme as helping with their career progression.

Q1e: Were there any unintended consequences or negative effects?

Both ECTs and mentors reported that the intervention had created additional work and had involved an additional time commitment. While most found the impact on their workload manageable and in some cases minimal, others found it difficult to find the necessary time to engage in mentoring activity:

'I've got free time in the holidays … I've kind of got time to burn. I quite like it. It's a bit of my week where I go and talk about chemistry, and I'm a proper nerd, so I love it!' (ECT 2).

'It's been an hour extra a half term so I could spare that no problem, and I enjoyed it so it didn't have a negative impact on me' (Mentor 3).

'I think just being so time poor, it would regularly pop into my head, "I really need to contact my mentor, we really need to book that next meeting", and then another thought would overtake it, something a bit more pressing' (ECT 12).

'I was expecting more [contact], but I think that was a bit optimistic given the teaching timetables' (ECT 3).

As discussed in response to research question 2c (see page 39), these findings should be considered in light of the fact that most ECT/mentor pairs did not have the expected six meetings/interactions. Seventeen out of the 26 ECTs responding to the end-point survey had met with their mentor either two to three times (n = 9) or four to five times (n = 8). If they had completed the expected six meetings/interactions, the time commitment to the intervention would have been greater.

The face-to-face meetings were the most time-intensive part of the intervention, although some ECTs reflected that the benefits would lead to time savings in the long run. Finding the time to meet was sometimes challenging, particularly during exam time and when travel was needed for face-to-face meetings:

'There's the time out [for the meetings] which impacts on your work-life balance, but it hasn't had a huge impact … it's saved me time in the long run through resources and pedagogical reading and all these other concepts that I probably wouldn't have had access to' (ECT 3).

Some ECT/mentor pairs were at some distance from each other which added considerable travel time to face-to-face meetings. NFER analysis suggests that the average distance between ECTs' and their mentors' schools was 44 miles, with the range being from two to 141 miles. These are one-way distances, not round trips. Using Google maps and estimating the time journeys would take on a week-day afternoon suggests that the average time for a one-way journey was 65 minutes, with the range being from eight minutes to over three hours.

'It would have been nice to have someone who was located a bit closer so that maybe even if it was every second meeting we could try and do face to face' (ECT 4).

'With him not being next door or in the next school … I appreciate the idea of having someone outside your school, but then he's not here when I want to go' (ECT 5).

'I think it would be beneficial to have people not from your school, but geographically closer to you' (ECT 1).

One ECT suggested that being paired with a mentor in their own school may have been preferable, although this view did not appear to be shared by the majority.

'[My mentor] lives quite far away and her school context is really different, and that can be really helpful in some ways, but at the same time it is nice to have someone in your school … if you had a mentor you were close to in your school I think that maybe it would be more beneficial' (ECT 1).

The distance between schools appeared to cause a particular issue for mentors who tended to travel to their ECT (although some met somewhere in between):

'The time commitment … is a bit of a pain with having to travel to see her; I'd hope if it was repeated again I'd be able to find someone a bit more local' (Mentor 8).

Correspondence from a small number of ECTs and mentors who dropped out of the programme suggests that distance was a barrier to the success of their mentoring relationship, and that it contributed to their partnerships ending prematurely.

It is worth noting that the research was undertaken before the Covid-19 pandemic and it is possible that recent experience may have resulted in teachers and mentors being more comfortable with remotely delivered mentoring, which would be a way of overcoming the distance and travel time barriers.

There were various unintended positive consequences of involvement in the intervention for some ECTs:

- Several mentors mentioned additional benefits for staff within their ECTs' chemistry/science departments, through ECTs' sharing their learning:

  'She'd been given KS3 as a management responsibility, so she wanted help with organising the teaching plan for other members of staff, so we went through the teaching topics and talked about how she might organise the schemes of work so that it worked for everybody' (Mentor 8).

  'His job was to be basically second in science, one of his roles was to look at the scheme of work and the transition between KS3 and 4 can happen. We talked about lots and lots of things because it wasn't just chemistry it was all of science, we talked about everything' (Mentor 7).

- Links were starting to be developed between ECTs' and mentors' departments or schools:

'I think there's also an impact for employers … my manager has minuted the fact that I'm on the programme, and that it's at [a local school] because they're quite keen to make those links' (Mentor 10).

- One mentor was inspired to remain in the profession, as mentioned above.

The extent to which the intervention displaced existing activity was unclear. While the interviews with ECTs and mentors confirmed that the intervention activities did take additional time, it was not clear whether these activities were additional to, or replaced, existing activities.

Q1f: Is there evidence to support the intervention's Theory of Change?

Given the mixed effects of the intervention (see research question 1b, page 28) and the low fidelity of some of the key implementation measures (see research question 2c, page 39), it is difficult to fully validate the Theory of Change developed by the RSC team. However, it is clear that while some ECTs experienced a number of benefits from the intervention, most did not experience the full range of benefits outlined in the 'process' chain.

Feasibility

This section presents findings relating to:

- recruitment to the intervention;
- matching;
- type and level of support given to ECTs;
- training;
- engagement of ECTs and mentors; and
- barriers to delivery.

The findings are discussed against each research question.

Q2a: Is the intervention feasible to deliver? For example, can the RSC recruit the necessary mentors and ECTs, effectively match mentors and ECTs, deliver training and provide support materials, and support the successful delivery of mentoring (i.e. to achieve intended outcomes) within the time allotted?

Recruitment

Recruitment took longer than planned and the process was not as effective as it could have been.

The RSC faced some challenges in recruiting the target number of mentors and ECTs (the target was to recruit 40 of each). The initial plan was to recruit mentors and ECTs within a three-month period (November 2018 to January 2019) but, in reality, the process took six months (from November 2018 to May 2019). This impacted on the time available for mentoring ECTs recruited later on.

The main challenge was recruiting ECTs. Although the RSC had existing contacts with teachers, these tended to be with more experienced chemistry teachers. This meant that it had to recruit ECTs without any existing contacts. Although it felt that using newsletters, social media, and school-based events worked well in raising awareness of the intervention, it took longer than expected to get ECTs signed up to the programme. It was reported that there was a lot of chasing of potential participants by phone, which may have led to 'communications fatigue'. In addition, it was unclear whether ECTs with the greatest need were recruited to the programme as many were already confident and skilled in a range of areas and were teaching in schools categorised as 'good' and 'outstanding' by Ofsted (see Table 5 and research question 1a, page 25).

One of the RSC consultees suggested that the timing of recruitment in the winter term contributed to the length of time it took to recruit programme participants. They suggested that this is the most pressured time for ECTs, and that recruitment would be best planned to be undertaken in the summer or beginning of the autumn term:

> *'There is the most pressure on early career teachers in the winter term. Everything is moving towards the exam season, getting mocks done, agreeing university and A-level choices. If I was to do it again, I think summer or the autumn term would be a better time to recruit teachers, because that is when teachers have time to think about things and they are planning for the year ahead. The window was also very tight. I think a rolling programme of recruitment and support would have been better.'*

In addition, the RSC and programme participants reported that the application process involved too many steps—that it could be simplified. The process included an initial survey to establish ECTs' needs which was reviewed to check their eligibility, followed by the ECT or mentor and their headteacher or senior school leader signing a Memorandum of Understanding and the ECT/mentor registering for a training day.

The process may have been speeded up a little if the MoU had been provided to ECTs and their schools at the outset so that they had an in-depth understanding of the programme and what they were signing up to upfront. The dates and locations of the training days were not confirmed when recruitment began, and members of the RSC delivery team later reflected that it would have been useful if ECTs and their mentors could have been informed of these dates when they first signed up. This would be possible in a geographically limited intervention but not where participants were spread across large areas; in this case, the geographic spread of all participants would need to be gauged before organising training days.

Regarding the need for participants to sign the MoU, it was commented that the document itself did not cause any issues but getting participants to sign and return it was an administrative burden and took time. Prospective mentors did not seem to have a problem getting the MoUs countersigned by a senior staff member but many ECTs did. This might have been due to ECTs' lack of confidence to follow-up with headteachers, or the lack of influence they had in school when they did try to move the process along. As an RSC consultee commented:

> *'The document itself is relatively uncontroversial. The impression I get is that once people have received it, most people were happy to sign it. But it was an administrative burden. We would get a response like, "It is sitting with my headteacher, and I am waiting to have it signed off." The challenge for us was tracking where the MoUs were in this process and being able to follow up with potential candidates as necessary.'*

The MoU explains both the intervention and the evaluation to prospective participants, and therefore an MoU would also need to be administered as part of a scaled-up evaluation or trial. The challenge appears to be that by recruiting ECTs directly, there is a risk that in some cases the MoU is not signed and returned in a timely fashion as ECTs feel they are not able to expedite its completion. Should the intervention be scaled-up, a different approach, whereby senior leaders are approached by the RSC directly, might be more effective in ensuring that more MoUs are returned.

In terms of the ECT target group, the original intention was to recruit ECTs with between two- and five-years' teaching experience. It was thought that, as many NQTs already received in-school mentoring as part of their school's induction arrangements, there would be a greater gap in support for recently qualified teachers (RQTs). However, due to the challenges faced in recruiting ECTs, and a number of early expressions of interest from teachers in their first year of teaching, a few weeks into the recruitment process a decision was made to include NQTs. While we have no evidence to support it, it is possible that this late change in eligibility criteria could have resulted in some potential NQT applicants, who might have considered the programme early on but found they were at that stage ineligible, from not signing up to the pilot.

Matching

The matching process met with a mixed response from ECTs.

It involved RSC staff reviewing ECT and mentor responses to a pre-mentoring questionnaire, which was administered online. Responses were used to assess participants' eligibility for the programme and to match eligible ECTs with suitable mentors. The original intention was for these matches to be based on their geographical proximity, gender preferences, and any specific goals or requirements they had flagged based on their responses to the pre-mentoring questionnaire. In practice, RSC delivery staff explained that due to the small number of participants, after gender and

geography had been taken into consideration, there was limited scope to match ECTs with mentors based on other criteria.

Evidence from the end-point survey and interviews with ECTs suggests that while most ECTs thought the matching process was successful, a quarter of ECTs were less satisfied with their match. As one of the RSC consultees reported:

> *'We were limited by the pool of mentors and mentees, which meant there were only limited opportunities to match mentors and mentees on other criteria.'*

In response to the end-point survey question, 'To what extent do you think that you and your mentor were appropriately matched to facilitate a successful relationship?', almost three quarters of ECTs reported they had been well-matched 'to a great extent' (n = 12; 46%) or 'to a moderate extent' (n = 7; 27%). However, a minority of ECTs reported that the matching process could have been better, with 15% (n = 4) reporting that the matching had been successful 'to a small extent', while 12% (n=3) reported that the matching had not been successful at all.

As with the survey respondents, most of the ECTs interviewed by telephone reported they had a positive experience of the matching process, as illustrated by the quote below:

> *'I think the fact that that relationship did form very naturally … really helped … I was initially a bit dubious about the scheme as I wasn't sure I'd get a mentor who I felt that I could talk to about stuff, but it seemed to work out that I have … I think it was key to how I felt about the scheme'* (ECT 4).

In a small number of cases, ECTs and mentors were less positive about the matching experience, suggesting that factors such as the physical distance between ECTs and mentors and the skills and experience of the mentor (relative to the support needs of the ECT) were important in determining the success of the mentoring partnership, as illustrated by the following quotes from an ECT and their mentor received by the RSC:

> *'I was happy to be part of this project, but it hasn't worked as I could not offer the support she needed and the distance of 30 miles was not conducive to success … I do hope it has been successful elsewhere … if the mentor was at a distance [enabling us to] meet I think it would have been more successful' (Mentor).*

> *'I applied specifically to get help and support with teaching A2 Organic Chemistry, and from the beginning [my mentor] said she couldn't help with that. I did voice my concerns about this from the [outset]. The meetings we've had haven't been useful to me … I don't need support with GCSE or data analysis … I just don't think we were a good match at all' (ECT).*

As stated elsewhere, having a larger pool of ECTs and mentors at the recruitment stage would have supported better matches on a location and skills/expertise basis, and may have contributed to a higher degree of satisfaction amongst participating ECTs with the matching process.

Training

The initial training days were positively received but attendance at the follow-up webinar was low. A full discussion can be found in response to research question 2d (see page 40).

Q2b: Has the matching process been successful? What are the key success factors? What could be improved?

As reported above (see research question 2a), most ECTs thought the matching process was successful but a minority felt it could have been better. Some suggested that better matching on factors such as (a) the physical distance between ECTs and mentors and (b) the skills and experience of the mentor (relative to the support needs of the ECT) would have further maximised the success of the mentoring partnership.

Q2c: What type and level of support to ECTs has been most effective? Have mentors undertaken the minimum of six interactions with the mentees over the year? Is this level of support appropriate? What other support has been provided? What types, levels, and combinations of support have been the most effective? How could support be improved?

The evidence from the fidelity logs and end-point survey suggests that most participants did not have six meetings or 'substantive interactions' over the course of the pilot, which was the minimum expectation. Evidence from the logs shows that, on average, ECTs and their mentors met just three times. The minimum number of reported mentoring sessions was one (the first meeting at the initial training event), with the maximum number of reported mentoring sessions being 'nine or more'.

The end-point survey of ECTs collected similar information. ECTs were asked to indicate from a closed list of response options, how many meetings or substantive interactions they had with their mentor over the course of the programme. The findings suggest that about seven out of ten (n = 18; 69%) met fewer than six times while the remainder (n = 8; 31%) met for six or more times, as shown in Table 11.

Table 11: Number of meetings/substantive interactions between ECTs and mentors, as reported by ECTs

Number of meetings	N	%
1	1	4
2–3	9	35
4–5	8	31
6 (minimum expected number)	3	12
7–8	2	8
9 or more	3	12
		N = 26

Source: NFER end-point survey of ECTs, February–March 2020.

A number of factors appear to have contributed to why most ECTs did not meet their mentors six times during the pilot.

- The distance between some ECTs and their mentors made it difficult for them to meet face-to-face, which was the intervention's preferred method for meeting.
- The fact that some ECT/mentor pairs did not start the intervention until May 2019, three months later than expected, shortened the duration of the intervention and limited the opportunities for meetings.
- Some ECTs reported problems engaging with the programme owing to how busy they were. In some cases, this appears to have disrupted the process for setting up meetings, including instances when ECTs would not reply to messages from their mentors. Indeed, the programme's onus on ECTs initiating meetings (rather than mentors) almost certainly contributed to the lower-than-expected number of meetings. In other cases, communication would continue but ECTs and mentors were unable to find mutually convenient times to meet.

Some ECTs felt that it had been both appropriate and beneficial to meet less frequently, although this view was not always shared by the mentor, as the following quotes demonstrate:

> *'This is what it was like on the [RSC] scholarship programme so I kind of expected it was going to be a check-in as and when you needed them there, they were there. That was what it was like on the scholarship so that's what I expected it to be' (ECT 9; two meetings).*

> *'I don't feel we've had enough contact really … it's been quite difficult to get hold of her and that's been the problem really … when we have had contact it's been really good, but I have struggled to get in contact with*

her, I think because she's just so busy … I think what we have done has been useful, but there just hasn't been enough of it' (Mentor 9; two meetings).

In a minority of cases where ECT/mentor pairs had the expected six meetings, this was also judged to be appropriate, perhaps suggesting that participants had different expectations regarding the frequency of the mentoring sessions:

'At the beginning I thought that six sessions would not be very much, but actually with everything that we've had on, that was about right. Time flies by in between sessions. I think that's pretty much the perfect spacing' (Mentor 7).

The 25 fidelity logs that were analysed suggested that ECT/mentor pairs used a variety of methods to communicate. These included face-to-face meetings (n = 68), email (n = 59), telephone (n = 13), text messaging (n = 6), and video calls/skype (n = 2). The telephone interviews with ECTs and mentors suggested a clear preference for face-to-face meetings, with telephone calls and video conferencing being less popular. Emails were mainly used for correspondence between meetings. The research was undertaken before the Covid-19 pandemic; it is possible that if the intervention were to be delivered in the future, more ECTs and mentors would have a preference for remotely delivered mentoring.

Additional support and resources

It was also intended that RSC staff would 'check in' with mentees and mentors three times during the course of the pilot (in March/April 2019, June 2019, and November 2019). Data from the RSC suggests that these check-ins took place, but they were not perceived by mentors and the RSC to be particularly effective as they were 'passive communications' and not everyone responded. The RSC sent out an email to all mentees and mentors and, if they did not respond, it was assumed that the mentoring was progressing effectively, which the drop-out figures suggest was not always the case.

In terms of the other forms of support listed in the Theory of Change and in the description of the intervention, the online mentors' forum was never set-up. The dedicated email inbox, which was designed to act as a single point of enquiry for ECTs and mentors, was set-up and monitored by the RSC central team. However, it was reported to be rarely used, with participants preferring to contact their regional Education Coordinator directly. Both Education Coordinators reported they received little ad hoc contact from ECTs and mentors, with the check-in emails triggering most responses:

'Mostly I send the catch-up emails and that triggers correspondence that people have been wanting to send. The mentors wouldn't hold back in contacting me, so I think they just haven't felt the need to.'

In addition, while the Education Coordinators reported that some ECTs/mentors had been directed towards the RSC's existing network of regional teachers or other RSC chemistry-teaching events, it is not clear to what extent these were taken up. Indeed, there was mixed evidence to suggest mentors were using the programme resources or any other RSC resources to which they were signposted (for example, the Learn/Teach Chemistry resources webpage) to support their mentoring. Interviews with the delivery team revealed that as some of the mentors already had experience of using the RSC's teaching resources, there was an assumption that they would be able to draw on the wealth of RSC resources available to use with their ECTs as relevant. However, this was not formally tracked or recorded, and interviews with ECTs and mentors did not suggest that these resources were being frequently used. However, survey responses suggest that some ECTs did experience an improvement in their access to resources and teaching repertoire, although it is not clear to what extent these improvements can be attributed to the intervention.

Q2d: Has the mentor/mentee training been effective in developing a mentoring approach and helping mentors understand how to facilitate sessions? How effective was the first training session? How effective was the second session? What proportion of mentors attended the second session face-to-face and via webinar? What were the pros and cons of attending the second session face-to-face or via webinar?

All of the ten mentors interviewed by telephone reported that they had the skills and experience to provide effective support to their ECTs. However, this view was based largely on prior experience, rather than on the ability of the programme to provide mentors with new skills. ECTs interviewed by telephone largely agreed that their mentors had the skills and experience to effectively support them. However, in one case an ECT was looking for support with delivering AS Chemistry but was paired with a mentor who only had experience of teaching chemistry at GCSE level. In this case, the ECT was reassigned to a different mentor who had the relevant experience to provide the support required.

As reported earlier, ECTs and mentors were generally positive about the initial training days (held in Cambridge, Leicester, and London). Initially, at least one mentor appeared slightly apprehensive about the prospect of providing mentoring support, but most appeared to relish the opportunity to support an early career chemistry teacher, as illustrated by the following quotes:

> *'It was such a brilliant start. I love being in a room full of chemistry teachers all there for the same reasons' (Mentor 2).*
>
> *'I just remember thinking, "Oh my god, what have I signed up to? I'm supposed to ask these sorts of questions, do I have to say this? Do I have to do this?" In hindsight I've been quite lucky … conversations with my mentee have sort of just happened' (Mentor 7).*

In addition, the opportunity to meet face-to-face was considered valuable and important in helping to establish relationships (although, as noted, attitudes may have changed as a result of Covid-19). However, as many mentors were already experienced in this role, the training was generally valued as a refresher, rather than as equipping them with new skills.

Although mentors reported that training materials were fit-for-purpose, many did not then go on to draw on them to support their mentoring or share materials with other mentors.

Several participants made suggestions for how the training could be improved further. This included:

- providing the mentors with information about their ECT in advance of their first meeting so that the mentor could more effectively prepare for the meeting; and
- pairing ECTs with their mentors earlier in the day, which would have allowed them to receive the training together, rather than separately.

Attendance at the follow-up webinar was low. Only nine mentors attended the follow-up training/webinar held on 12 and 13 November 2019. It should be noted that participation was voluntary, and the webinar was recorded for mentors who could not attend. Four of the ten mentor interviewees attended this training. Their feedback suggested that they gained limited value from attending; one (who attended the London training in April 2019) queried the timing of the session in terms of the focus on closing down the relationship, which they felt was premature.

Q2e: Is the intervention reaching its intended target population (that is, both specialist and non-specialist chemistry teachers in the first to fifth year of teaching)?

While no specific numerical targets were set in terms of the intended target population of ECTs and the schools in which they were teaching, the intervention did reach both specialist and non-specialist teachers, and those with different levels of experience, as intended by the developers. In addition, participating ECTs were from schools in different Ofsted categories. However, the vast majority were teaching in 'good' or 'outstanding' schools, where you might expect they would already be receiving good in-school support, and many were already confident and skilled in a range of areas. Collectively, these findings raise questions about whether ECTs with the greatest support needs were recruited to the programme. Further details about the selected characteristics of recruited ECTs and their schools can be found in Table 5, while a discussion of ECT's self-reported skills at baseline are provided in response to research question 1a (see page 25).

Q2f: Were all recipients engaged during the delivery of the intervention? Were there any barriers to engagement (relating to senior leader support, workload, or time)? How, if at all, have these been overcome?

While mentors were highly engaged with the intervention, there appeared to be considerable variation in the degree to which different ECTs engaged with the programme, as evidenced by the variation in the frequency with which they met with their mentors and the relatively high drop out.

Key barriers to engagement have already been discussed throughout the report but include ECTs' feeling they were too busy to participate and the physical distance between some ECT/mentor pairs. Half of those ECTs and mentors interviewed by telephone reported that the distance between their schools was a key barrier, as illustrated by the following quote:

> *'The only [improvement] would be getting people who are closer together … I think that, in terms of being able to observe each other, or if you wanted to have a face-to-face meeting … I feel like that's different from just having a phone call … I definitely would have gone to his school more … or asked him to come and give me feedback, whereas that's a lot to organise when that would take an entire day' (ECT 8).*

NFER analysis suggests that the mean travel time between mentors' and ECTs' schools was one hour or more, emphasising the challenge that physical distance had in enabling ECTs and their mentors to meet face-to-face.

Mentors, as well as the RSC delivery staff, reported that some ECTs did not respond to their emails or did so infrequently. In one case, text messaging was reported to be more effective, and in another, having grown frustrated with the lack of response from her ECT, the mentor told the ECT she would visit her at school on a specific date, as illustrated by the following quote:

> *'It's been constant trying to set something up and then it not happening … I spoke to her on the phone a couple of times … and then I didn't give her the option, I just told her I'm coming to see you on this day at school, and I went!' (Mentor 9).*

In a future iteration of the intervention, more guidance will need to be provided to mentors on how they should deal with lack of engagement from mentees as this approach does not fit with the usual ethos of mentoring which is meant to be a collaborative and supportive rather than a directive process.

Some ECTs reported that they would have found it helpful to have had more structure, such as a set programme of meetings:

> *'It would be useful to have it like a university tutorial so you know you have to go in on that day, because it's too easy to forget or have something come up … it was hard to get the school release for the time' (ECT 5).*

In addition, some ECTs also reported that they did not feel they were able to request time out of school to meet with their mentor as they thought this would not be granted or they did not want to cause disruption or be a burden to their school, even if they thought this would have been useful:

> *'As an early career teacher you're constantly trying to climb the ladder and do everything for free, and you could really do with the leeway to have an afternoon off and have a mentoring session rather than having to squeeze that in after work' (ECT 6).*

However, as in most cases these requests were never made, it is not clear whether such opportunities would have been granted or not.

To overcome these challenges, at least two ECT/mentor pairs agreed to meet at mutually agreed locations between their schools, such as coffee shops, while at least two pairs met during the school holidays. Some mentors also appeared more proactive in trying to establish dates for meetings or visits rather than waiting to be led by the ECT.

While this was reported to be successful, some mentors were concerned this approach was counter to the developer's preference for an ECT-led approach, as had been originally intended.

Readiness for trial

Q3a: What can be learned from the above to take to the next stage of evaluation? For example, do changes need to be made to recruitment, matching, training, implementation (such as content, delivery mode, and level of support provided to ECTs), project management, and the intervention theory?

Although there seems to be a need for this type of intervention (that is, subject-specialist external mentoring support), we suggest that a number of changes would need to be made to the intervention before it was ready to go to trial, and that these would require further piloting. The changes that are needed are detailed below.

Recruitment

The following changes to recruitment should be considered:

- Set a clearer strategy for recruiting the required numbers of ECTs and mentors, which may include a longer lead time of up to six months.
- Undertake recruitment in the summer term so that the programme can start in the autumn term. However, should NQTs be amongst the target group—which will need careful consideration due to the induction support already targeted at them—they will not be in post then, and so a change to the process of recruiting NQTs would be required (such as asking schools to enrol any new NQTs into the programme).
- Develop clear criteria regarding the types and characteristics of ECTs to be targeted by the intervention.
- Recruit a larger pool of ECTs and mentors than is targeted to both allow for some drop-out and to support effective matching in terms of location and other characteristics (see below).
- Re-visit the assertion that most ECTs need to volunteer for the programme. Although there are benefits to ECTs volunteering in terms of levels of engagement, consider whether schools should be more involved in identifying ECTs. This would help with the recruitment of sufficient numbers of ECTs with the greatest need for the programme who will subsequently benefit the most. In addition, it will increase schools' engagement with the programme and the support and encouragement that they give to ECTs, which could, in turn, help to reduce drop-out. However, care should be taken to ensure that the intervention does not displace in-school support.
- Simplify the recruitment process and streamline the supply of information to increase sign-up and reduce drop-out. The initial pre-mentoring questionnaire could be shortened but still capture the required eligibility and matching information. In addition, at the point of applying, prospective ECTs/mentors should be provided with all the necessary information on the programme such as the time commitment, the MoU, and training dates and venues, enabling them to book onto training upfront.
- Consider placing more emphasis on targeting ECTs based in schools in challenging circumstances where there may be more significant need for the intervention and external support might be most impactful.

Matching

The criteria against which ECTs and mentors were supposed to be matched appears sound. However, the implementation of this approach needs to be improved, with greater priority given to location and recruiting a larger pool of ECTs/mentors. This will enable matching on location and a range of other characteristics such as teaching style and mentors' skills and expertise in relation to ECTs' needs. The evidence suggested that where ECTs and mentors had similar teaching styles, the mentoring was more effective. It also showed that simply matching any ECT with any mentor is not effective and so a larger pool of each group is needed to ensure effective matching.

Training

In terms of training, the improvements highlighted below should be considered.

- Initial training: offering both weekday and weekend options should be explored to see if this increases take-up. However, if the intervention is supported by ECTs' schools, then it will be easier for them to schedule time out

of school to attend meetings. Consideration should also be given to providing mentors with information about their ECT in advance of their first meeting so that the mentor could more effectively prepare for the meeting, while pairing ECTs with their mentors earlier in the day would allow them to receive the training together, rather than separately.

- Training materials: although seen as fit for purpose, the evaluation evidence suggests that these materials were not used often by mentors to support mentoring once it was underway. Prior to delivering a future programme, it would be worth reviewing what programme materials were used and any gaps. In addition, gathering and sharing effective materials developed by mentors on the MECCT programme and drawing on wider best practice would be beneficial. A training manual drawing on this learning and evidence could be devised to provide guidance and links to relevant supporting material. This would also add uniformity and improve the effectiveness of implementation.
- Follow-up webinar: the RSC needs to reassess the purpose, timing, format, and content of the follow-up webinar taking more account of the needs of mentors and how it is 'sold' to them. Relying on voluntary attendance and recording the proceedings should be reviewed as these aspects may have limited participation. Taking more of a clinic format where mentors are able to share experiences, learning, and effective practice could be considered.

Implementation

Regarding implementation, the improvements highlighted below should be considered.

- Requirement for six interactions: we suggest the guidance and process for setting up the meetings is strengthened to ensure the requirement for a minimum number of meetings is met to achieve maximum impact from the mentoring. This could be through requiring pre-scheduled timetabled meetings taking place during the school day. This may, however, require greater school involvement. Meetings could also be organised at times of the year when ECTs might feel less pressured, for example, in the summer term following exams. In its present form of delivery, better matching on location would support more face-to-face meetings and reduce the time spent on travel. However, it is also worth noting that the research was undertaken before the Covid-19 pandemic and it is possible that, if the intervention were to be delivered in the future, more ECTs and mentors would give a preference for, and be comfortable with, remotely delivered mentoring.
- Setting up meetings: the onus was on the ECT to set up the meetings, which, in some cases, led to the mentoring not progressing, often due to the ECT's workload. Consideration should be given to whether mentors should drive the process for setting up meetings.
- Focus of mentoring: although 11 possible areas of support were identified, in reality not all of these were key areas of need for ECTs and support was less effectively provided to tackle workload and stress, improve job satisfaction, and support progression. These 11 areas should be reviewed to ensure they meet the needs of the ECTs recruited in a future programme while placing more focus on tackling workload and stress.
- Needs assessment: it might be helpful to require mentors to undertake a more formal assessment of ECTs' needs at the start of the intervention so that plans can be put in place for these to be met and resources and other support can be identified. This can be reviewed and amended on an ongoing basis as needs change and evolve.
- The role of the school: reassess the role of the school in terms of recruitment (see point above) and how it might provide a further supportive role to the ECT, for example, to ensure the mentoring is given the required priority and time and to help increase the outcomes. Where the ECT is open to it, there may also be some merit in mentors engaging with the ECT's school to better understand school cultures and processes, such as its approach to teacher workload. This will enable mentors to provide more tailored guidance and improve outcomes on this key area. Some teachers involved in the intervention were engaging in external mentoring without senior leadership commitment and support, which seemed to be a weakness of the design. However, a balance would need to be struck between gaining senior leadership commitment and support and retaining the confidentiality of the discussions between the ECT and their external mentor, which was one the main reasons why ECTs were attracted to external mentoring in the first place.

Project management

Project management and monitoring should be strengthened and expectations of mentors and ECTs set out more clearly from the outset. The RSC should encourage mentors to achieve the minimum of the six meetings and set out the implications of this requirement not being met. For example, setting incremental targets for the numbers of meetings, such as two in the first term, and asking for confirmation from participants that this had happened, would help the RSC to identify where mentoring relationships might be faltering and better support early intervention.

Indeed, there should be more active and regular monitoring of the mentoring relationships to assess if ECTs and mentors are well matched, that regular meetings are taking place, and that the mentoring is working effectively. The regular check-in should involve the RSC staff talking to mentors and mentees, or having an email exchange requiring a response. These exchanges should explore how many sessions have taken place and are booked, how the mentoring is progressing, and if any challenges are being faced. Advice and support can then be provided where mentors are experiencing challenges.

Intervention theory

The Theory of Change for the intervention identified a set of intermediate outcomes that it was expected could ultimately impact on teacher retention. The end-point survey and telephone interviews indicated that there had been improvements in some of these intermediate outcomes for around half or more of the ECTs, particularly in relation to ECTs' pedagogical knowledge, access to resources and support, confidence, and behaviour management. However, the evidence collected on workload and stress, satisfaction with teaching, and ECTs' plans to stay in teaching over the next three years did not suggest any improvements for most ECTs during the course of the pilot. As suggested above, greater involvement from schools, if handled sensitively, could strengthen these outcomes.

Q3b: Are there any key contextual factors that appear to facilitate or impede successful implementation (for example, related to the characteristics or circumstances of mentors, ECTs, and schools)?

There were a number of contextual factors that facilitated or impeded successful implementation, which are detailed below.

- Location of mentoring pairs: a key issue for many mentors and ECTs was the distance between them. Many of the pairs were located over an hour away from each other, which impacted on opportunities for face-to-face meetings. In some cases, the distance meant that less mentoring occurred or the relationship did not develop.
- ECTs' workloads: ECTs with higher workloads found it harder to find time to properly engage with the programme. Conversely, it is possible that that these ECTs stand to benefit most from the intervention.
- The quality of the matching process: where ECTs and mentors were well matched—particularly where they had similar teaching styles and mentors had the required expertise to meet their mentee's needs—the mentoring appeared to be more successful.

Due to the small sample size, it is difficult to discern whether there were any differences in the experiences of ECTs and mentors based on their characteristics (for example, years of experience or subject specialism) and the characteristics of their schools. However, the eligibility criteria for ECTs should be reviewed in light of the evidence on the perceived demand for this type of intervention from different ECTs, the ability to recruit ECTs with different lengths of experience, variations in reported outcomes, and the ability of any future trial or quasi-experimental design to robustly assess the impact of the intervention on teacher retention.

Q3c: Is the intervention considered to be affordable by schools? Do schools give mentees and mentors dedicated time to meet with or speak to one another? To what extent do schools feel it is feasible to provide such opportunities?

In the majority of cases, there did not appear to have been a financial cost to ECTs' schools as participants tended to participate in the mentoring in their own time. For example, data from the logs suggested that around three-fifths of the ECTs participated in the mentoring meetings straight after school, in the evening, at weekends, or in the holidays. Two-fifths undertook mentoring during the school day. However, evidence from the interviews suggests that most ECTs did not draw on external supply cover for the mentoring. Only one ECT who was interviewed reported that they drew on external supply cover to facilitate one or more meetings with their mentor. In addition, there were six instances of mentors or ECTs accessing internal cover from colleagues to facilitate one or more meetings.

ECTs and mentors could apply to the RSC for reimbursement of up to £300 to cover costs associated with mentoring (such as supply cover). However, at the time of reporting, no claims have been made against supply cover but three claims have been made for travel.

Q3d: Is the intervention sufficiently well manualised such that it can be readily scaled up into a larger trial if required?

MECCT is not currently a heavily manualised intervention. It includes a training day, a 'Support for mentors' handbook and ongoing support for mentors but not in-depth instruction on what the mentoring relationship should entail, how mentoring should be delivered (for example, whether an action should be developed and worked towards), and how any challenges (such as a lack of mentee or school engagement) should be tackled. However, we suggest that a more manualised approach may be helpful in improving its effectiveness and supporting it to achieve its intended outcomes, particularly if delivered at scale. As detailed in response to research question 3a above (see page 43), specific attention should be given to:

- timing and dispatch of recruitment materials;
- matching process:
    - ensuring that ECTs' and mentors' schools are less than 30 minutes' drive from one another (assuming there remains a preference for mentoring to take place face-to-face); and
    - matching ECTs and mentors with similar teaching styles and taking account of mentees' needs;
- clearly defining the role and expectations of the ECTs' host schools;
- providing guidance on the scheduling of meetings and the requirements for a minimum of one meeting per half term and procedures for re-scheduling cancelled meetings;
- providing clear guidance on the purpose of the mentoring and how it should be actioned;
- requiring mentors to undertake a more systematic needs assessment at the beginning of the intervention which can be referred to and revised on an ongoing basis and used to guide the content of the mentoring sessions;
- providing more guidance on what the mentoring should involve and, importantly, what strategies mentors should draw on to maintain the relationship and the required number of meetings when ECTs still have a need for support but their engagement is declining; and
- revising approaches for mentor and mentee check-ins and monitoring, which needs to be more stringent and require mentors and mentees to provide an update on their progress.

Conclusion

Formative findings

The evidence on whether the MECCT programme is needed is mixed. Less than a third of ECTs (30%) reported that at the time they started the intervention, they did not have access to mentoring support, and many already had good subject and pedagogical knowledge and were not at risk of leaving the profession. Despite this, most of the ECTs and mentors participating in the programme were positive about their experiences of being involved and ECTs valued the external support that they had received.

The Theory of Change for the intervention identified a set of intermediate outcomes that it was expected could ultimately impact on teacher retention. The end-point survey and telephone interviews indicated that there had been improvements in some of these intermediate outcomes for around half or more of the ECTs, particularly in relation to ECTs' pedagogical knowledge, access to resources and support, confidence, and behaviour management. However, the evidence collected on workload and stress, satisfaction with teaching, and ECTs' plans to stay in teaching over the next three years did not suggest any improvements for most ECTs during the course of the pilot. In addition, in many cases, some of the improvements shown by some ECTs in the intermediate outcomes were only partly attributed to the intervention, with some occurring naturally as ECTs gained more experience over the course of the year and received support within their schools.

As reported earlier, the developers experienced a range of challenges in recruiting to, and delivering, the intervention, and there are a number of areas in which improvements could be made.

The recruitment process

- The recruitment process needs to be more streamlined and provide all of the information about what the intervention involves and time commitment up-front and consideration should be given to whether the process needs to be lengthened to allow sufficient time for recruitment targets to be achieved.
- A larger pool of ECTs and mentors needs to be recruited to enable more effective matching.
- More clarity is needed regarding the ECTs the intervention is targeted at, for example, in terms of their stage of development and the type and extent of their needs.
- To support recruitment of the required number of ECTs, as well as to ensure that those who have the greatest need are recruited, consideration could be given to involving schools further in identifying ECTs for the programme. This could, in turn, help to reduce drop-out. However, this approach would need to be handled carefully to ensure that ECTs are engaged in the programme and can see how they will benefit, which is an advantage of an approach which relies on participants volunteering. It will also be key to ensure that external mentoring does not displace in-school support
- Consideration should be given to placing more emphasis on targeting ECTs based in schools in challenging circumstances where there may be more significant need for the intervention and external support might be most impactful.

The matching process

- This needs to take more account of the distance between ECTs and mentors so that distance does not impact on face-to-face meetings and the development of the relationship. However, if attitudes have changed as a result of Covid-19 and there is more openness to some meetings being undertaken virtually, then location would become less of an issue. As was originally intended, it also needs to take account of other characteristics such as ECTs' and mentors' teaching styles and ECTs' specific needs.

Training

- The training materials and follow-up webinar could be reviewed and improved, which could include the development of a more in-depth training manual.

Implementation

There are a range of areas in which implementation could be improved including:

- setting clearer guidance on the requirement for a minimum of six meetings and how this may be achieved;

- reviewing the 11 areas of support to ensure they meet the needs of ECTs and placing more emphasis on supporting ECTs to manage their workload and stress;
- considering whether a more formal process for needs assessment could be undertaken at the start of the mentoring process to ensure that mentoring targets identified needs; and
- reassessing the role of ECTs' schools and the extent to which they might be engaged within the programme in order to provide a further supportive role to the ECT that could improve outcomes.

Project management

- Project management and monitoring should be strengthened and expectations of ECTs and mentors set out more clearly from the outset, including the minimum requirement of six meetings. There should be more active and regular monitoring of the mentoring relationships to assess if ECTs and mentors are well matched, whether regular meetings are taking place, that the mentoring is working effectively, and if RSC support is required to help overcome any challenges.

Interpretation

The pilot indicates that the MECCT programme has the potential to improve the confidence, knowledge, and skills of some ECTs and their feelings of being supported. The absence of a comparison group, though, meant that it was not possible to estimate the level of improvement that would have occurred in the absence of the programme. However, ECTs responding to the end-point survey were able to identify improvements in these areas which they attributed to being brought about 'partly' or 'largely' as a result of the intervention. In addition, ECTs and mentors interviewed by telephone were, in some cases, able to provide examples of how changes had occurred as a direct result of the mentoring support. Without a comparison group, this is the only data that can help evidence whether the Theory of Change is working as intended.

Having said this, there was no evidence from the survey to suggest there had been a change in ECTs' plans to stay in teaching, including in their current school, nor in their satisfaction with teaching. Similar proportions of ECTs experienced an improvement or a negative change in these areas, with the situation for many being the same at the beginning and end of the pilot. These findings are important for schools. They suggest that there is a significant need for support to retain ECTs, particularly in their current schools, and that in many cases it needs to go beyond the support provided by this intervention.

There is evidence, though, that subject-specific mentoring delivered by an experienced teacher external to the school can be beneficial. There are benefits in enabling ECTs to speak freely about areas they are finding challenging to someone outside of their school and, particularly in the case of NQTs, where that person is not responsible for assessing their competencies against the teacher standards. However, there are also drawbacks in this approach in that there are limits to how much influence external mentors can have on areas such as workload and developmental culture within schools.

Following on from the point above, the evaluation identified a key issue for external mentoring in terms of how, if at all, programmes like this should engage with participants' host schools to support fidelity of delivery (for example, to ensure the mentoring is given the required priority and time by the ECT and their school) and to enable the mentoring to complement other in-school support and career development. There seem to be disadvantages to ECTs participating in mentoring in an isolated manner, particularly where they are not supported to fully engage in, and benefit from, the intervention alongside other internal support. In addition, where the ECT is open to it, there could be some merit in mentors engaging with their school to better understand school cultures and processes, such as their approach to teacher workload; this would enable mentors to provide more tailored guidance and improve outcomes. This would seem a sensible approach given that end-point survey responses showed that many of the topics most commonly covered during mentoring related to school culture and processes (for example, behaviour management, lesson planning, paperwork and bureaucracy, and time and workload management). However, this approach would need to be handled sensitively and could not impinge on the confidentiality of the discussions between the ECT and their external mentor, which is one the main reasons why ECTs were attracted to external mentoring in the first place. In a future intervention, it may also be worth considering other delivery options, for example pairing local schools and opening up the mentoring to all eligible ECTs in schools.

Although the MECCT programme drew on evidence of effective practice in external subject-specific mentoring, we suggest that, should there be a second iteration of the programme, this should go further. As well as taking on board the learning from this study and the questions raised, there would be value in strengthening the links between programme design and what is known about the ingredients of effective external mentoring. This could include undertaking a scoping/systematic review of the available evidence to gather any new insights to help shape the intervention.

The evaluators consider that the MECCT programme is not yet ready to be evaluated as part of a trial or quasi-experimental design. As noted above, there are a range of improvements that are needed before the intervention should be scaled-up. In addition, more evidence should be gathered on its potential or otherwise to address and impact on the key needs of ECTs—workload and stress—as a precursor to improving retention. We suggest that, instead, there should be a larger-scale piloting of the programme that takes on board suggestions for improvement and embeds effective practice in external subject-specific mentoring drawn from the evidence. This should include consideration of greater engagement of ECTs' host schools to increase outcomes. In an effort to ensure that the intervention is delivered to those who need it most, this future pilot should also test different approaches to participant selection as well as the feasibility of recruiting ECTs who are at greater risk of leaving the profession.

Limitations

The primary aim of the MECCT programme was to increase the number of participating chemistry ECTs within the profession. However, the pilot evaluation was not designed to robustly assess this outcome due to the relatively small number of ECTs involved and the short period over which any assessments of teacher retention could be made. Due to the small sample sizes, particularly at end-point, it is not possible to robustly assess any differences in outcomes by ECTs' characteristics and geographical area. Any differences that are observed should be regarded as tentative and treated with caution.

The fact that only three ECTs came from schools with a 'requires improvement' Ofsted rating and none were based in schools rated 'inadequate' meant that the impact on ECTs from these types of schools, particularly on retention, could not be explored. For example, comments from ECTs about staying in teaching but moving school may have been more common if ECTs had come from a broader range of schools. In addition, most ECTs taking part in the interviews were uncomfortable with their line managers being contacted as part of the evaluation, which meant that external views on impacts on ECTs, and on their pupils and colleagues, were not captured. Consideration would need to be given to addressing these limitations in a future trial.

Nearly all of those ECTs and mentors who took part in the end-point surveys (and all of those who took part in the case-study interviews) reported they had completed the programme, or were still engaged in it. It is therefore likely that the findings are biased towards those ECTs and mentors who had a more positive experience of the programme as those who dropped out early—and who may therefore have experienced particular challenges or issues—were less likely to take part in evaluation activities.

The original intention was to conduct ten telephone case studies involving separate interviews with matched ECT/mentor pairs together with the ECT's line manager. However, on the advice of the RSC, the interview with a line manager was made optional and at the discretion of the ECT. This was due to concerns about sensitivity of the intervention and the different motivations that ECTs may have had for joining the pilot (for example, some may have embarked on the programme owing to a lack of perceived support from their line manager). In the end, the evaluation team only interviewed one ECT's line manager. This was because most ECTs reported that they did not think it was suitable or appropriate for the research team to speak to somebody in that role, although their concerns were mainly expressed in terms of the additional burden this interview would place on their colleagues. The importance of speaking to an ECT's line manager and the methods for gaining access should be considered in any future evaluation design.

The absence of a comparison group means that it is not possible to estimate the level of improvement that would have occurred in the absence of the programme. Without a comparator group, we do not know, for example, the full extent to which these changes would have occurred naturally as ECTs gained more experience and expertise over the course of the intervention and benefitted from in-school support. Given the mixed effects of the intervention, and the low fidelity of some of the key implementation measures (such as the number of meetings between ECTs and mentors), it is difficult to fully validate the Theory of Change developed by the RSC team. However, it is clear that while some ECTs experienced a number of benefits from the intervention, most did not experience the full range of benefits outlined in the 'process' chain.

Future research and publications

We recommend that an evaluation of a future pilot of the programme should explore the effectiveness and outcomes of the improved model. It should also explore the extent to which greater school engagement has the potential to increase outcomes. We also suggest that a future evaluation should explore additionality through a comparison group design.

References

Buchanan, J., Prescott, A., Schuck, S., Aubusson, P., Burke, P. and Louviere, J. (2013) 'Teacher Retention and Attrition: Views of Early Career Teachers', Australian Journal of Teacher Education, [e-journal] 38 (3). DOI 10.14221/ajte.2013v38n3.9

Department for Education (2018) 'Teachers Analysis Compendium 4': https://www.gov.uk/government/statistics/teachers-analysis-compendium-4

Department for Education (2019 'Teacher Recruitment and Retention Strategy': https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/786856/DFE_Teacher_Retention_Strategy_Report.pdf

Ginnis, S., Pestell, G., Mason, E. and Knibbs, S. (2018) 'Newly Qualified Teachers: Annual Survey 2017: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738037/NQT_2017_survey.pdf

Hall, S., Lowden, K. and Lusk, D. (2018, unpublished) 'Evaluation of RSC Mentoring Scheme', Glasgow: Robert Owen Centre for Educational Change, University of Glasgow.

Hobson, A. J., McIntyre, J., Ashby, P., Hayward, V., Stevens, A. and Malderez, A. (2012) 'The Nature, Impact and Potential of External Mentoring for Teachers of Physics and Other Subjects in England' (full report): https://www.gatsby.org.uk/uploads/education/reports/pdf/gatsby-impact-of-mentoring.pdf

Humphrey, N., Lendrum, A., Ashworth, E., Frearson, K., Buck, R. and Kerr, K. (2019) 'Implementation and Process Evaluation (IPE) for Interventions in Education Settings: An Introductory Handbook', London: Education Endowment Foundation: https://educationendowmentfoundation.org.uk/public/files/Evaluation/Setting_up_an_Evaluation/IPE_Handbook.pdf

Ingersoll, R. and Kralik, K. (2004) 'The Impact of Mentoring on Teacher Retention: What the Research Says', ECS Research Review: Teaching Quality: https://www.gse.upenn.edu/pdf/rmi/ECS-RMI-2004.pdf

Ingersoll, R. M. and Strong, M. (2011) 'The Impact of Induction and Mentoring Programs for Beginning Teachers: A Critical Review of the Research', Review of Educational Research, [e-journal] 81 (2), pp. 201–233: https://doi.org/10.3102/0034654311403323

Johnson, S. and Birkeland, S. E. (2003) 'Pursuing a "Sense of Success": New Teachers Explain Their Career Decisions', American Educational Research Journal, [e-journal] 40 (3), pp. 581–617: https://doi.org/10.3102/00028312040003581

Perryman, J. and Calvert, G. (2019) 'What Motivates People to Teach, and Why Do They Leave? Accountability, Performativity and Teacher Retention', British Journal of Educational Studies, [e-journal] 68 (1), pp. 3–23: https://doi.org/10.1080/00071005.2019.1589417

Sims, S. and Jerrim, J. (2020) 'TALIS 2018: Teacher Working Conditions, Turnover and Attrition': https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/873922/Teaching_and_Learning_International_Survey_2018_March_2020.pdf

Spooner-Lane, R. (2017) 'Mentoring Beginning Teachers in Primary Schools: Research Review', Professional Development in Education, [e-journal] 43 (2), pp. 253–273: https://doi.org/10.1080/19415257.2016.1148624.

Walker, M., Straw, S., Worth, J. and Grayson, H. (2018) 'Early Career CPD: Exploratory Research': https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752572/Early_career_CPD-exploratory_research.pdf

Worth, J. and Van den Brande, J. (2019a) 'Teacher Labour Market in England: Annual Report 2019': https://www.nfer.ac.uk/media/3344/teacher_labour_market_in_england_2019.pdf

Worth, J. and Van den Brande, J. (2019b) 'Retaining Science, Mathematics and Computing Teachers': https://www.nfer.ac.uk/media/3784/retaining_science_mathematics_and_computing_teachers.pdf

Appendix 1: Additional analysis of ECTs' support needs

Progression

At baseline, **a key support need was increasing ECTs' confidence in applying for new roles and negotiating pay and conditions**, as indicated by the fact that over half (n=21; 52 per cent) strongly disagreed/disagreed that they were confident in this area.

A much smaller proportion (n=6; 15 per cent) strongly disagreed/disagreed that they had a good understanding of the roles and responsibilities they could take on. For more details see Table A1 below.

Table A1: ECTs' confidence in applying for, and understanding of, potential new roles

Statement	Strongly disagree/Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I feel confident about applying for new roles and negotiating pay and conditions	21	52	14	35	5	13	40
I have a good understanding of the roles and responsibilities I could take on	6	15	12	30	22	55	40

Source: NFER baseline survey of ECTs, February-May 2019.

Subject knowledge

In terms of subject knowledge, the primary area in which ECTs needed support was at Key Stage 5 (KS5). A third of ECTs (n=13; 33 per cent) strongly disagreed/disagreed that they had the required subject knowledge to effectively teach chemistry at this level and a further 28 per cent (n=11) neither agreed nor disagreed. By contrast, the vast majority of ECTs felt that they already had the required subject knowledge to effectively teach chemistry at KS3 (n=39; 97 per cent) and KS4 (n=35; 88 per cent). For more details see Table A2 below.

Table A2: ECTs' perceptions of their subject knowledge

Statement	Strongly disagree/ Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I have the required subject knowledge to effectively teach chemistry at KS5	13	33	11	28	15	38	39
I have the required subject knowledge to effectively teach chemistry at KS4	2	5	3	8	35	88	40
I have the required subject knowledge to effectively teach chemistry at KS3	1	3	0	0	39	97	40

Source: NFER baseline survey of ECTs, February-May 2019.

Managing workload and stress

Support to manage their workload and stress was another area of need for some ECTs. Around a fifth or more strongly disagreed/disagreed with the following statements:

- I am able to achieve a sustainable work/life balance (n=11; 28 per cent)
- I can draw on a range of strategies for managing stress at work (n=8; 20 per cent)
- I am able to manage my workload effectively (n=7; 18 per cent).

In addition, around a third or more neither agreed nor disagreed with these statements. For more details see Table A3 below.

Table A3: ECTs' perceptions of their workload and stress

Statement	Strongly disagree/ Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I am able to achieve a sustainable work/life balance	11	28	15	38	13	33	39
I can draw on a range of strategies for managing stress at work	8	20	15	38	17	42	40
I am able to manage my workload effectively	7	18	12	31	20	51	39
I am able to manage paperwork and bureaucracy	5	13	17	44	17	44	39

Source: NFER baseline survey of ECTs, February-May 2019.

Pedagogical knowledge

In terms of pedagogical knowledge, there were again a number of areas in which ECTs' responses indicated that most felt they were already knowledgeable and skilled. This included in their understanding of chemistry theory (n=37; 93 per cent) and their ability to pitch lessons at the right level (n=28; 70 per cent).

In terms of pedagogy, the area in which the largest proportion of ECTs seemed to have a need was drawing on a repertoire of teaching approaches in chemistry. Around a fifth (n=8; 20 per cent) strongly disagreed/disagreed and a further 38 per cent (n-15) neither disagreed nor agreed that they could draw on a repertoire of approaches. For more details see Table A4 below.

Table A4: ECTs' perceptions of their pedagogical knowledge and skills

Statement	Strongly disagree/ Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I can draw on a wide repertoire of teaching approaches in chemistry	8	20	15	38	17	43	40
I am able to pitch my lessons at the right level	2	5	10	25	28	70	40

I have a good understanding of chemistry theory	3	8	0	0	37	93	40
I can effectively teach students with different abilities	3	8	17	43	20	50	40
I can teach chemistry in an engaging way	2	5	13	33	24	62	39
I am able to differentiate my planning to meet the needs of different students	2	5	11	28	27	67	40

Source: NFER baseline survey of ECTs, February-May 2019.

Access to resources and support

The baseline data suggested that around a fifth of ECTs would benefit from more support and help in accessing resources, information and advice. Just over a quarter (n=11; 28 per cent) strongly disagreed/disagreed that they had access to a wide range of resources. In addition, 20 per cent (n=8) and 18 per cent (n=7) respectively strongly disagreed/disagreed that they were well supported or knew where to go for information and advice. In addition, more than a fifth of ECTs neither agreed nor disagreed that they had access to a wide range of resources, were well supported or knew where to go for information and advice. For more details see Table A5 below.

Table A5: ECTs perceptions of their access to resources and support

Statement	Strongly disagree/ Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I have access to a wide range of materials and resources	11	28	9	23	19	49	39
I feel well supported	8	20	11	28	21	52	40
I know where to go for information and advice	7	18	8	20	25	62	40

Source: NFER baseline survey of ECTs, February-May 2019.

Confidence

Most ECTs were already quite/very confident in teaching and needed less support in this area. In particular, they were quite confident/very confident in teaching chemistry and teaching practical lessons (82 per cent and 73 per cent respectively reported this).

The areas in which ECTs were least confident were rectifying students' misconceptions and managing students behaviour, in which small proportions (n=7; 18 per cent, and n=6; 15 per cent respectively) reported that they were not at all confident/not very confident. Conversely, around a half or more of ECTs reported that they were quite confident/very confident in these areas. For more details see Table A6 below.

Table A6: ECTs' perceptions of their confidence

Statement	Not at all confident/Not very confident	Neither confident nor unconfident	Quite confident/Very confident	Total N

	N	%	N	%	N	%	
Rectifying students' misconceptions	7	18	9	22	24	60	40
Managing students' behaviour	6	15	15	38	19	48	40
Teaching practical lessons	5	13	6	15	29	73	40
Teaching chemistry	4	10	3	8	32	82	39

Source: NFER baseline survey of ECTs, February-May 2019.

Behaviour management

Although only around a half of ECTs' reported that they were quite/very confident in managing students' behaviour, a higher proportion (n=25; 64 per cent) agreed/strongly agreed that they could already use a variety of techniques to manage student behaviour. **Only a small proportion of ECTs (n=6; 15 per cent) strongly disagreed/disagreed that they could use a variety of techniques to effectively manage the behaviour of students which, again, suggested that less support was needed in this area**. For more details see Table A7 below.

Table A7: ECTs perceptions of their behaviour management techniques

Statement	Strongly disagree/Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
I can use a variety of techniques to effectively manage the behaviour of students	6	15	8	21	25	64	39

Source: NFER baseline survey of ECTs, February-May 2019.

Assessment and student progress

ECTs' positive views on their understanding of formative assessment and ability to provide pupil feedback suggested these were not areas in which they required support. About three-quarters strongly agreed/agreed that they were already knowledgeable about formative assessment (n=29; 73 per cent) and could provide clear feedback to students (n=31; 78 per cent). In addition, four-fifths (n=32; 82 per cent) strongly agreed/agreed that their students were making good progress. For more details see Table A8 below.

Table A8: ECTs' perceptions of their understanding of formative assessment and views on how their students are progressing

Statement	Strongly disagree/Disagree		Neither agree nor disagree		Agree/Strongly agree		Total N
	N	%	N	%	N	%	
My students are making good progress	1	3	6	15	32	82	39
I can provide clear feedback to pupils on their progress	1	3	8	20	31	78	40
I have a good understanding of formative assessment	0	0	11	28	29	73	40

Source: NFER baseline survey of ECTs, February-May

Appendix 2: Analysis of the improvements that occurred in ECTs' confidence, knowledge, skills and support between the baseline and end-point survey

The sections below explore any improvements that occurred in ECTs' confidence, knowledge, skills and support between the baseline and end-point survey. To do this, we first assigned a score to each ECT's response by allocating values to the underlying Likert scale as follows: Not at all confident (-2); Not very confident (-1); Neither confident nor unconfident (0); Quite confident (+1) and Very confident (+2). For each statement, we then looked at the average difference in scores between baseline and endpoint for all responding ECTs and tested whether any changes were significant. These average differences in scores (change in mean), along with the percentages of ECTs whose ratings improved, stayed the same and got worse, are presented in the tables.

For some areas, we also asked ECTs to look back to before they were involved in MECCT and to assess whether they had experienced improvements and to what extent these were related to MECCT. In some cases, a higher proportion of ECTs noted improvements than was seen by comparing their baseline and end-point responses. However, these improvements were not all attributable to MECCT and, in many cases, they had occurred due to other factors (e.g. experiences and support outside of the MECCT programme and natural development and maturation).

Pedagogical knowledge

Table A9 below shows the improvements that were made in ECTs' pedagogical knowledge. **The greatest improvements were seen in ECTs' ability to draw on a wide repertoire of teaching approaches in chemistry (in which 81 per cent experienced an improvement) and to effectively teach students with different abilities (in which 69 per cent experienced an improvement)**. Differences were significantly different between baseline and endpoint across all measures. For more details see Table A9 below.

Table A9: Changes in ECTs' pedagogical knowledge

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I can draw on a wide repertoire of teaching approaches in chemistry	1.2***	21	81	4	15	1	4	26
I can effectively teach students with different abilities	0.8***	18	69	7	27	1	4	26
I am able to pitch my lessons at the right level	0.6***	14	54	11	42	1	4	26
I can teach chemistry in an engaging way	0.5***	12	50	11	46	1	4	24
I am able to differentiate my planning to meet the needs of different students	0.6***	13	50	12	46	1	4	26
I have a good understanding of chemistry theory	0.4***	10	38	16	62	0	0	26

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. *** indicates that change in mean is significantly different at 1% level.

Although when asked a direct question about improvements in their knowledge of chemistry pedagogy during the period of the intervention, most ECTs (n=24; 93 per cent) reported improvements. However, most respondents (n=15; 58 per cent) reported these improvements were not attributed to MECCT, while just over a third of ECTs (n=9; 35 per cent) agreed that they were 'partly' or 'largely' a result of their participation in MECCT. For more details see Table A10 below.

Table A10: ECTs' perceptions on the extent to which any improvements in knowledge of chemistry pedagogy were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Knowledge of chemistry pedagogy	2	8	15	58	6	23	3	12	26

Source: NFER end-point survey of ECTs, February-March 2020.

Access to resources and support

Another key area in which MECCT impacted on ECTs was increasing access to information, resources and support, with more than half of the ECTs experiencing an improvement in these areas during the course of the intervention. Differences were significantly different between baseline and endpoint across all measures. For more details see Table A11 below.

Table A11: Changes in ECTs' access to resources and support

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I have access to a wide range of materials and resources	0.8***	15	60	10	40	0	0	25
I know where to go for information and advice	0.9***	16	62	8	31	2	8	26
I feel well supported	0.7***	13	50	10	38	3	12	26

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. *** indicates that change in mean is significantly different at 1% level.

In response to a separate standalone question in the end-point survey, an even greater proportion of ECTs reported that they had experienced an improvement in their feelings of being supported, although not all in relation to the MECCT. Just under three-quarters of ECTs (n=18; 69 per cent) agreed that improvements in this area were 'partly' or 'largely' a result of their participation in MECCT. And, around a fifth (n=5; 19 per cent) reported that improvements were 'largely' as a result of MECCT. For more details see Table A12 below. Differences in the design of the two questions will partly explain the differences in response, but collectively they suggest that 50 per cent or more of ECTs felt better supported at the end of the pilot, than they did at the beginning.

Table A12: ECTs' perceptions on the extent to which any improvements in feeling supported were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Feelings of being better supported	5	19	3	12	13	50	5	19	26

Source: NFER end-point survey of ECTs, February-March 2020.

Confidence

Confidence was one of the areas in which impact seemed to be greatest. Half or more of the ECTs reported improvements in confidence in relation to: managing students' behaviour, teaching chemistry and teaching practical lessons. Just less than half reported an improvement in terms of rectifying students' misconceptions. Differences between baseline and endpoint were statistically significant across all measures. For more details see Table A13 below.

Table A13: Changes in ECTs' confidence

Confidence in:	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
Managing students' behaviour	0.7***	15	58	11	42	0	0	26
Teaching chemistry	0.6***	15	58	11	42	0	0	26
Teaching practical lessons	0.5***	13	50	12	46	1	4	26
Rectifying students' misconceptions	0.5***	12	46	14	54	0	0	26

Source: NFER end-point survey of ECTs, February-March 2020.

Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Not at all confident (-2); Not very confident (-1); Neither confident nor unconfident (0); Quite confident (+1); Very confident (+2). N/A responses would be excluded from the mean score calculations. *** indicates that change in mean is significantly different at 1% level.

When asked to what extent these improvements in confidence could be attributed to MECCT, just over two-fifths (n=11; 42 per cent) agreed that they were 'partly' or 'largely' a result of their participation in MECCT. For more details see Table A14 below.

Table A14: ECTs' perceptions on the extent to which any improvements in confidence in teaching chemistry were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Confidence in teaching chemistry	1	4	14	54	10	38	1	4	26

Source: NFER end-point survey of ECTs, February-March 2020.

Behaviour management

At baseline, around two-thirds of ECTs agreed that they could use a variety of techniques to effectively manage the behaviour of students. However, **there was some movement at endpoint, with half of the ECTs experiencing an improvement in the use of behaviour management techniques**. Differences were significantly different between baseline and endpoint. For more details see Table A15 below.

Table A15: Changes in ECTs' use of a variety of techniques to manage student behaviour

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I can use a variety of techniques to effectively manage the behaviour of students	0.6***	13	50	11	42	2	8	26

Source: NFER end-point survey of ECTs, February-March 2020.

Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. *** indicates that change in mean is significantly different at 1% level.

When asked to what extent improvements in their ability to manage pupil behaviour could be attributed to MECCT, just less than a third of ECTs (n=8; 31 per cent) agreed that they were 'partly' or 'largely' a result of their participation in MECCT. For more details see Table A16 below.

Table A16: ECTs' perceptions on the extent to which any improvements in their ability to manage pupil behaviour were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Ability to manage pupil behaviour	2	8	16	62	7	27	1	4	26

Source: NFER end-point survey of ECTs, February-March 2020.

Subject knowledge

At baseline, large proportions of ECTs reported they already had good subject knowledge at Key Stage 3 and 4. However, they were less knowledgeable at Key Stage 5 and, as can be seen from Table A17 below, **just less than two-fifths of ECTs reported an improvement in terms of their subject knowledge at KS5. However, the proportion who reported an improvement for KS4 was a little higher.** Differences were significantly different between baseline and endpoint across all measures. For more details see Table A17 below.

Table A17: Changes in ECTs' subject knowledge

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I have the required subject knowledge to effectively teach chemistry at KS3	0.3**	8	31	17	65	1	4	26
I have the required subject	0.5***	11	42	14	54	1	4	26

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
knowledge to effectively teach chemistry at KS4								
I have the required subject knowledge to effectively teach chemistry at KS5	0.5***	9	39	13	57	1	4	23

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. *** indicates that change in mean is significantly different at 1% level, ** indicates that change in mean is significantly different at 5% level.

Although when asked a direct question about improvements in their chemistry subject knowledge during the period of the intervention, most ECTs (n= 23; 89 per cent) reported improvements, only just over a third of ECTs (n=9; 35 per cent) agreed that they were 'partly' or 'largely' a result of their participation in MECCT. For more details see Table A18 below.

Table A18: ECTs' perceptions on the extent to which any improvements in chemistry subject knowledge were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Chemistry subject knowledge	3	12	14	54	8	31	1	4	26

Source: NFER end-point survey of ECTs, February-March 2020.

Progression

Just over two-fifths of ECT reported an improvement in their confidence in applying for new roles and negotiating pay and conditions, and their understanding of the roles and responsibilities they could take on. Differences were significantly different between baseline and endpoint across both measures. For more details see Table A19 below.

Table A19: Changes in ECTs' understanding of new roles and confidence in applying for them

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I have a good understanding of the roles and responsibilities I could take on	0.3**	11	42	12	46	3	12	26
I feel confident about applying for new roles and negotiating pay and conditions	0.7***	12	46	11	42	3	12	26

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score

calculations. *** indicates that change in mean is significantly different at 1% level, ** indicates that change in mean is significantly different at 5% level.

Knowledge and expertise in assessment and feedback

As with subject knowledge, most ECTs already had good understanding and expertise regarding formative assessment and providing feedback at the start of the intervention. However, **around two-fifths of ECTs reported experiencing an improvement in their understanding of formative assessment and ability to provide clear feedback during the course of the pilot, although this may not all be attributable to MECCT**. Differences were significantly different between baseline and endpoint across both measures. For more details see Table A20 below.

Table A20: Changes in ECTs' understanding of formative assessment and provision of feedback

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I have a good understanding of formative assessment	0.5***	12	46	14	54	0	0	26
I can provide clear feedback to pupils on their progress	0.4***	10	38	16	62	0	0	26

Source: NFER end-point survey of ECTs, February-March 2020.

ECTs tended not to discuss assessment in the interviews as this was an area in which they felt they were already competent.

Student progress

Again, at baseline, most ECTs reported that their students were already making good progress. However, one in five reported experiencing an improvement in students' progress during the course of the intervention. Differences were significantly different between baseline and endpoint. For more details see Table A21 below.

Table A21: Changes in ECTs' students' progress

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
My students are making good progress	0.2**	5	20	20	80	0	0	25

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. ** indicates that change in mean is significantly different at 5% level.

In the interviews, ECTs did not tend to specifically comment on improvements in their students' progress as a result of the mentoring they had received. And, considering the fairly limited contact many had had, this is not surprising. However, a minority of ECTs mentioned the improvement in their lessons which some felt was leading to improvements in students' attitudes to learning, which might ultimately improve their progress:

> *'I've still planned my lessons and I've still delivered them, I've still been tackling the issues in the classroom, it's still been me. But especially at A level, I definitely came back from meetings feeling like I we've discussed things and I can plan it really well and I can deliver a really good lesson, whereas before I would have been like 'oh my goodness how do I teach this crazy new concept'* (ECT 2)

> *'I can see how some students are improving and how their attitude is improving, I think I can now do it [help them improve] in the right environment and with help'* (ECT 11).

Workload and stress

Although workload and stress appeared to be areas in which ECTs experienced the greatest challenges, ECTs' responses to the end-point survey suggest that improvements were generally not seen in these areas over the course of the intervention. For example, a similar proportion of ECTs reported that their experiences had worsened as those that had improved, while most respondents reported no change. In any case, the differences between baseline and endpoint were not statistically significant, suggesting the observed differences could have happened by chance. For more details see Table A22 below.

Table A22: Changes in ECTs' workload and stress

Statement	Change in mean	Experiencing improvement		Rating stayed same		Rating worsened		Total (N)
		N	%	N	%	N	%	
I am able to manage my workload effectively	0	7	28	12	48	6	24	25
I am able to manage paperwork and bureaucracy	0	5	20	15	60	5	20	25
I can draw on a range of strategies for managing stress at work	-0.1	6	23	13	50	7	27	26
I am able to achieve a sustainable work/life balance	-0.1	4	16	15	60	6	24	25

Source: NFER end-point survey of ECTs, February-March 2020.
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. None of the changes were statistically significant.

Although we found no evidence that ECTs' abilities to manage their workload improved between baseline and endpoint, this may be due to other factors which changed between baseline and end-point such as experiencing an increased workload or additional responsibilities. It may still be that MECCT improved teachers' ability to manage workload.

In response to a separate standalone question in the end-point survey, a greater proportion of ECTs reported improvements in their abilities to manage workload and stress, although not all in relation to the MECCT. When asked to what extent any improvements in their ability to manage their workload and stress could be attributed to MECCT, only 10 ECTs (38 per cent) agreed that they were 'partly' a result of their participation in MECCT. For more details see Table A23 below. Differences in the design of the two questions will partly explain the differences in response, but collectively they suggest that a minority of ECTs felt the MECCT programme had helped them to better manage their workload and stress.

Table A23: ECTs' perceptions on the extent to which any improvements in their ability to manage workload and stress were related to MECCT

Area	No improvement		Improved but not due to MECCT		Improved partly due to MECCT		Improved largely due to MECCT		Total N
	N	%	N	%	N	%	N	%	
Ability to manage workload and stress	7	27	9	35	10	38	0	0	26

Source: NFER end-point survey of ECTs, February-March 2020.

The interviews reflected the survey data in that, although discussed, interviewees identified only limited gains in stress reduction as a result of their participation in MECCT and they did not mention impacts on workload:

'We talked about stress a lot, but whether I did anything to help specifically, I don't know…I think it was quite useful having someone there to talk to about whether she should stop or go or say something…I think sometimes you just need to say things out loud to someone to get them straight' (Mentor 9)

'I think we all as teachers have times where we could go to the doctors and say 'I'm not sleeping and I cry all the time' and they would sign you off, and I think sometimes you just need someone to talk to and for her I was that person' (Mentor 4)

'*I think there have been times where I've considered moving to another role because of the stresses of the job, but I think having that support there, I've been having those thoughts less frequently'* (ECT 3).

Appendix 3: Differences in outcomes by ECTs' characteristics and geographical area

Table A24: Differences in the response from ECTs between the baseline and end-point surveys to the statement 'I have the required subject knowledge to effectively teach chemistry at KS5'

Years in teaching	Mean score at baseline	Mean score at endpoint	Change in mean
First year (NQT)	-0.3	0.7	+1.0
Two to five years	0.4	0.5	+0.1
N=23			

Source: NFER baseline (February-May 2019) and end-point survey of ECTs (February-March 2020).
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. None of the changes were statistically significant.

Table A25: Differences in the response from ECTs between the baseline and end-point surveys to the statement 'I can draw on a wide repertoire of teaching approaches in chemistry'

Years in teaching	Mean score at baseline	Mean score at endpoint	Change in mean
First year (NQT)	-0.1	1.3	+1.4
Two to five years	0.5	1.3	+0.8
N=26			

Source: NFER baseline (February-May 2019) and end-point survey of ECTs (February-March 2020).
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. None of the changes were statistically significant.

Table A26: Differences in the response from ECTs between the baseline and end-point surveys to the statement 'I feel well supported'

Variable	Mean score at baseline	Mean score at endpoint	Change in mean
Years in teaching			
First year (NQT)	0.2	0.6	+0.4
Two to five years	0.5	1.6	+1.1
Region			
East	0.0	1.3	+1.3
Midlands	0.5	0.9	+0.4
N=26			

Source: NFER baseline (February-May 2019) and end-point survey of ECTs (February-March 2020).
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. None of the changes were statistically significant.

Table A27: Differences in the response from ECTs between the baseline and end-point surveys to the statement 'I plan to stay teaching at this school for at least the next three years'

Variable	Mean score at baseline	Mean score at endpoint	Change in mean
Years in teaching			
First year (NQT)	0.3	-0.7	-1.0
Two to five years	0.5	1.0	+0.5
Region			
East	0.2	0.7	+0.5
Midlands	0.5	-0.3	-0.8
N=26			

Source: NFER baseline (February-May 2019) and end-point survey of ECTs (February-March 2020).
Note: Mean scores are constructed by assigning scores to the underlying Likert scale as follows: Strongly disagree (-2); Disagree (-1); Neither agree nor disagree (0); Agree (+1); Strongly agree (+2). N/A responses would be excluded from the mean score calculations. None of the changes were statistically significant.

Appendix 4: Memorandum of Understanding and Information Sheet

Agreement to Participate in the Mentoring for Early Career Chemistry Teachers Programme and Evaluation
Memorandum of Understanding (MoU) and Information Sheet

Please sign two copies of this MoU, retaining one and providing one to your Royal Society of Chemistry (RSC) representative:

- *Heidi Dobbs, Midlands, dobbsh@rsc.org*
- *Rizwana Alvi, East of England, alvir@rsc.org*

Alternatively, please scan and email this agreement to mentoring@rsc.org

Aims of the programme:

The Education Endowment Foundation (EEF) and the Wellcome Trust have provided grant funding for the Royal Society of Chemistry (RSC) to deliver the Mentoring for Early Career Chemistry Teachers Programme. The programme will be evaluated by the National Foundation for Educational Research (NFER).

The programme will pair early career chemistry teachers with specialist external mentors, and aims to:

- boost participating early career teachers' confidence, expand their chemistry pedagogical content knowledge and help teachers of chemistry feel more supported
- support early career teachers to stay in teaching
- provide mentors with the skills required to implement flexible and personalised mentoring

Aims of the evaluation:

NFER's independent evaluation will explore whether:

- there is preliminary evidence that the programme has impacted positively on participating early career teachers and mentors
- the programme is feasible to deliver
- the programme is ready to be scaled up and evaluated as part of a larger scale study

What is the Mentoring for Early Career Chemistry Teachers Programme and how will it work?

The RSC will be training and matching experienced chemistry teachers to act as mentors to early career teachers of chemistry in the Midlands and East of England.

The RSC ran a similar mentoring pilot in Scotland, which was evaluated by the Robert Owen Centre for Educational Change. The evaluation found indicative evidence of positive outcomes for both mentees and mentors. The current programme primarily aims to improve mentee's confidence in their teaching and have a positive impact on their intentions to stay in the profession. The RSC plans to support 40 mentees with up to 40 mentors (one mentor can choose to mentor more than one mentee if they wish).

- Mentees will be early career teachers (ECTs) of chemistry with qualified teacher status (QTS). The programme is open to both chemistry subject specialists and non-specialists in years two to five of

their teaching career. The programme is not open to NQTs. Mentees should report teaching at least five hours of chemistry in an average school week

- Mentors will be experienced teachers of chemistry with QTS and over five years of teaching experience. They may be current or former teachers who taught/teach at least five hours of chemistry in an average school week

Both mentors and mentees will be asked to complete an online pre-mentoring survey to confirm their eligibility. The survey responses will also allow the RSC mentoring professional to manually match mentors and mentees based on their geographical proximity and responses to the questionnaire, including any specific goals or requirements they have identified.

In February 2019, the RSC will host a local, five-hour training day for mentors that will cover: defining mentoring, setting goals, questioning skills and planning at each stage of the mentoring cycle from initiation to close. Mentees will attend two hours in the afternoon of the initial training day in order to understand the mentoring programme, meet their mentor, network with their peers and be trained in navigating and using RSC resources.

The RSC expect mentor pairs to have a minimum of six mentoring sessions over the course of the year for up to an hour each time. The exact number of sessions is expected to vary depending on the mentees' preferences and their personalised objectives. Communication will ideally take place face-to-face, but can also take place via Skype, phone, email and other forms of social media. Some interactions are expected to be scheduled while others will be ad hoc.

The RSC will monitor the relationships via personal check-ins with mentees and mentors via email every term. Further support for mentors will include access to a private mentoring MyRSC forum, which will contain content and guidance on tackling the topics most commonly raised by mentees, including:

- classroom/behaviour management
- time and workload management
- dealing with paperwork and bureaucracy
- academic/theory and subject specific knowledge
- assessment approaches
- applying for teaching posts
- hearing what teaching over time actually involved
- pastoral support
- interacting with other stakeholders

The RSC will also be monitoring a mailbox set-up for ad hoc queries and support: mentoring@rsc.org.

Mentors will be expected to attend a second three-hour training session either at a face-to-face meeting or remotely via webinar in October/November 2019. This session will focus on refreshing questioning techniques and closing the relationship. We expect most mentoring relationships to have met their mentees' objectives by the start of March 2020, however teachers can continue their relationships informally if they wish.

Recruitment data collection:

You should already have completed a pre-mentoring survey that establishes your eligibility for the programme and that will allow the RSC to match you to another appropriate teacher for mentoring.

For mentees, this data includes:

- Mentees' names, years in teaching, phase of teaching, subject area, school name, address and number, email address, phone number, teaching status, whether have QTS or not, main specialist subject, hours of chemistry taught each week, and views on the programme

For mentors, this data includes:

- Mentors' names, years in teaching, phase of teaching, subject area, school name, address and number, prior mentoring experience, email address, phone number, teaching status, whether have QTS or not, main specialist subject, hours of chemistry taught each week, and views on the programme

Data protection:

For more information about how we process and store your data, you can download our Privacy Notice here: http://www.rsc.org/events/download/Document/0e52cffe-b5e7-4f6f-b1aa-a8caeffbc5a7.

NFER and the RSC are joint Data Controllers and Processors for this project. They will jointly decide on the means and purposes of processing personal data in order to effectively deliver and evaluate the programme. For example, the RSC will use your responses to the pre-mentoring questionnaire to match you with another participant. Data collected by NFER will be used to evaluate the RSC's mentoring programme in line with the aims of the evaluation above.

Mentors and mentees will:

- Attend the training day in February 2019, including the first mentoring session that afternoon
- Arrange at least five further mentoring sessions over a 12-month period – these can be via skype or telephone, although face-to-face is preferable. Ad-hoc interactions might take place via email, SMS or social media.
- If they are a mentor, complete the follow up training session in October/November 2019 either at a three-hour face-to-face meeting or via webinar
- In line with GDPR and data protection regulations, keep all personal information secure and confidential and notify us of any breaches as soon as possible
- Take part in evaluation requirements as set out below

NFER's evaluation requirements:

All participating early career teachers (ECTs) and mentors, together with their line managers/heads of departments of ten ECTs, will be expected to participate in a series of light-touch evaluation activities, where invited to do so. The main evaluation activities are described below.

Early career chemistry teachers

All early career teachers will be required to complete a short:

- baseline paper survey prior to starting the programme (February 2019)
- follow-up paper survey towards the end of the programme (February/March 2020)

In addition, up to ten early career teachers will need to:

- share their thoughts about the first training day during the day itself (February 2019)
- take part in a telephone interview as part of a school case-study, where NFER will also be talking separately to the ECT's external mentor and school-based line manager/head of department (autumn 2019)

Mentors

All mentors will be required to:

- complete a simple fidelity log on an ongoing basis, which will involve making a note of the date, duration, format and focus of each meeting/contact with their mentee

In addition, up to ten mentors will need to:

- share their thoughts about the first day of training day during the day itself (February 2019)
- take part in a telephone interview as part of a school case-study, where NFER will also be talking separately to the ECT and their school-based line manager/head of department (autumn 2019)

Early career chemistry teachers' line managers/heads of department

The line managers/heads of departments of ten ECTs will be required to:

- take part in a telephone interview as part of a school case-study, where NFER will also be talking separately to the ECT and their external mentor (October/November 2019)

Please note that no individual participants (ECTs, mentors or line managers/heads of department) or schools will be identified in any report that NFER writes

The RSC will provide:

- An initial training day in February 2019 for mentors (lasting five hours) and mentees (lasting two hours)
- A follow up training session lasting three hours in October/November 2019 for mentors, which mentors can choose to attend in person or via webinar
- Support and guidance to mentees throughout the programme through their local Education Coordinator and termly email check-ins
- Support and guidance to mentors throughout the programme through their local Education Coordinator, termly email check-ins and a dedicated online MyRSC forum containing content on topics most frequently raised by mentees
- Access to ad-hoc support via the mentoring@rsc.org inbox

Participating teachers will receive from the RSC:

- Reimbursement of reasonable travel costs to training, upon production of an original receipt and completed expense form

Participating schools will receive from the RSC:

- Reimbursement of up to £300 incurred in arranging supply cover for the participating teacher for one school day – this is for teacher attendance at mentoring sessions, not teacher attendance at training. A one-off payment will be made on request when bank details are submitted to mentoring@rsc.org

The school will:

- Release participating teachers so that they can attend the training sessions and take part in the programme
- If selected by NFER, allow teachers/managers/head of department to discuss their experiences of the programme with NFER via a telephone interview
- Ensure the shared understanding and support of all school staff for the project and personnel involved

Key dates for the programme and evaluation

Dates	Programme activities	Evaluation activities
29 January 2019	Recruitment closes	
12 and 26 February 2019	Initial training days scheduled *(teachers will only need to attend one meeting)*	Baseline survey of early career teachers during training days Observation of initial training session
	Mentees and mentors co-ordinate their own mentoring sessions (at least 6 between February 2019 and February 2020)	Mentors complete fidelity log provided by NFER on an ongoing basis
May 2019	Termly check in email sent	
October/November 2019	Termly check in email sent Second mentor training session scheduled or attended via webinar	School telephone case studies
January 2020	Termly check in email sent	
February 2020		Endpoint survey of early career teachers

Please sign two copies of this MoU, retaining one and providing one to your Royal Society of Chemistry (RSC) representative:

- *Heidi Dobbs, Midlands, dobbsh@rsc.org*
- *Rizwana Alvi, East of England, alvir@rsc.org*

Alternatively, please scan and email this agreement to mentoring@rsc.org

We commit to the Mentoring for Early Career Chemistry Teachers Programme as detailed above.

Participating teacher:

Signed:..... Date:.....

Name:..... Role: .....

Headteacher:

Signed:..... Date:.....

Name:.....

School: ..... School postcode:.....

Appendix 5: Privacy Notice

Privacy Notice for Mentoring for Early Career Chemistry Teachers

1 Why are we collecting this data?

The Education Endowment Foundation (EEF) and the Wellcome Trust have provided grant funding for the Royal Society of Chemistry (RSC) to deliver the Mentoring for Early Career Chemistry Teachers Programme. The programme will be independently evaluated by the National Foundation for Educational Research (NFER). The RSC and the NFER will be collecting personal data to support the recruitment of participating early career teachers and mentors, the delivery of the programme, and to undertake a light-touch evaluation.

The programme will pair early career chemistry teachers with specialist external mentors and aims to:

- boost participating early career teachers' confidence, expand their chemistry pedagogical content knowledge and help teachers of chemistry feel more supported
- support early career teachers to stay in teaching
- provide mentors with the skills required to implement flexible and personalised mentoring.

The evaluation will explore whether:

- there is preliminary evidence that the programme has impacted positively on participating early career teachers and mentors
- the programme is feasible to deliver
- the programme is ready to be scaled up and evaluated as part of a larger scale study.

The evaluation will involve a baseline and endpoint survey of mentees, and interviews and observations with mentors, mentees and RSC staff to find out about their views on the programme and to explore how well it was implemented. Some mentees' line managers/heads of department will also be interviewed as part of the evaluation. No individual participants or schools will be identified in any report that NFER writes as part of the evaluation.

The NFER and the RSC are joint Data Controllers and Processors for this project. They will jointly decide on the means and purposes of processing personal data in order to effectively deliver and evaluate the programme. For example, the RSC will use your responses to the pre-mentoring questionnaire to match you with another participant. Data collected by NFER will be used to evaluate the RSC's mentoring programme as outlined above.

Last updated: 29/11/2018
Public

2 What is the legal basis for processing activities?

The legal basis for processing personal data is:

- GDPR Article 6 (1) (f) which states that 'processing is necessary for the purposes of the legitimate interests pursued by the controller or by a third party except where such interest are overridden by the interests or fundamental rights and freedoms of the data subject which require protection of the personal data'.

The RSC's and NFER's legitimate interest for processing personal data for this project is to deliver and evaluate the programme.

In the event that you, the data subject, should share information that could be regarded as special personal data relative to your health or mental health, Article 9 of GDPR will apply and the lawful exemption for processing this data will be:

- Explicit consent. You will be asked to give explicit consent to the processing of such special category data at the time it is collected from you. This is on the basis of:
  - GDPR Article 9 (2) (a) which states that 'the data subject has given explicit consent to the processing of those personal data for one or more specified purposes, except where Union or Member State law provide that the prohibition referred to in paragraph 1 may not be lifted by the data subject'

3 How will personal data be obtained?

Personal data will be obtained by the RSC and the NFER in the following ways:

- via the Memorandum of Understanding, administered by the RSC, which all schools/mentors/mentees sign as they join the programme
- any information provided to the RSC on an ad hoc basis throughout the project for example via the mentoring@rsc.org inbox, to Education Coordinators during termly check-ins
- via the pre-mentoring and post-mentoring questionnaires which will be administered by the RSC
- via baseline and follow-up paper surveys with mentors administered by the NFER
- via interviews with mentors, mentees and RSC staff undertaken by the NFER
- via completion of a fidelity log (which will involve making a note of the date, duration, format and focus of each meeting between the mentor and the mentee), which will be completed by mentors, and which will be managed by the NFER.

All personal data collected electronically by NFER will be collected using NFER's secure portal.

4 What personal data is being collected by this project?

Personal data for this project includes data about mentors, mentees, mentee's line managers/ heads of department and RSC staff, as described below:

- Mentees' names, years in teaching, phase of teaching, subject area, school name, address and number, email address, phone number, teaching status, hours of chemistry taught each week, and views on and experiences of the programme.
- Mentors' names, years in teaching, phase of teaching, subject area, school name, address and number, prior mentoring experience, email address, phone number, teaching status, hours of chemistry taught each week, and views on and experiences of the programme.
- The views on the programme from the line managers/ heads of department of participating early career teachers/mentees.
- The views on and experiences of the programme from the RSC staff involved in its delivery.

Special personal data for this project pertaining to participants' health or mental health may be captured through exploration of mentees' views on the extent to which the programme has helped them to manage their stress and workload.

5 Who will personal data be shared with?

Personal data in the form of school, mentor and mentee contact details, together with selected background characteristics, will be shared securely between the RSC and the NFER using NFER's Secure Portal.

At the end of the evaluation, NFER will produce a report for publication based on anonymised findings. This will be made available to the general public, including the RSC and EEF. No individual participant's views or responses will be identifiable from the reports NFER will write.

6 Is personal data being transferred outside of the European Economic Areas (EEA)?

NFER will not store or transfer any personal data outside of the EEA

Data collected by the RSC via surveymonkey.com may be transferred outside of the EEA. Surveymonkey participates in and has certified its compliance with the EU-U.S. Privacy Shield Framework and Swiss-U.S. Privacy Shield. SurveyMonkey is committed to subjecting all personal information and data received from European Union (EU) member countries and Switzerland, in reliance on the Privacy Shield Framework, to the Framework's applicable Principles. To learn more about the Privacy Shield Framework, visit the U.S. Department of Commerce's Privacy Shield List: https://www.privacyshield.gov/

7 How long will personal data be retained?

The RSC and the NFER will delete any personal data within one year of the publication of the evaluation report.

In certain circumstances, data subjects have the right to restrict or object to processing. They have the right to withdraw any consent to processing that they have given at any time. They also have the right to make a subject access request to see all the information held about them. To exercise any of these rights, please contact the RSC at mentoring@rsc.org or the NFER's Compliance Officer at compliance@nfer.ac.uk.

8 Can I stop my personal data being used?

The RSC and the NFER will handle your personal data in accordance with the rights given to individuals under data protection legislation. If at any time you wish us to withdraw your data from the programme or correct errors in it, please contact the RSC at mentoring@rsc.org or the NFER at m.walker@nfer.ac.uk.

In certain circumstances, data subjects have the right to restrict or object to processing. They also have the right to make a subject access request to see all the information held about them. To exercise any of these rights, please contact the NFER's Compliance Officer at compliance@nfer.ac.uk or the RSC's data protection team at barrd@rsc.org.

9 Who can I contact about this project?

The RSC is responsible for the day-to-day delivery of the programme. Contact Luke Blackburn at blackburnl@rsc.org with any queries.

The NFER is responsible for the independent evaluation of the programme. Contact Matt Walker at m.walker@nfer.ac.uk with any queries.

If you have a concern about the way this project processes personal data, we request that you raise your concern with RSC and NFER in the first instance (see the details above). Alternatively, you can contact the Information Commissioner's Office, the body responsible for enforcing data protection legislation in the UK, at https://ico.org.uk/concerns/.

10 Updates

We may need to update this privacy notice periodically so we recommend that you revisit this information from time to time. The date when this privacy notice was last updated is shown in the footer at the bottom of this document.

Last updated: 29/11/2018
Public

Appendix 6: Baseline ECT survey

NFER
National Foundation for Educational Research

Evaluation of the Mentoring of Early Career Chemistry Teachers (MECCT) Pilot Project – Baseline Survey for Early Career Teachers

Introduction

We would like to thank you for taking the time to complete this baseline questionnaire, which you are receiving as you are participating in the Mentoring for Early Career Chemistry Teachers (MECCT) pilot project. The project, which is being delivered by the Royal Society of Chemistry (RSC), will pair early career chemistry teachers with specialist external mentors with the aim of boosting the confidence of participating early career teachers, expanding their chemistry pedagogical content knowledge, and helping teachers of chemistry to feel more supported.

The Education Endowment Foundation (EEF) has provided grant funding for the National Foundation for Educational Research (NFER) to independently evaluate the MECCT pilot. The evaluation will explore whether there is preliminary evidence that the programme has impacted positively on participating teachers and mentors, whether the programme is feasible to deliver, and whether the programme is ready to be scaled up and evaluated as part of a larger scale study. In order for your responses to provide a 'baseline', from which the impacts of the project can be explored, it is important that you complete this questionnaire before the mentoring support begins. We will follow up this baseline survey with an end-point survey at the completion of the pilot. This will contain similar questions so that we can explore changes over time.

The questionnaire will take around 10-15 minutes to complete and asks you about:

- How you came to be involved in the pilot
- What you hope to achieve from the pilot
- Your views on your current skills and abilities in teaching chemistry
- Your satisfaction with teaching and future plans.

The questionnaire also asks you to provide some background information about your qualifications and training including your school name. Please be assured that all responses are confidential, and that no individual or school will be identified in any report we write, or shared with the RSC, EEF or anyone in your school. Please return your completed questionnaire in the free post envelope provided. If you have any questions about the survey, please contact Matt Walker at m.walker@nfer.ac.uk

You can find more details about the evaluation and how we will use the data you provide on the project information site:https://www.nfer.ac.uk/for-schools/participate-in-research/evaluation-of-mentoring-for-early-career-chemistry-teachers-mecct-pilot/
By completing the survey you are agreeing that we can use your responses for research purposes.

PLEASE COMPLETE THE FOLLOWING:

FULL NAME

SCHOOL NAME

A. YOUR PARTICIPATION IN THE MENTORING PROJECT

1. **Which of the following statements best reflects <u>how you came to apply</u> for MECCT?**
   Please select one only.

I was told/asked to participate by my school ☐

I volunteered to take part/put myself forward ☐

2. **We are also interested in exploring <u>why you applied</u>, and specifically how you view the support being provided by MECCT relative to the support you have available in your school.**

   Please select one of the followings statements that most closely reflects your reasons for taking part, or add another reason by selecting 'other'.

   I applied to join the pilot because…

I have access to mentoring support in my school, but it is not effective ☐

I have access to mentoring support in my school, it is effective, but I would like external support ☐

I do not have access to mentoring support in my school ☐

Other (please specify) ☐

B. YOUR CHEMISTRY TEACHING

3. **Please rate your confidence in undertaking each of the following activities, using the scale below.** *Please select one option per row.*

	Not at all confident 1	Not very Confident 2	Neither confident nor unconfident 3	Quite Confident 4	Very confident 5
Teaching chemistry	☐	☐	☐	☐	☐
Rectifying students' misconceptions	☐	☐	☐	☐	☐
Teaching practical lessons (e.g. experiments, demonstrations, investigations)	☐	☐	☐	☐	☐
Managing students' behaviour	☐	☐	☐	☐	☐

4. Please rate your current skills and abilities in teaching chemistry and your access to information and support below.
Please select one option per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	N/A
PLANNING	1	2	3	4	5	6
I am able to differentiate my planning to meet the needs of different students	☐	☐	☐	☐	☐	☐
SUBJECT KNOWLEDGE						
I have a good understanding of chemistry theory	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS3	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS4	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS5	☐	☐	☐	☐	☐	☐
PEDAGOGICAL KNOWLEDGE						
I can draw on a wide repertoire of teaching approaches in chemistry	☐	☐	☐	☐	☐	☐
I can teach chemistry in an engaging way	☐	☐	☐	☐	☐	☐
I am able to pitch my lessons at the right level	☐	☐	☐	☐	☐	☐
I can effectively teach students with different abilities	☐	☐	☐	☐	☐	☐
I have access to a wide range of materials and resources	☐	☐	☐	☐	☐	☐
ASSESSMENT						
I have a good understanding of formative assessment	☐	☐	☐	☐	☐	☐
I can provide clear feedback to students on their progress	☐	☐	☐	☐	☐	☐
BEHAVIOUR MANAGEMENT						
I can use a variety of techniques to effectively manage the behaviour of students in my classes	☐	☐	☐	☐	☐	☐
STUDENTS						
My students are making good progress	☐	☐	☐	☐	☐	☐
INFORMATION AND SUPPORT						
I know where to go for information and advice	☐	☐	☐	☐	☐	☐
I feel well supported	☐	☐	☐	☐	☐	☐

C. YOUR WORKLOAD AND WELLBEING

5. To what extent do you agree with each of the following statements?
Please select one option per row.

	Strongly disagree 1	Disagree 2	Neither agree nor disagree 3	Agree 4	Strongly agree 5
I am able to manage my workload effectively	☐	☐	☐	☐	☐
I am able to manage paperwork and bureaucracy	☐	☐	☐	☐	☐
I am able to achieve a sustainable work/life balance	☐	☐	☐	☐	☐
I can draw on a range of strategies for managing stress at work	☐	☐	☐	☐	☐

D. SATISFACTION WITH TEACHING AND FUTURE PLANS

6. To what extent do you agree with each of the following statements?
Please select one option per row

	Strongly disagree 1	Disagree 2	Neither agree nor disagree 3	Agree 4	Strongly agree 5
I have a good understanding of the roles and responsibilities I could take on in the future	☐	☐	☐	☐	☐
I feel confident about applying for new roles and negotiating pay and conditions	☐	☐	☐	☐	☐
I plan to stay in the teaching profession for at least the next three years	☐	☐	☐	☐	☐
I plan to stay teaching at this school for at least the next three years	☐	☐	☐	☐	☐
All in all I am satisfied with my job	☐	☐	☐	☐	☐

E. YOUR SCHOOL CONTEXT

7. To what extent do you agree with each of the following statements?
Please select one option per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
The school has an effective school leadership team	☐	☐	☐	☐	☐
The school has helpful policies for managing workload	☐	☐	☐	☐	☐
The school leadership team is committed to developing early career teachers	☐	☐	☐	☐	☐
I feel well supported by my head of department	☐	☐	☐	☐	☐

F. ABOUT YOU

8. What is your highest level of chemistry qualification?
Please select one only (or the nearest equivalent qualification), from the list provided below.

Doctorate	☐ 1
MPhil	☐ 2
Masters/Postgraduate Diploma or Certificate	☐ 3
Degree/HND/HNC	☐ 4
GCE 'A' level/Scottish/Irish/Higher Grade/Vocational Level 3	☐ 5
GCSE/GCE O level/School Certificate/NVQ level 2	☐ 6
Other (Please specify)	☐ 7

9. Did you specialise in chemistry as part of Initial Teaching Training (ITT)?
Please select one only.

Yes	☐
No	☐
I didn't do ITT	☐

G. FURTHER CONTACT

As part of our evaluation, we would like to conduct some telephone interviews with a sample of participating teachers in September/October 2019 to find out how the mentoring has been going.

	Yes	No
10. Would you be happy to take part in a further telephone interview? Please select one response. Please note that if you agree now, you can still drop out later. If you agree, and are later selected as part of a shortlist of teachers, we will contact you nearer the time to see whether you are still willing to participate.	☐	☐

If yes, please provide your direct dial or mobile number below. Your telephone number will only be used for the purpose of contacting you for this research project, and will not be passed on to any third parties.

Name	
Telephone number	
Email address	

Thank you very much for your time in completing this questionnaire.
Please return it to NFER using the envelope provided.

Appendix 7: Endpoint ECT survey

NFER
National Foundation for Educational Research

Evaluation of the Mentoring of Early Career Chemistry Teachers (MECCT) Pilot Programme – Endpoint Survey for Early Career Teachers

Introduction

We would like to thank you for taking the time to complete this endpoint questionnaire, which you are receiving as you have participated in the Mentoring for Early Career Chemistry Teachers (MECCT) pilot programme.

The Education Endowment Foundation (EEF) has provided grant funding for the National Foundation for Educational Research (NFER) to independently evaluate the MECCT pilot. The evaluation aims to explore whether there is preliminary evidence that the programme has impacted positively on participating teachers and mentors, whether the programme is feasible to deliver, and whether the programme is ready to be scaled up and evaluated as part of a larger-scale study. You kindly agreed to complete a survey at the beginning of the programme, and we now invite you to provide an 'end-point' perspective, to allow the impacts of the programme to be explored.

If you dropped out of the pilot or ended the mentoring support early we would still like to hear from you! If that applies to you, you should be able complete the survey in approximately **two minutes**. For those that have participated for longer, the questionnaire will take around **ten minutes** to complete. The survey explores:

- The methods by which you have participated in the mentoring support and the number of interactions with your mentor
- Your perceptions on the effectiveness of the mentoring support
- Your views on your current skills and abilities in teaching chemistry
- Your satisfaction with teaching and future plans.

Please be assured that all responses are confidential, and that no individual or school will be identified in any report we write, or shared with the RSC, EEF or anyone in your school. If you have any questions about the survey, please contact Peter Binfield at p.binfield@nfer.ac.uk

You can find more details about the evaluation and how we will use the data you provide on the project information site:https://www.nfer.ac.uk/for-schools/participate-in-research/evaluation-of-mentoring-for-early-career-chemistry-teachers-mecct-pilot/

By completing the survey you are agreeing that we can use your responses for research purposes.

A. YOUR PARTICIPATION IN THE MENTORING PROGRAMME

[All - Force]

1. **Have you received any mentoring support since your first meeting with your mentor? For most people, this first meeting will have occurred during the initial training day.**

   Please select one answer only.

Yes ☐ No ☐

[If 'yes', go to Q2. If 'no', go to Q7]

[Those who answered 'yes' to Q1]

2. **What was the approximate date of your last conversation with your mentor as part of the MECCT pilot?**

   Please answer with a specific date, or approximate month if you are unsure.

[Those who answered 'yes' to Q1]

3. **Including your initial meeting on your training day, how many meetings/substantive interactions took place between you and your mentor over the course of the programme? By 'substantive interaction' we mean something like a telephone or face-to-face conversation, rather than say, exchanging text messages.**

1	2-3	4-5	6	7-8	9 or more
☐	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

4. **Of these meetings/substantive interactions, please indicate the approximate number that took place using the following methods.**
   Please indicate the number of interactions for each method.

Face-to-face ☐ Telephone ☐

Video Call/Skype ☐ Email/messaging app ☐

Other (please specify) ☐

[Those who answered 'yes' to Q1]

5. **Which topics or themes did you cover as part of your discussions with your mentor?**
   Please select all that apply.

Classroom and behaviour management	☐
Time and workload management	☐
Lesson planning, paperwork and bureaucracy	☐
Pedagogical approaches	☐
Assessment approaches	☐
Career progression	☐
Day-to-day teacher experiences	☐
Pastoral support	☐
Interacting with other stakeholders	☐
Chemistry practicals	☐
Other (please specify)	☐ _____

[Those who answered 'yes' to Q1]

B. MATCHING PROCESS

6. **To what extent do you think that you and your mentor were appropriately matched to facilitate a successful relationship?**

   Please select one option.

Not at all	To a small extent	To a moderate extent	To a great extent

[Those who answered 'no' to Q1]

C. REASONS FOR LEAVING THE PILOT

7. **What were your reasons for dropping out of the pilot or leaving the pilot early?**

Thank you very much for your time.

[Close the survey]

[Those who answered 'yes' to Q1]

D. YOUR CHEMISTRY TEACHING

8. **Please rate your confidence in undertaking each of the following activities, using the scale below.**

Please select one option per row.

	Not at all confident 1	Not very Confident 2	Neither confident nor unconfident 3	Quite Confident 4	Very confident 5
Teaching chemistry	☐	☐	☐	☐	☐
Rectifying students' misconceptions	☐	☐	☐	☐	☐
Teaching practical lessons (e.g. experiments, demonstrations, investigations)	☐	☐	☐	☐	☐
Managing students' behaviour	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

9. **Please rate your current skills and abilities in teaching chemistry and your access to information and support below.**

Please select one option per row.

	Strongly disagree 1	Disagree 2	Neither agree nor disagree 3	Agree 4	Strongly agree 5	N/A 6
PLANNING						
I am able to differentiate my planning to meet the needs of different students	☐	☐	☐	☐	☐	☐
SUBJECT KNOWLEDGE						
I have a good understanding of chemistry theory	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS3	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS4	☐	☐	☐	☐	☐	☐
I have the required subject knowledge to effectively teach chemistry at KS5	☐	☐	☐	☐	☐	☐

PEDAGOGICAL KNOWLEDGE						
I can draw on a wide repertoire of teaching approaches in chemistry	☐	☐	☐	☐	☐	☐
I can teach chemistry in an engaging way	☐	☐	☐	☐	☐	☐
I am able to pitch my lessons at the right level	☐	☐	☐	☐	☐	☐
I can effectively teach students with different abilities	☐	☐	☐	☐	☐	☐
I have access to a wide range of materials and resources	☐	☐	☐	☐	☐	☐
ASSESSMENT						
I have a good understanding of formative assessment	☐	☐	☐	☐	☐	☐
I can provide clear feedback to students on their progress	☐	☐	☐	☐	☐	☐
BEHAVIOUR MANAGEMENT						
I can use a variety of techniques to effectively manage the behaviour of students in my classes	☐	☐	☐	☐	☐	☐
STUDENTS						
My students are making good progress	☐	☐	☐	☐	☐	☐
INFORMATION AND SUPPORT						
I know where to go for information and advice	☐	☐	☐	☐	☐	☐
I feel well supported	☐	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

E. YOUR WORKLOAD AND WELLBEING

10. **To what extent do you agree with each of the following statements?**

Please select one option per row.

	Strongly disagree 1	Disagree 2	Neither agree nor disagree 3	Agree 4	Strongly agree 5
I am able to manage my workload effectively	☐	☐	☐	☐	☐
I am able to manage paperwork and bureaucracy	☐	☐	☐	☐	☐
I am able to achieve a sustainable work/life balance	☐	☐	☐	☐	☐
I can draw on a range of strategies for managing stress at work	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

F. SATISFACTION WITH TEACHING AND FUTURE PLANS

11. **To what extent do you agree with each of the following statements?**

Please select one option per row

	Strongly disagree *1*	Disagree *2*	Neither agree nor disagree *3*	Agree *4*	Strongly agree *5*
I have a good understanding of the roles and responsibilities I could take on in the future	☐	☐	☐	☐	☐
I feel confident about applying for new roles and negotiating pay and conditions	☐	☐	☐	☐	☐
I plan to stay in the teaching profession for at least the next three years	☐	☐	☐	☐	☐
I plan to stay teaching at this school for at least the next three years	☐	☐	☐	☐	☐

All in all I am satisfied with my job	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

G. YOUR SCHOOL CONTEXT

12. **To what extent do you agree with each of the following statements?**

Please select one option per row.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
The school has an effective school leadership team	☐	☐	☐	☐	☐
The school has helpful policies for managing workload	☐	☐	☐	☐	☐
The school leadership team is committed to developing early career teachers	☐	☐	☐	☐	☐
I feel well supported by my head of department	☐	☐	☐	☐	☐

[Those who answered 'yes' to Q1]

H. FINAL QUESTIONS

13. **To what extent do you believe that any improvements in the following areas over the last year are a result of your participation in the MECCT programme?**

Please select one box on each row.

	No improvement over last year	Improved, but not as a result of MECCT	Improved, partly as a result of MECCT	Improved, largely as a result of MECCT
	1	2	3	4
Ability to manage workload and stress	☐	☐	☐	☐
Ability to manage pupil behaviour	☐	☐	☐	☐
Feelings of being better supported	☐	☐	☐	☐
Chemistry subject knowledge	☐	☐	☐	☐
Knowledge of chemistry pedagogy	☐	☐	☐	☐
Confidence in teaching chemistry	☐	☐	☐	☐
Intention/desire to stay in teaching	☐	☐	☐	☐

14. Are there any aspects of the programme that you thought worked well?

15. Are there any aspects of the programme that thought could have been improved?

16. Would you recommend the MECCT programme to other early career chemistry teachers who are looking for additional support?

Please select one option.

Yes	No	Don't know
1	2	3
☐	☐	☐

Thank you very much for your time.

Appendix 8: Observation schedule

NFER

Mentoring for Early Career Chemistry Teachers

Observation Schedule

Note to researcher: Have all training materials to hand

Background information	
NFER researcher:	
Date:	
Number of attendees (mentors):	
Number of attendees (mentees):	
Observation duration: (e.g. start and end times, did it keep to time?)	

Main aims and objectives of the event:

Researcher: Please populate prior to observation using protocol and any materials you are provided with in advance of training

Resources provided to participants

NFER

Activity	Activity Aim	Timing	Very brief notes on content and delivery (e.g. delivery mode, content of session)	Researcher impressions/ notes (e.g. engagement of participants and views on content and delivery)

Questions for Mentees

1) Do you feel you have a good understanding of what will be required of you during the project?

Respondent 1:
Respondent 2:
Respondent 3:

2) Are there any parts of the session today that you have found particularly helpful/informative?

Respondent 1:
Respondent 2:
Respondent 3:

3) Is there any further information that might have been helpful or questions/areas that you feel have not been addressed?

Respondent 1:
Respondent 2:
Respondent 3:

NFER

Questions for Mentees

1) Do you feel you have a good understanding of what will be required of you during the project?

Respondent 1:
Respondent 2:
Respondent 3:

2) Are there any parts of the session today that you have found particularly helpful/informative?

Respondent 1:
Respondent 2:
Respondent 3:

3) Is there any further information that might have been helpful or questions/areas that you feel have not been addressed?

Respondent 1:
Respondent 2:
Respondent 3:

NFER

Questions for Mentors

1) Do you feel you have a good understanding of what will be required of you during the project?

Respondent 1:
Respondent 2:
Respondent 3:

2) Are there any parts of the session today that you have found particularly helpful/informative?

Respondent 1:
Respondent 2:
Respondent 3:

3) Is there any further information that might have been helpful or questions/areas that you feel have not been addressed?

Respondent 1:
Respondent 2:
Respondent 3:

NFER

Summary of session

Quality of delivery:	
How clearly were the aims and expectations of the training explained?	
Any details of the content/delivery of the intervention that differs from our understanding of what was planned?	
What challenges/barriers (if any) were identified by mentors and mentees when considering carrying out the mentoring? What suggestions were given for overcoming these? • Re: the principles of the intervention – degree of 'buy in' and whether assumptions were challenged • Re: the practicalities of the intervention – logistical challenges and opportunities identified.	
What key pieces of advice for successful implementation of mentoring (i.e. 'what works'/effective practice) were discussed?	
Was the trainer able to create and maintain a positive rapport with both mentors and mentees throughout the session?	
Responsiveness of attendees:	
What questions were asked by attendees and what experiences were shared?	

NFER

Questions for Trainers

1) Were you happy with how the event ran today?

2) Did the session run as you expected? Was there anything unexpected that occurred?

3) Were you able to cover everything that you planned to in the time that was availiable to you?

4) What are your perceptions of the attendees' engagement with the training today?

5) How prepared do you feel mentors are to implement the mentoring programme?

6) Do you anticipate having any further contact with the mentors and/or mentees after today?

7) Did you receive any feedback from attenees about how the session went that you would be willing to let us have access to?

8) Anything else you want to say?

NFER

Additional notes

Appendix 9: Mentoring/fidelity log

Welcome to your Mentoring Log

As part of NFER's evaluation of the Mentoring for Early Career Chemistry Teachers (MECCT) pilot project, we would like you, the mentor, to use this tool to record information about your interactions/discussions with your mentee. After each interaction, please use this log to record a summary of when and how you were in contact and the type of issue/topic that was discussed. This information will be used by NFER researchers to better understand the nature of mentor/mentee interactions. You can find more details about the evaluation and how we will use the data you provide on the Project Information Site

Please complete the fields as follows:

- **Date** – date of interaction, give in form dd/mm/yy
- **Duration** – an approximate length of your interaction in minutes
- **Time** – Select the time of day your interaction took place from the drop menu. NB: 'After School' should be considered to be any time after the end of the school day, but before you leave to go home.
- **Mode of interaction** – Select a mode of interaction from the drop down menu, if you have communicated via a different method, please select 'Other' and specify what this was in the adjacent box.
- **Main topics of discussion** – Identify up to 3 topics that were covered during your discussion from the drop down menu, if you covered less than 3 topics, please leave the extra fields blank or select 'N/A'. If you covered more than 3 topics, please select the 3 topics you spent most of your discussion time on.
- **Additional Details/Comments** – Please add any further information or comments that you feel might be helpful for us.

As a mentor, it is your role to complete the Mentoring Log after each interaction/discussion with your mentee. You may, however, find it useful to share the log with your mentee and/or complete it together so that you have a shared record of your meetings.

This document is available for download at https://educationendowmentfoundation.org.uk

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