Maths and physics teacher supply package

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Maths and physics teacher supply package

Research report

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Executive summary

E1   Introduction

In March 2016, the National Foundation for Educational Research (NFER) and Sheffield Hallam Institute of Education (SIoE), were commissioned by the Department for Education (DfE) and the National College for Teaching and Leadership (NCTL) to undertake an early process evaluation of the Maths and Physics Teacher Supply Package (MPTSP).

The MPTSP includes a series of targeted interventions to increase the supply of maths and physics teachers and upskill existing teachers. The package includes eight interventions, which target the supply chain at different stages. The following four strands were delivered for the first time to participants in the 2015 to 2016 academic year and are included in this early process evaluation.

- Paid Internships: offers paid experience in schools over either four weeks or two periods of six weeks, and is targeted at maths and physics undergraduates in their penultimate year.
- Maths and Physics Chairs: targeted at post-doctoral maths and physics researchers. It includes one-year initial teacher training (ITT) in schools followed by up to two years' teaching. Chairs support other teachers, undertake research and aim to inspire young people to take up science, technology, engineering and maths (STEM) subjects post-16. An uplifted salary is funded for three years with time allocated for research.
- Return to Teaching (RTT): targeted at qualified teachers who are currently inactive (i.e. not employed in state-funded schools). It provides support to return to the profession to teach maths or physics in the state sector, including one-to-one support from an advisor and access to Teacher Subject Specialism Training (TSST).
- Teacher Subject Specialism Training (TSST): subject-specialism training in maths and physics available to teachers who are not specialists in those subjects, as well as teachers returning to the profession.

E2   Aims and methodology

The aim of the process evaluation, which was undertaken between May and September 2016, was to learn from the delivery of the MPTSP in the 2015 to 2016 academic year. The research explored: content and delivery; progress against targets; outcomes; and early indications of additionality (i.e. whether outcomes would have been achieved in the absence of the programme).

The evaluation involved qualitative interviews with providers and participants, alongside an online survey of TSST participants. A primarily qualitative methodology was chosen to gain an in-depth understanding of the delivery of the four strands and it is worth noting that findings based on these qualitative interviews cannot be generalised to all providers and participants. However, the TSST survey achieved a large enough sample (882 participants, 30 per cent response rate) to generalise the findings.

Table 1 summarises the process evaluation activity that took place between May and September 2016 with providers and participants from the 2015 to 2016 academic year cohort.

Table 1 Evaluation activity between May and September 2016

	Total no. of strand providers	No. of provider interviews, June/July 2016	Total no. of participants recruited/ commencing strand	No. of participant interviews, June/July 2016	No. of participant follow-ups, Sept 2016	No. of participant survey responses, June/July 2016
Paid Internships	21	8	265	10	8	N/A
Maths and Physics Chairs	1	1	55	8	6	N/A
Return to Teaching	2	1	479	10	9	N/A
TSST	98	15	2978[1]	20	17	882

The following sections summarise the findings and recommendations of the evaluation, in relation to both the individual strands and the overall programme.

E3   Key findings and recommendations by strand

E3.1 Paid Internships

Paid Internships offer paid experience in schools and are targeted at penultimate year maths and physics undergraduates.

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[1] The total number of participants recruited to TSST was estimated by NCTL using progress reports, management information (MI), and end of project reports submitted by providers.

A pilot cohort of 265 interns, against a target of 200, undertook Paid Internships and were placed in schools by 21 providers in June and July 2016. Equal numbers of male and female participants were recruited. The process evaluation included qualitative telephone interviews with eight providers delivering the strand and ten participants.

Providers and participants reported that Paid Internships are proving successful in providing well devised, realistic and hands-on experiences of teaching and immersing interns in school life, enabling participants to make better-informed decisions about teaching as a career. Key success factors for the strand include:

- the publicising of the strand via universities

- offering payment for the internship

- the length and intensity of internships which offer an in-depth understanding of teaching as well as flexibility to meet individual's needs

- delivery by experienced providers

- the skills, expertise and time of mentors and other staff in schools.

All of the participants interviewed were extremely positive about their internship and would recommend it to others. Interviewees reported a range of outcomes for participants including:

- increased and realistic understanding of teaching and how a school department operates

- a chance to experience teaching and make an informed decision as to whether it would be a suitable career

- increased confidence in their ability to teach, often gained through positive feedback from existing teachers

- relevant experience and evidence for ITT applications

- more knowledge about routes into teaching

- increased interest in teaching.

Some interviewees reported that the internship had persuaded them to apply for ITT when previously they had been uncertain about teaching as a career. (At the time of writing it is not known how many interns will apply for ITT.) Interviewees were not aware of any competing initiatives providing a similar experience of maths and physics teaching, and nine out of the ten interviewees reported that they would not have undertaken work-experience in a school if Paid Internships had not been available.

Only minor changes are recommended to delivery:

- providers should ensure successful recruitment by publicising the internships via universities

- the processes for collecting management information could be streamlined

- providers would benefit from a forum for sharing effective practice.

E3.2 Maths and Physics Chairs

The Maths and Physics Chairs programme recruits, trains (through the School Direct Salaried ITT programme) and places PhD researchers as teachers in non-selective state schools.

The provider recruited 55 Maths and Physics Chairs to the 2015 to 2016 cohort, against a target of 70. As of September 2016, of the 55 recruited, 38 (69 per cent) had progressed to the second year of the strand and the remaining 17 (31 per cent) had withdrawn. Almost all (34) of the continuing Chairs achieved QTS during the 2015 to 2016 academic year, with four Chairs deferring their final assessment. The process evaluation included qualitative telephone interviews with the strand provider and eight strand participants.

Interviewees identified that the key strengths of this strand were:

- the salary uplift and research day, which were hugely appealing to applicants
- the ethos behind the strand, of bringing high level maths and physics researchers into schools
- the support of other Chairs.

There are no similar initiatives directly comparable to this strand. Some participants had considered more traditional routes into teaching such as a Post-graduate Certificate in Education (PGCE). However, the structure of the strand, the salary uplift and time available to undertake research while teaching is not offered elsewhere.

Of the eight Chairs interviewed, four felt they would not be engaged in ITT in the absence of the strand, suggesting the strand had succeeded in recruiting new teachers who might not otherwise have joined the profession.

Chairs experienced a number of issues in relation to:

- the research day being poorly managed by some schools, with time being absorbed by other activities and research often not matching schools' needs or interests

- poor communication regarding the role of Chairs and the aim of the research day
- Chairs being matched to schools in which there was no sixth form - which hampered activities related to widening participation in higher education – and in which their subject specialism was not fully capitalised upon
- lack of power of the provider to influence schools that employed the Chairs or the ITT providers delivering their training.

The main recommendations for improvement relate to:

- improved communication to providers of SCITT and schools, to ensure they fully understand the aims of the strand and their role
- further guidance to schools to support the effective integration of Chairs
- additional support to participants in performing their role in school clarifying how the research day should be used and recorded; and improved data collection.

E3.3 Return to Teaching (RTT)

The RTT strand aims to support teachers who are not active in the state funded sector to return.

As of the end of September 2016, 63 returners supported by the strand had been successful in securing teaching jobs in state-funded schools, above the target of 50 for the academic year 2015 to 2016. The two Return to Teaching Advisors (RTTAs) who were in post in the 2015 to 2016 academic year supported a total of 541 eligible returners up until the end of September 2016, indicating a conversion rate of 11.6 per cent of eligible returners who have gone on to secure a teaching post. The process evaluation included qualitative interviews with one RTTA and ten participants who had received support.

Almost all interviewees were positive about the advisory support they had received, praising the:

- prompt contact
- useful advice on courses
- general careers advice, which included skills audits, application advice and interview preparation.

However, many reported difficulties with the pre-existing provision (not funded by RTT) to which they had been signposted by their RTTA. Interviewees struggled to obtain classroom experience or mentoring support from schools, particularly if they were not also engaged in TSST. They also noted the variable quality and suitability of pre-existing courses and resources.

Of those interviewed, one of the ten had successfully returned to teaching by securing a permanent teaching post (reflecting the overall conversion rate); they had received support from RTT and TSST, but also felt that luck had played a part. Two more returners had secured temporary teaching posts.

Although returners interviewed were aware of some pre-existing sources of support, they were of the view that there were no or few other competing signposting and support services available to meet their needs: none of those interviewed mentioned the alternative school-based Supporting Returning Teachers (SRT) pilot, nor commercial/return to teaching fee paying services.

Recommendations for improvements include:

- consider ways for providing placements for potential returners

- source/provide courses with more integrated classroom experience/observations and the opportunity for a reference

- incorporate a promotion and brokering role with schools

- improve marketing messages to better manage the expectations of returners about the support offered.

E3.4   TSST

TSST offers subject-specialism training in maths or physics to non specialist teachers and teachers wishing to return to the profession. In the 2015 to 2016 academic year (Year 1 of the programme), 98 providers recruited an estimated 2,978 participants to TSST programmes (against a target of 3,000 participants). The process evaluation included an online survey of teachers participating in TSST during the 2015 to 2016 academic year (882 responses) and qualitative telephone interviews with 15 providers and 20 participants.

The programme was very well received by participants, with 90 per cent of the survey respondents reporting that they would recommend TSST to others. Key success factors include:

- the content and the focus on improving subject-specific pedagogy and subject/curriculum knowledge

- practical sessions and practical tips for teaching

- free training tailored to local need

- delivery by good or outstanding current teachers with up-to-date experience

- differentiation of training sessions to cater for participants with different levels of prior knowledge/experience

- certification was attractive and aided recruitment

- having opportunities for participants to practice what they have learnt, or observe good or outstanding maths or physics teaching.

Positive outcomes were reported by participants, particularly in terms of improved confidence and subject and pedagogical knowledge, and for those already teaching maths or physics, the ability to apply their new subject and pedagogical knowledge in the classroom. Higher proportions of physics participants said that TSST had improved the way they worked with pupils to a 'large' or 'very large' extent, while maths participants reported more of a change in their subject knowledge. Some TSST participants had already secured new jobs teaching maths/physics and the survey showed early modest increases in the number of hours spent teaching maths and physics since completing TSST.

Almost half of the survey respondents (47 per cent) said they would not have done any subject-specialism training in the absence of TSST – one measure of additionality for this strand. This increased to 61 per cent of survey respondents who had not taught maths or physics before, indicating that TSST particularly enables new non-specialist teachers to train to teach maths and physics.

Recommendations to improve strand delivery and outcomes include to:

- share learning from good practice in relation to the success factors across providers (for example providing opportunities to observe or practice teaching maths/physics and differentiation of content for participants with different levels of experience)

- offer further guidance to providers about how to engage strategic partners who could help them to offer certification or academic awards

- secure buy-in from participants' employers to ensure that support is in place (for example a commitment to release staff to attend and, where possible, opportunities to observe or practice teaching maths or physics).

E4   Key programme-wide findings and recommendations

E4.1 Effectiveness of content and delivery

Qualitative evaluation data suggest that there is variation in the effectiveness of the four strands. Paid Internships and TSST are perceived to be working particularly successfully, with the TSST participant survey providing more robust evidence that this strand is improving the self-reported confidence and knowledge of participants, and leading to early modest increases in the number of hours spent teaching

maths/physics by TSST participants. In terms of RTT and Maths and Physics Chairs, there are some areas for development, as reported above.

The study identified the following key success factors for strands:

- well-conceived content and delivery at strand level, combined with flexibility to adapt to local/participants' needs
- universal buy-in to aims
- existing provider expertise
- market demand from the local area
- schools' autonomy in recruiting participants
- effective promotion, drawing on local school networks and partnerships, including links with universities
- good communication between the strand lead, providers and participants
- effective management of participants' expectations
- high quality delivery
- provision of real classroom experience.

Programme-wide recommendations

- Ensure that classroom experience and observation of good/outstanding teaching are an integral feature of all strands
- Where strands are working well, explore ways in which provision can be extended to other target audiences (for example, other university year groups in the case of Paid Internships) or extended to offer wider support such as training in higher key stages (e.g. Key Stage 5) in the case of TSST.
- Facilitate wider sharing of the learning and benefits of strands with all those involved including providers, participants, schools and ITT providers. This could be extended to include the other four strands of the MPTSP.

E4.2 Structure of provision and role of schools

The structure of provision and the role of schools differ by strand, with central placement of schools within delivery models and headteacher/senior leader engagement perceived to be vital to effective delivery.

Where schools are *providers* delivering training and are committed to the strands' aims, there has been considerable success. For example, the success of Paid Internship and TSST are primarily related to the fact that schools are highly engaged with delivering the model and can see how they will benefit in the longer-term. In contrast, some of the issues faced by RTT seem to be related to the fact that schools are not directly involved as providers or beneficiaries, but are being asked to offer

shadowing and placement opportunities for potential returners, without receiving any reimbursement or direct benefit.

In the case of Maths and Physics Chairs, schools are employing Chairs but are not the provider which has resulted in schools' lack of engagement in, and understanding of, the model. This is linked to the provider's lack of influence or control over schools. This has meant that some Chairs have experienced a lack of support from their schools, resulting in difficulties in being accepted by colleagues and in performing their role effectively.

Programme-wide recommendations

- All strands need to specify and require a level of engagement and commitment from schools who should have a clear understanding of the aims of strands and how they will benefit.

E4.3 Outcomes for strand participants

Early evaluation data suggests that Paid Internships and TSST are resulting in the desired early outcomes for participants and have achieved good levels of recruitment and retention. However, the RTT and Maths and Physics Chairs strands are experiencing less initial success. For Maths and Physics Chairs, retention is an ongoing issue, and many participants interviewed were unsure as to whether they wished to stay in teaching in the longer-term. While RTT has met its overall recruitment target for 2015 to 2016, it has had a lower than anticipated conversion rate, partly due to schools being reluctant to offer shadowing and placement opportunities and/or to employ returners.

Programme-wide recommendations

Ongoing evaluation is vital to explore the effectiveness of support as it is enhanced, as well as longer-term impact and additionality. This should include an exploration of:

- schools' perceptions of the quality of teaching of trainees and teachers recruited and trained through strands
- the conversion rate of interns into trainee teachers; returners' rates of re-entry into teaching; and the teaching roles, retention rates and promotion of strand participants
- the overall value for money of all strands compared with other routes for attracting highly qualified maths and physics candidates into teaching, such as bursaries and scholarships.

E4.4 Future supply, reach and demand

In terms of future supply of participants, there is likely to be an ongoing pool of undergraduates in maths and physics for Paid Internships. However, the supply for the other three strands is less certain.

TSST could encounter a supply problem once the first cohorts of participants have undertaken the training, and some areas have already experienced competition for participants. In the case of the RTT strand, it was anticipated that there would be a large population of inactive teachers to draw on, but evaluation findings suggest that this should be monitored in the future.

Maths and Physics Chairs appears to have relatively modest recruitment targets given the target market of all those with a PhD in maths or physics. However, the fact that this strand has experienced difficulties in meeting recruitment targets, and retaining some participants, suggests that the number of those with the required PhD in maths or physics, as well as the appropriate attributes and motivation, may be smaller than it first appears.

Programme-wide recommendations

- Carry out analysis to estimate the size of the pool of trainees and teachers who are both eligible and suitable to participate in the strands in order to inform planning of subsequent cohorts.
- Where it is possible that supply for strands may tighten in future, plan for actively managing future provision and supply in terms of ensuring that provision:
  - is available in deprived and geographically isolated areas which may have the most severe recruitment issues – this will require mapping existing provision to identify gaps
  - fits the needs of under-represented groups (e.g. teachers wishing to work part-time).
- Review messaging to schools to encourage support for all strands, but especially RTT and Maths and Physics Chairs. Consider using previous participants and schools as advocates and/or good practice case studies to counteract any negative attitudes and encourage more sceptical schools to get involved.

E4.5 Early indications of additionality

Perception data from interviewees suggests that three of the four strands (Paid Internships, Maths and Physics Chairs and TSST) are showing potential for a good level of additionality i.e. in recruiting additional trainees and teachers who would not

otherwise have entered the profession and upskilling existing teachers. Regarding RTT, this early and small-scale research did not find any indications of additionality.

Programme-wide recommendations

- A more scientific evaluation is required to assess additionality. This is being commissioned by the DfE.

E4.6 Monitoring information

The quality of monitoring information differs by strand and, for most strands, positive changes have already been made or are proposed. Issues have generally related to lack of consistency in the data collected by providers, data that is essential not being collected, and additional data being requested by NCTL too late (i.e. after providers have already collected data from registrants).

Programme-wide recommendations

- High quality data collection systems, with inbuilt checks to reduce human error, should be set up to make it as easy as possible for providers submitting the data.
- Prior to recruitment, providers should be alerted to the types of data they need to collect from registrants, participants and those who start and then withdraw.
- Where there is an expectation that the information will be matched to other datasets, such as the School Workforce Census, providers need clear instructions about the requirements for data collection to support matching to these datasets.

E5   Conclusion

Overall, this early process evaluation suggests that the four strands of the MPTSP show promise in terms of increasing the numbers aspiring to, and entering, maths and physics ITT and teaching and increasing the subject and pedagogical knowledge and hours teaching maths and physics of TSST participants. Key areas of strength that have been identified should be built on in the delivery of all strands of the MPTSP to future cohorts. In addition, action should be taken to tackle the key challenges and barriers that have been identified to enhance future participants' experiences and outcomes.

1. Introduction and background

1.1 Introduction

In March 2016, the National Foundation for Educational Research (NFER) and Sheffield Hallam Institute of Education (SIOE), were commissioned by the Department for Education (DfE) and the National College for Teaching and Leadership (NCTL) to undertake an early process evaluation of the Maths and Physics Teacher Supply Package (MPTSP). This report presents the findings from that evaluation.

1.2 About the MPTSP

The MPTSP includes a series of targeted interventions to increase the supply of maths and physics teachers and upskill existing teachers. The package includes eight interventions, of which four were delivered to participants in the 2015 to 2016 academic year and included in this early process evaluation:

- **Paid Internships**: targeted at maths and physics undergraduates in their penultimate year. It includes two forms of paid experience in schools: Option One – a four-week internship after the end of the penultimate year of study with support for Initial Teacher Training (ITT) applications; and Option Two – two six-week internships (at the end of the penultimate and final year of study), with placement experience contributing to qualified teacher status (QTS).
- **Maths and Physics Chairs**: targeted at post-doctoral researchers. It includes one-year ITT followed by up to two years' teaching (the third year was optional for the 2015 cohort but future cohorts are expected to complete it). Throughout the programme, Chairs share their expertise by providing continuing professional development (CPD) for other maths and physics teachers, whilst undertaking research and fostering links with business. Chairs also champion university access, inspiring young people to take science, technology, engineering and maths (STEM) subjects at A Level and beyond. An uplifted salary is funded for all three years and time is allocated for continuing research. The salary and uplift are paid to participants by their employing school, with schools receiving funding for the uplift.
- **Return to Teaching (RTT)**: targeted at qualified maths and physics teachers who are currently inactive (i.e. not employed in the state sector). It provides support to return to the profession in the state sector, including one-to-one support from a recruitment advisor and access to Teacher Subject Specialism Training (TSST).

- **Teacher Subject Specialism Training (TSST)**: subject-specialism training in maths and physics available to teachers who are not specialists in those subjects, as well as qualified teachers returning to the profession.

The remaining strands of the package were not included in the early process evaluation as they were at an earlier stage of development during the 2015 to 2016 academic year. They are:

- **Future Teaching Scholars**: targeted at A Level students who achieve a B or above in maths or physics. It includes financial support and additional training during an undergraduate maths- or physics-related degree and a guaranteed place on a bespoke employment-based ITT scheme, in return for a commitment to teach for two further years post-ITT
- **Undergraduate Maths or Physics with QTS**: funding to ITT providers (higher education institutions) to develop undergraduate maths or physics with QTS courses. Students can opt into QTS courses in year 2 or 3 of their undergraduate degree
- **Flexible Routes for Career Changers**: targeted at career changers who either have advanced maths and/or physics skills and may achieve QTS more quickly, or require part-time training. It provides two new formats of the School Direct (salaried) ITT route: abridged and part-time
- **International Recruitment**: targeted at qualified overseas maths and physics teachers.

1.3 Aims of the evaluation

The aim of the early process evaluation was to learn from the delivery of the programme in the 2015 to 2016 academic year, in order to improve delivery in future years. This report presents the findings of this evaluation, which was undertaken between May and September 2016.

1.4 Key research questions

The key research questions for the process evaluation are detailed below.

Content and delivery

- What is being delivered? Are aims and objectives being met and is the programme being delivered as intended?
- What are the mechanisms through which the programme works to produce positive outcomes?

- What are the characteristics of applicants? How do they compare between strands and to applicants for other similar routes/options?
- What is working well, for whom, in what circumstances, and, why?
- How successful has recruitment been? Are some methods of recruitment more effective than others?
- How effective is content and delivery? Are some strands or models of delivery more effective than others? How does effectiveness of programme content and delivery compare to what is available through other routes?
- What is working less well and why? What are the key challenges to effective delivery? What lessons can be learnt? What improvements are needed?
- What monitoring data is being collected and are any improvements needed?

Progress to target outputs

- What outputs have been achieved?
- Have output targets been met?
- What are completion rates? What influences completion?
- What are the characteristics of those who do and do not complete?

Outcomes

- What shorter- to-medium-term outcomes have been achieved e.g. in terms of:

  - aspirations to enter ITT and teaching?
  - increased confidence, subject and pedagogical knowledge?
  - positive changes to teaching practice?
  - increased hours teaching maths and physics?

Additionality

- At this early stage, what are the indications of what has been achieved that would not have been in the absence of the MPTSP?

1.5 Methodology

The evaluation primarily involved qualitative interviews with providers and participants, and for TSST, it also included an online survey of participants. A primarily qualitative methodology was chosen for the process evaluation in order to gain an in-depth understanding of the delivery of the four strands and participants' experiences and outcomes. However, it is worth noting that for the three strands using only a qualitative approach (Paid Internships, Maths and Physics Chairs and Return to Teaching), the findings cannot be generalised to all providers and participants.

As TSST is delivered to a much larger cohort, it was also possible to conduct a participant survey to gather views on their experiences and outcomes. The survey achieved a large enough sample (882 participants, 30 per cent response rate) such that it was possible to generalise the findings (although, as outlined in section 5.2.2 it was not possible to check the representativeness of the achieved sample due to gaps in the management information (MI) data received from NCTL).

Note that this research did not gather the views of ITT providers or employing schools and it is possible that their views could differ from those of the participants and providers consulted. This is indicated in relevant sections of the report where this may affect the interpretation of the findings, and where their inclusion would be beneficial to any future research into this package.

1.6 Interview and survey samples

Table 2 below provides details of the process evaluation activity that took place between May and September 2016 for the four strands of the MPTSP active in the 2015 to 2016 academic year.

Table 2 Evaluation activity between May and September 2016

	Total no. of strand providers	No. of provider interviews, June/July 2016	Total no. of participants recruited/ commencing strand	No. of participant interviews, June/July 2016	No. of participant follow-ups, Sept 2016	No. of participant survey responses, June/July 2016
Paid Internships	21	8	265	10	8	N/A
Maths and Physics Chairs	1	1	55	8	6	N/A
Return to Teaching	2	1	479	10	9	N/A
TSST	98	15	2,978[2]	20	17	882

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[2] The total number of participants recruited to TSST was estimated by NCTL using progress reports, MI, and end of project reports submitted by providers.

1.7 Structure of the report

The following sections present the findings of the early process evaluation for each of the four strands separately: Paid Internships, Maths and Physics Chairs, Return to Teaching and TSST. They are followed by general conclusions and recommendations for the programme as a whole.

2   Paid Internships

Key findings

Paid Internships offer paid experience in schools and are targeted at penultimate year maths and physics undergraduates.

A pilot cohort of 265 interns, against a target of 200, undertook Paid Internships and were placed in schools by 21 providers in June and July 2016. Equal numbers of male and female participants were recruited. The process evaluation included qualitative telephone interviews with eight providers delivering the strand and ten participants.

Providers and participants reported that Paid Internships are proving successful in providing well devised, realistic and hands-on experiences of teaching and immersing interns in school life, enabling participants to make better-informed decisions about teaching as a career. Key success factors for the strand include:

- the publicising of the strand via universities
- offering payment for the internship
- the length and intensity of internships which offer an in-depth understanding of teaching as well as flexibility to meet individual's needs
- delivery by experienced providers
- the skills, expertise and time of mentors and other staff in schools.

All of the participants interviewed were extremely positive about their internship and would recommend it to others. Interviewees reported a range of outcomes for participants including:

- increased and realistic understanding of teaching and how a school department operates
- a chance to experience teaching and make an informed decision as to whether it would be a suitable career
- increased confidence in their ability to teach, often gained through positive feedback from existing teachers
- relevant experience and evidence for ITT applications
- more knowledge about routes into teaching
- increased interest in teaching.

Some interviewees reported that the internship had persuaded them to apply for ITT when previously they had been uncertain about teaching as a career. (At the time of writing it is not known how many interns will apply for ITT.) Interviewees were not aware of any competing initiatives providing a similar experience of maths and physics teaching, and nine out of the ten interviewees reported that they would not have undertaken experience in a school if Paid Internships had not been available.

Only minor changes are recommended to delivery:
- providers should ensure successful recruitment by publicising the internships via universities
- the processes for collecting management information could be streamlined providers would benefit from a forum for sharing effective practice.

2.1 About Paid Internships

Paid Internships offer paid experience in schools and are targeted at penultimate year maths and physics undergraduates. There are two formats:

1. a four-week internship after the end of the penultimate year of study combined with support for participants' ITT applications.
2. two six-week internships (after the end of the penultimate and the final year of study), with placement experience contributing to QTS.

A logic model providing further details of the aims, inputs and intended outcomes and impacts of the strand is provided in Appendix A.

2.2 Methodology

As part of the early process evaluation, qualitative telephone interviews were conducted in June and July 2016 with just over a third of the providers delivering the strand (eight out of 21 providers) and with ten participants.

Participant interviewees were followed up in September and October 2016 to explore any further impacts and their current intentions regarding teaching as a career. Of the ten original interviewees, eight returned a short follow-up questionnaire or took part in a short telephone interview.

Of the eight providers interviewed, seven were running the four-week placement in students' penultimate year of university, whilst one was running the two six-week placements at the end of the penultimate and final year of undergraduate study. This reflects the strand overall (also see section 2.3.2), as 18 of the 21 providers offered the four-week internship, while the remaining three offered the six-week placements. Five of the providers interviewed were offering both maths and physics internships, whilst three were offering maths only.

Of the ten participants interviewed, nine had undertaken four-week placements whilst one had completed a six-week placement with a view to undertaking another six-week placement after completing their degree.

Two participants had undertaken physics placements with eight focusing on maths teaching. This generally reflected the strand overall in which the largest proportion of participants was focusing on maths (56 per cent), with just over a fifth (23 per cent) focusing on physics. The remainder were focusing on both maths and physics (16 per cent) or other sciences (2 per cent).

Eight interviewees were female and two were male, which compares to equal proportions of females and males on the strand overall. Interns interviewed ranged from 19 to 21 years which reflected the most commonly reported ages of interns on the strand.

2.3 Progress to date

2.3.1 Progress to strand targets

A pilot cohort of 265 interns, against a target of 200 interns, undertook Paid Internships and were placed by 21 providers in June and July 2016.

A key motivation for providers' involvement in the pilot was to help them address their own issues in recruiting maths and physics trainees to SCITT and School Direct, as well as to tackle issues in recruiting maths and physics teachers more generally and attracting good quality teachers of these subjects. This was reported by all providers interviewed. A common response was that schools wanted to *'grow their own'* trainees and develop relationships with prospective trainees.

2.3.2 Characteristics of Paid Internship participants

As part of the evaluation, analysis was undertaken of monitoring data collected by NCTL from the Paid Internship providers. Please see section 2.3.3 below for comment on the quality of the monitoring data and what improvements could be made in the future.

Data compiled from the providers' monthly progress/monitoring reports indicated that 265 students had taken part in Paid Internships in the 2015 to 16 academic year. In addition to the monthly progress reports, providers were also asked to complete and submit monitoring information about participants; however, 17 participants were missing[3] from this dataset resulting in a complete dataset for 248 participants[4]. The summary below is based on the 248 participants for whom data was available.

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[3] It was suggested that the shortfall related to some participants being reluctant to provide personal data.

The data on the length of participants' internships was not always completed or completed accurately, but it seems that the majority of interns completed a four-week internship, with very few completing six weeks. Records showed that four of those on four week placements did not complete the full four weeks. Reasons for this were not collected but interviews with providers suggested that some interns arranged shorter placements due to other commitments, such as summer jobs.

Providers had attracted equal proportions of males (49 per cent) and females (51 per cent) to the internships, and students of a range of ages (see Table 3 below). The majority of interns were aged between 20 and 22 (81 per cent), with the largest proportions aged 20 (35 per cent) and 21 (33 per cent). The next largest group was aged 22 (13 per cent). The remainder (8 per cent) were 23 years and above, whilst 10 per cent did not provide their age.

Table 3 Age of interns

Age (years)	19	20	21	22	23 and above	Not provided
Percentage (N= 248)	1	35	33	13	8	10

In terms of the subject focus of their internship, the largest proportion of internships were in maths (56 per cent), followed by physics (23 per cent) and maths and physics (16 per cent). Two per cent reported focusing on other subjects and data was not provider for three per cent.

Interns were studying a wide range of subjects at university. As would be expected, the largest proportion was studying maths (42 per cent) followed by physics (14 per cent). Smaller proportions were studying combined maths and physics (two per cent), maths combined with another subject (nine per cent) or physics combined with another subject (eight per cent). In addition, eight per cent were studying engineering disciplines. Small proportions were studying astrophysics/astronomy (two per cent), accounting/finance/ actuarial maths (two per cent) and biomedical/biological/bio-veterinary/medical sciences (four per cent). The remaining nine per cent were studying a range of subjects such as: chemistry/biochemistry, natural sciences, computing/IT, economics/business, forensic science, geology, nuclear science and psychology.

Interns had been recruited from 49 different universities. This included half (50 per cent; 123 interns) who were studying at a Russell Group university.

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[4] The spreadsheet also included data for another 46 candidates who were unsuccessful or did not start but it seems that some providers only included data for successful candidates in their monitoring returns.

2.3.3 Monitoring and internal evaluation

Requests for monitoring data from providers

Half of the providers interviewed did not report any issues with the requests for monitoring data from NCTL/DfE, with some commenting that they were happy with the amount of paperwork required. The other half mentioned the additional requests for data from DfE, which were made after they had received applications from interns. This meant that they had to ask interns for additional information and some were slow in responding and had to be chased. One provider also reported that they were uncomfortable asking interns to register on the Get into Teaching website, although none of the interns who were interviewed reported any concerns about this request.

Quality and accuracy of monitoring data collected

The quality and accuracy of the monitoring data was explored as part of the evaluation. This year's dataset (2015 to 2016) was fairly complete and allowed for analysis of participants' gender, age, university subject, university of study and focus of internship, as reported above in section 2.3.2. However, some suggestions for improvements to the data collection include:

- full and accurate data should be collected for all applicants, including those who are offered, but do not take up places, as well as those who are unsuccessful[5]. This will support a comparison group design in a future evaluation and an exploration of demand
- accurate data should be collected on those who withdraw after starting, including reasons for drop-out
- in addition to the data gathered on date of birth and gender, which was accurately and consistently collected, data should be collected on the start and finish dates of internships, A Level grades and ethnicity (data was often missing for these fields)
- pre-coded response categories would facilitate easier completion and analysis rather than collecting data via free text (e.g. on ethnicity, how participants found out about the internship, degree subject currently studied). Response categories could be modelled on those used for ITT data and amended if strand-specific information is required.

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[5] A privacy notice for applicants allows for their anonymised data to be used where necessary in evaluating the strand.

Collection of internal feedback data

All providers interviewed had either been collecting internal feedback data from participants already, or intended to do so. They reported gathering/intending to gather data at different time points, such as after induction, mid-point and at the end of the internship. Many also intended to keep in touch with their interns to provide support with ITT applications and to monitor intentions to teach and entry into ITT.

Two providers reported that the reflective log that was completed with mentors was used as a form of feedback on the strand (as well as evidence for ITT). Another provider, who was delivering the strand across a number of schools, reported having regular contact with host schools and interns to see how they were getting on and to gather feedback on the strand. Another reported emailing interns every week to check on their progress.

Some providers were also intending to invite interns to future activities such as train-to-teach events, teacher networking events and social activities for new teachers.

2.4   Recruitment

2.4.1 Recruitment process

Recruitment for the Paid Internships pilot has been very effective, with the overall target being exceeded.

Links with universities have been a key factor in successful recruitment by providers. Half of the providers interviewed reported that they had more applicants than places and could have taken on additional qualified and motivated interns who had met the assessment criteria. These providers tended to be schools with very strong links with their local university, who promoted their opportunity via maths and physics lectures and fliers and, in one case, through attending university careers/recruitment fairs.

Alongside promoting the opportunity via local universities, other common approaches to recruitment included: contacting schools' alumni and promoting opportunities via networks such as Further Maths, which resulted in some success. Schools also reported advertising the opportunity via Twitter and school websites. However, schools without university links tended to find recruitment more difficult and often struggled to meet their targets. These schools relied on methods such as: schools in their alliance contacting their alumni; contacting sixth form colleges; and sending out letters to parents/carers. However, these approaches did not usually yield sufficient applications.

A number of providers reported using the same stringent interview process and assessment criteria used for recruiting trainee teachers and scoring applicants

against criteria such as enthusiasm, potential and relevant experience. In some cases, interns who passed the assessment process were also offered a place on ITT. However, two providers in the sample of eight did not interview; one assessed purely on the basis of the application and the other offered places to all who applied due to challenges in filling places.

Providers interviewed reported that the strand had enabled them to attract more female students than was the norm for ITT in maths and physics. Where larger proportions of female interns were recruited, providers tended to have capitalised on their links with universities and promoted the opportunity within lectures. Both female and male interns interviewed reported that finding out about the internship through their university gave it credibility.

2.4.2 Reasons for participation

Nine out of ten interviewees had found out about Paid Internships through their universities. This had been through talks in lectures, fliers and leaflets, emails from the undergraduate office, emails forwarded from providers and careers advisers. The other interviewee had found out via direct communications from a local school.

Four interviewees reported that, prior to starting their internship, they were definitely considering teaching as a career, whilst six were open minded and considering teaching as one of several options.

The main reason for participants applying for the Paid Internship was to gain an understanding of what maths or physics teaching is like to support their career decision making, as this comment illustrates:

> *I hadn't seriously considered teaching, but it was on my list of potential careers so I thought I'd see … and gain a taste of what teaching is like* [for] *which* [the internship] *was perfect* (Paid Internship participant).

Interviewees reported that they were attracted by the length and intensive nature of the internships, as well as the coverage of different ages of pupils, different teaching styles and methods of engaging pupils of different abilities:

> *I thought if I want to find out what teaching is like, then this is going to be a really good way to do it, because I can see all the ways, through all the key stages, all the different teaching styles, the different abilities and everything. It will give me a taste for it…* (Paid Internship participant).

> *It sounded like a really varied course with two and a half weeks at the secondary school, a few days at a primary school and to get to see what*

happens at sixth form colleges as well…I thought this would be a great introduction to a teaching career… (Paid Internship participant).

For the majority of interviewees, the fact the internship was paid was also an important factor in encouraging them to apply, although they were all committed to making the most of the experience, as this quotation indicates:

As it is paid, it is an incentive to do this internship. But, because it is paid, it means you as an intern put lots into it, and you get lots out of it too (Paid Internship participant).

The salary enabled participant interviewees to pay rent and travel costs during the internship and also went toward their costs for the next academic year. Only one of the ten interviewees reported that they would have undertaken the internship even if there had been no payment. Providers interviewed echoed participants in commenting that the payment was key to recruiting participants, with just one of the eight providers suggesting that the payment could be reduced. It was commented that many other internships offer a payment so this was needed for reasons of parity and to attract good-quality applicants.

2.5 Content and delivery

2.5.1 About the providers

NCTL oversaw an application process inviting schools to apply to provide Paid Internships. Applications were assessed by a panel at NCTL and Paid Internship places were awarded to the providers with the highest scores against the assessment criteria. Providers' experience in running School Direct or SCITT and providing CPD for teachers and leaders, helped schools demonstrate their evidence to provide Paid Internships against the assessment criteria required to run the internships.

All of the 21 providers were teaching schools, with 18 being a lead school within a Teaching School Alliance (TSA). Ten reported that they had previous experience of running a SCITT in their application. The remainder did not explicitly mention SCITT experience but offered other evidence against the assessment criteria.

Many providers had close links with their local university. One explicitly mentioned experience of delivering CPD and it is likely that many of the others were also experienced in this area. Some providers placed interns with a number of schools in their TSA or with whom they had close links/partnerships.

2.5.2 Models of delivery

The content and delivery of the Paid Internships varied by provider and participant but has commonly included most, or all, of the following:

- application and interview process and matching interns to schools (taking account of location and travel times)
- induction/training days covering safeguarding, input on pedagogy, behaviour management, subject knowledge – in some cases, the training day took place before the internship
- shadowing pupils
- shadowing teachers
- lesson observations across the key stages – usually accompanied by guidance on what to look for
- allocation to a mentor
- supporting individual pupils and working with small groups in a teaching assistant (TA)-type role
- planning and teaching part of a lesson, team teaching and/or carrying out lesson starters and plenaries
- input on the ITT application process and what ITT and teaching involves and/or the opportunity to speak to those on ITT or to newly-qualified teachers.

In most cases, participants were provided with a booklet to complete during the internship and/or a reflective log. Some of these had been developed/adapted from booklets used for ITT courses. These were then regularly reviewed with the participant's mentor.

Providers and participants also mentioned a range of other activities that had formed part of some internships, depending on the model offered by the provider and/or adaptation to the needs and interests of the participants. This included:

- allocation to a form group to gain an understanding of the pastoral system
- input on special educational needs (SEN)
- the opportunity to attend sessions from Subject Knowledge Enhancement or middle leaders courses
- involvement with extra-curricular activities such as off-timetable days and STEM (science, technology, engineering and maths) Clubs
- visiting primary schools and sixth form colleges to observe maths or science lessons
- observing lessons in other subjects; marking students' work; input on the school's research programme
- the development of a legacy activity for use in the subject department.

The focus of internships was on participants gaining a whole school experience, as well as integration into their subject department.

2.5.3 Participants' experiences of the strand

All of the participants interviewed were extremely positive about their experience on the internship, which was more than meeting their expectations. They all rated the experience highly and would recommend it. They reported that they:

- felt really welcome and fully immersed in the life of school and were treated like a member of staff
- had been provided with a well devised programme which provided a realistic view of school life and was flexible to their needs and interests
- had gained an in-depth understanding of their department and school
- had gained hands-on experience of teaching and working with pupils which went way beyond observations and shadowing
- had learnt about whole-school issues such as safeguarding, pastoral care and behaviour management
- had received excellent support from their mentor and experienced enthusiastic staff within their department and school and were encouraged to ask questions and for support when needed.

The quotations below in Box 2.1 illustrate the positive feedback provided by the Paid Internship participants taking part in interviews.

Box 2.1: Participant interviewees' views on Paid Internships

Quality of advice and support

They were so giving of their experience and they would tell you everything you needed to know.

The helpfulness and openness of staff made it relaxed and I wasn't nervous about asking questions.

Breadth of experience and flexibility

I was expecting to be shadowing a teacher and observing, but they have got me really involved.

It was a much deeper insight than I thought it would be…We got to do a lot.

I wanted to know more about SEN so they arranged for me to talk to an SEN teacher. I also watched lessons in other subjects to see whether any of the teaching skills could be transferred to maths lessons…I also asked for experience in a primary school and the deputy headteacher is organising that for me.

Integration in school

The school treated me like actual staff. We got a laptop and they had set up email accounts for us…It gave us a proper feel of what it is like to be a teacher.

Overall high-quality experience

The whole experience, I couldn't have asked for anything better.

This one went so well that I couldn't imagine any other internship being as good.

2.6   Strengths and success factors

Echoing participants' reports, providers noted a number of strengths contributing to the success of the Paid Internship strand. These related to the existing expertise and partnerships of providers, the attractiveness of the offer to potential recruits, and the delivery and design of the strand. More details are included in Box 2.2 below.

Existing provider expertise and partnerships

- Provider expertise in delivering ITT (SCITT or School Direct) coupled with a robust selection and matching process and tried and tested resources that can be adapted.

- Strong relationships between schools and local universities, which has aided recruitment and given the strand credibility.

- Strong links across TSAs with supportive schools in all phases.

The attractiveness of the offer to recruits

- The length of the internship which provides an opportunity for participants to gain an in-depth understanding of teaching.

- The payment which gives the scheme credibility and enables it to compete with internships in other career areas for well-qualified undergraduates.

- As a result, the high calibre of interns recruited – most providers commented that they were very bright and personable and would make effective teachers (*'These four are by far the best candidates for maths we have had in years'* and *'They have a fantastic attitude and would fly in teaching'*).

Strand delivery and design

- Well conceived with clear aims and objectives.

- The right timing i.e. targeting undergraduates in their penultimate year of their degree.

- The professional generosity of schools, which has meant that interns have been well supported.

- The expertise and support of mentors and the integration of interns into their department.

- The insight into the theory and practice of teaching and on teaching across the key stages.

- The opportunity for flexibility in the strand – both in devising it from the outset and in adapting it to interns' needs and interests.

Providers commented that, due to the in-depth and high quality experience of teaching offered by the internships, they believed that interns would have a better chance of subsequently becoming outstanding teachers on SCITT.

Interns who were interviewed were asked to identify **key strand-level and personal success factors** which had enabled them to get the best from the experience. They are shown in Box 2.3 below.

Box 2.3: Interns' views of the key strand-level and personal success factors of Paid Internships

Strand factors	Personal factors
• The expertise and support of their mentor and helpfulness of staff. • Being welcomed and treated like a member of school staff. • The opportunity for hands-on teaching experience, with the back-up of the class teacher where needed. • Receiving feedback from teachers which, when positive, increased participants' confidence that they would make a good teacher and their enthusiasm for, and confidence in, applying for ITT. • Having the opportunity to talk to ITT trainees and NQTs. • Flexibility to develop their areas of interest. • Payment.	• Having an existing interest in teaching –they were motivated to get the most out of the experience and were proactive in talking to teachers. • Prior teaching experience/ volunteering – those with prior experience felt that they went into school with more confidence and were able to get *'stuck in'*.

2.7 Learning and areas for development

Only a small number of delivery issues were identified by providers and participants.

One issue, reported by a small number of providers, was the process for paying interns. One provider reported that this had caused significant issues and they had had to treat interns like teachers, by adding them to the payroll, going through an immigration check and subsuming costs such as salary on-costs and the Disclosure and Barring Service (DBS) check. As this provider reported:

> *… the biggest problem was paying them… We have to comply with our auditing processes...We had to enrol all of the interns onto the payroll for the four weeks and to take a hit on the on-costs internally… It took us two months to sort out the payments with HR in* [name of LA]. *We put the participants from the other school onto our payroll for uniformity. It was a real fag…Getting the DBS sorted was a pain too and we had to pay for this. Getting them all onto the payroll wasn't straightforward as we need to do an immigration check and ask for participants' passports…*

While schools were alerted in advance about what was required, some found it burdensome and would have preferred NCTL to pay interns centrally. Another option

would be for schools, which have developed effective payment systems, to share their practice with other schools.

Other issues mentioned by small numbers of providers included responding to late requests for additional monitoring data (mentioned above), difficulties recruiting in rural areas and in areas where there was not a nearby university, and fitting in the internships after students' exams and before the end of the school term. Some providers mentioned that they had offered some interns the flexibility of splitting the four weeks.

Most interns interviewed were highly satisfied with their internship and did not feel that their internship could be improved. A small number mentioned the difficult journeys and long time spent getting to schools, particularly in rural areas. However, in the main, interns had managed to find a way round these transport issues. Other areas for additional activities/improvements mentioned by individuals included:

- better publicity of the internship (some interns had found out about the internship via friends, or family members who had seen leaflets from their local school, rather than being told about it directly)
- more information prior to starting the internship on what to expect and what they would be doing week by week
- more hands-on work with Key Stage 5
- more information on what to look for in lesson observations
- additional resources to help with lesson planning
- more time in class teaching
- more direct input on behaviour patterns and how to deal with them rather than gaining this primarily from lesson observation
- allocating more time to the mentor to prepare for the internship.

In addition, one participant suggested that the four-week internship should be opened up to final year undergraduates:

> *To improve the internship, I personally think that it's a good idea to provide this opportunity to final year students who are thinking of going into teaching…I think it would help them to make sure teaching is definitely something they would like to do…and would also help them to get the school experience required…*

Most of these areas for development were also noted by providers who were enhancing their provision on an ongoing basis.

2.8 Outcomes

2.8.1 Outcomes for participants

Participants and providers who were interviewed reported a range of outcomes that they perceived were being realised for interns, including:

- increased and realistic understanding of how a department and school operates and what teaching entails including: planning and differentiation; class teaching; assessment, marking and target setting; pastoral care and behaviour management; attending faculty meetings; extra-curricular activities; and leadership roles
- a chance to experience teaching and make an informed decision as to whether it would be a suitable career
- increased confidence in teaching through standing up in front of a class and learning how to communicate effectively with pupils
- relevant experience and evidence for ITT applications, including a knowledge of what to expect from, and a 'head start' in, ITT
- a range of transferable skills such as: experience in a working environment, communication skills, time management and personal effectiveness
- more knowledge about routes into teaching and what they involve (including school-based routes) and teaching in the different phases
- increased interest in teaching and, for some, confirmation that it would be the right career choice.

Box 2.4 below includes quotations from participants and providers relating to their perceptions of the range of outcomes realised to date by Paid Internships.

Box 2.4: Participant and provider interviewees' perceptions of Paid Internship outcomes

Increased understanding of what teaching entails

I have come out of it with a more fleshed out view, but also a more positive view (Participant).

It's been excellent to watch teachers teach (Participant).

Help in decision making and increased interest in teaching

I feel a lot more confident about it and it is an option for me, I feel like I could do it if I wanted to...It has shown me how rewarding it is (Participant).

It helped to confirm that I definitely want to be a teacher (Participant).

Increased confidence in teaching

The experience has really built my confidence. It was my first time standing in front of a class teaching, and I've done that quite a few times now, and I feel I can stand in front of them confidently (Participant).

I think I can control them [pupils] *now, because of all the things I've seen in lessons, I'm more confident* (Participant).

Relevant experience for applications

They are a few steps ahead of other ITT applicants and can talk about teaching in a much more dynamic and informed way and will perform better at interview. Often ITT applicants have a real lack of understanding of what teaching entails (Provider).

2.8.2 Participants' future intentions

At the beginning of the internship, four of the ten interviewees were seriously considering teaching and at the end of the internship their decision had been positively confirmed. In addition, another intern who at the start was undecided had now been 'converted' to teaching. These five participants were intending to apply for SCITT or a PGCE. The remaining five interviewees were still considering teaching alongside other options, as had been the case before they started. However, after the internship, teaching for these interns now tended to be 'much higher up the list' than other career options.

A number of interns - who were either seriously considering applying for ITT or who were still undecided - intended to return to their host school during the next academic year to help out and gain additional experience and/or support with their ITT applications.

In September and October 2016, eight interns (out of the ten previously interviewed) responded to a request for a follow-up interview or returned a short questionnaire. Of these eight, when interviewed in June and July, five were unsure about whether they wanted to enter a career in teaching and three were clear that teaching was a career they wanted to pursue. At follow-up, three of those who had been unsure, as well as the three who were certain that teaching was the right career choice (i.e. six interns), reported that they intended to apply for ITT starting in September 2017. Of the other two interviewees, one remained undecided and the other had decided not to enter teaching.

The interns who had decided to apply for teaching but were previously unsure, reported that they had made their decision based on two key pieces of learning. They were more aware of what teaching involves as a result of their internship, both in terms of 'behind the scenes' and in the classroom and the resulting influence of teachers on children's interest and progress, as this intern remarked:

> *The internship has showed me the extra things that teachers do to ensure students get the best learning experiences. It has also showed me the influence a teacher could have on a child's interest in the subject as well as their progress through school. It's reaffirmed my intention of going into teaching.*

They were also now more confident that they could be effective teachers and better prepared for the training. As these interns reported:

> *I am more confident and prepared to become a maths teacher after the Paid Internship. I know what I am signing up for.*

> *It made me more confident in my potential to become a teacher due to the feedback I received from the teachers I worked with. Also, it just secured my feelings that I do want to become a teacher and left me with no doubt.*

The participant who remained unsure was still considering teaching alongside other options. This interviewee reported a much greater understanding of what teaching involves and how rewarding it can be, more confidence in teaching, and increased awareness of the opportunities. However, this interviewee remained concerned about the amount of planning involved for mixed-ability classes of students and the resulting impact on work-life balance:

> *My view of what teaching involves has definitely changed, as I did not anticipate the amount of planning teaching requires - and how thorough planning a lesson can be (for example, considering multiple learning objectives and meeting them, along with adapting a single lesson for higher and lower ability students), and my perception coming out of the internship was that the life-work balance was a challenging one to maintain as a result of the workload that stemmed from planning and other tasks.*

In the meantime, this intern had become a peer-assisted learning mentor for first year physics undergraduates and reported that the internship had helped with the interview. The participant who had decided against teaching had done so as they felt they would not be suited, but reported that the internship had been a great experience, which they would recommend to others.

The interns who remained convinced that teaching was the right career for them reiterated the increased confidence they had gained from the internship in terms of their potential to become a teacher. This had partly been related to the positive feedback they had received from the teachers they had worked with, which had strengthened their desire to become a teacher. The internship had also given them more insight into what teaching is like and relevant experience for their application which, one commented, would make their application stronger and more likely to succeed:

> …*the internship gave me relevant experience and I'm better informed about what it* [teaching] *is actually like. I think my application will be stronger so I think it* [the internship] *will help me get on a course.* [Doing the internship] *made me much more confident about teaching, especially being able to stand up in front of a whole class…It especially helped with my confidence to teach sixth form as I was worried there wasn't much of an age difference.*

One of these interns also mentioned the support being provided by their host school with their ITT application and personal statement, which was much appreciated. The other was undertaking a dissertation on how maths is taught in schools, which had been influenced by their internship and which would draw on the learning from it. One intern reported that they were considering undertaking SCITT at their Paid Internship placement school. The remainder were keeping all options open.

2.8.3 Outcomes for schools

Providers also mentioned a range of school outcomes that had been, or they expected to be, realised including:

- the development of relationships with prospective ITT trainees - *'It's like a long interview'*
- improved quality and *'readiness'* of ITT applicants and, as a result, improved retention: *'This kind of classroom experience is absolutely invaluable because...what everyone is trying to discourage is drop out* [in ITT]'
- increases in maths and physics subject-specialist teachers in the longer term
- increases in female applicants for maths and physics ITT due to the higher than expected proportion of female interns
- *'fantastic role models'* for pupils of young people at university and females studying maths, which could raise their aspirations for studying maths and physics.

One provider also commented on the wider outcomes of the strand through the potential for interns to spread positive messages about teaching: *'We see them as ambassadors who may go back and talk to people who were not interns about how good it was'*. Another suggested that Paid Internships were a better investment than ITT bursaries due to high drop-out from the latter:

> *Paid Internships may be a better investment long-term than the big bursaries to get trainee teachers who become good quality teachers. They* [bursaries] *help get people onto the courses…* [but] *people also do the ITT course but do not then become teachers.*

2.9 Early indications of potential for additionality

2.9.1 Competing initiatives

Most of the providers and all of the participants interviewed were not aware of any competing initiatives providing a similar experience of maths and physics teaching[6]. Those who were able to think of similar initiatives mentioned taster days, shadowing, work-experience undertaken one day a week and the School Experience Programme[7]. However, these options were not considered to result in the same level of understanding of teaching. In particular, interviewees reported that the unique features of the Paid Internships strand are that it:

- is well structured and intensive
- provides a realistic and broad-ranging school experience
- builds strong relationships between interns and schools, which will continue beyond the internship and build students' confidence in applying for ITT
- allows interns to have direct contact with pupils via group work and teaching
- enables contact with parents/carers
- integrates interns into a school, giving them specific responsibilities for which they are accountable.

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[6] Although providers and interns were not aware of it, The Ogden Trust runs a similar internship programme focusing on physics teaching. Teach Physics Internships are aimed at 2nd, 3rd and 4th year undergraduates and last for four to five weeks. Interns receive a training grant of £260 a week.
[7] A 10 day experience of teaching organised by the NCTL which covers all subjects not just maths and physics. It is being upgraded and is not currently available: https://getintoteaching.education.gov.uk/school-experience.

In addition, it was reported that the internship provided a way into busy schools, which were otherwise difficult to get into. Quotations from providers and participants on the uniqueness of Paid Internships are provided in Box 2.5 below.

Box 2.5: Provider and participant views on the uniqueness of Paid Internships

[There is nothing] *so robust and structured which builds relationships between students and schools so significantly* (Provider).

Paid Internships give a powerful glimpse into teaching that cannot be done through other courses…It is superior to a school experience programme because the interns are actually working rather than just observing in school (Provider).

This programme is much less superficial [than other options]. *A four-week intensive block does give a real opportunity for the undergraduates to get a genuine feel and experience of what school life is like* (Provider).

Other internships would only let you do photocopying and admin. This internship lets you get involved with students, to work directly with them. I was even able to contribute at a parents' evening. I don't think I would get the same outcomes from another internship (Participant).

I think the key to me reaching these [outcomes] *has been the suggestions provided by the materials, and by* [the people on] *the programme. I could ask for advice from the Teaching Alliance over email like 'How do you conduct yourself professionally, when do you turn up…?' That was really good external help that I wouldn't have received if I had done a self-organised work-experience. And I wouldn't have had the materials…on what do I look out for in observations, how do I do a lesson plan. Obviously, I could have looked stuff up on the internet, but it was all supplied to me, and explained as well in the two* [training] *days, I wouldn't have had that, that was really good at giving us creative ways to teach* (Participant).

One provider mentioned the Try Teaching Graduate Teaching Internship Scheme (GTIS) but this was not seen to be a competing initiative, as it was much longer (minimum of a term), targeted at students who were already convinced that teaching was for them and did not just focus on maths and physics. Other providers were aware of internships only in other career areas.

2.9.2 Additionality

It is important to note that, as for all other strands, the methodology of this qualitative research was not deigned to robustly measure additionality i.e. what has been achieved that would not have been achieved in the absence of the strand. However, it has been

possible to explore early perceptions and indications of possible additionality, which are reported below.

Most providers felt that participants would not have achieved the same outcomes in the absence of the strand due to the lack of anything similar. However, they reported that it was difficult to gauge at this stage what proportion would apply to ITT who would not have done so otherwise. As one provider commented:

> *We are making an early pitch when undergraduates are hearing about other options and are still open minded. We may help those who may go down another route without really considering all their options.*

Participants were asked what they would be doing to further their career if the Paid Internships strand had not been available. Only one reported that they might have organised their own work-experience in a school. More specifically:

- three reported that they would be working close to home in a shop, pub or as a cleaner during their summer break from university and would not be furthering their career
- four were not sure what they would be doing but thought that they would not be furthering their career
- one would probably be doing a year in employment as part of their course
- one had been considering undertaking an internship in banking
- one had been considering organising work-experience in a school or an internship in engineering.

As one participant interviewee reported:

> [It was a] *really good choice. Possibly more rewarding than any other internship would have been at this time. I wouldn't get that much variety or breadth out of other internships in one profession. I got to experience a lot in four weeks.*

2.10 Summary and next steps

Evidence from the research suggests that Paid Internships are proving successful in providing realistic experiences of teaching, enabling interns to make better informed decisions regarding teaching as a career, and attracting equal numbers of male and female participants. Internships are increasing participants' interest in teaching, though it will be some time before the proportion of participants who go on to apply for and complete ITT can be measured. Key success factors for the strand reported include: the publicising of the strand via universities; offering payment for the internship; the length and intensity of internships which offer an in-depth understanding of teaching as well as

flexibility to meet individual's needs; delivery by experienced providers; and the skills, expertise and time of mentors and other staff in schools.

In terms of areas for development, it seems that no major changes are required and providers are responding to participant feedback and enhancing provision on an ongoing basis. However, the findings from the evaluation suggest that the following could be considered:

- providers would benefit from sharing examples of what works and effective practice in recruitment and delivery and it would be worth considering how this might be facilitated
- in terms of future recruitment, emphasis should be placed on providers collaborating with local universities
- DfE/NCTL should consider if interns could be paid centrally rather than this being a role for schools, or facilitate sharing of effective practice in payment systems
- DfE/NCTL should provide details of MI requirements before providers recruit so that this can be built into the application form and, where appropriate, pre-specified response categories should be used to facilitate ease of data collection and analysis
- DfE/NCTL should require providers to improve the quality, completeness and accuracy of monitoring data. This should include: expanding the data collected; improving the completeness and accuracy of data; enhancing the method of data collection and analysis e.g. through use of pre-coded response categories; and ensuring all necessary data is collected for applicants (to allow for a comparison group design) and for those who withdraw after starting (see section 2.3.3 above)
- opening up the opportunity to final year undergraduates and year two of four-year courses which include a Masters degree
- providing a similar model of internships in others strands such as RTT.

These areas for development are currently being considered by NCTL.

3   Maths and Physics Chairs

Key findings

The Maths and Physics Chairs programme recruits, trains (through School Centred Initial Teacher Training (SCITT) providers) and places PhD researchers as teachers in non-selective state schools.

The provider recruited 55 Maths and Physics Chairs to the 2015 cohort, against a target of 70. As of September 2016, of the 55 recruited, 38 (69 per cent) had progressed to the second year of the strand and the remaining 17 (31 per cent) had withdrawn. Almost all (34) of the continuing Chairs achieved QTS during the 2015 to 2016 academic year, with four Chairs deferring their final assessment. The process evaluation included qualitative telephone interviews with the strand provider and eight strand participants. Interviewees identified that the key strengths of this strand were:

- the salary uplift and research day, which were hugely appealing to applicants
- the ethos behind the strand, of bringing high level maths and physics researchers into schools
- the support of other Chairs.

There are no similar initiatives directly comparable to this strand. Some participants had considered more traditional routes into teaching such as a PGCE. However, the structure of the strand, the salary uplift and time available to undertake research while teaching is not offered elsewhere.

Of the eight Chairs interviewed, four felt they would not be engaged in ITT in the absence of the strand, suggesting the strand had succeeded in recruiting new teachers who might not otherwise have joined the profession.

Chairs experienced a number of issues in relation to:

- the research day being poorly managed by some schools, with time being absorbed by other activities and research often not matching schools' needs or interests
- poor communication regarding the role of Chairs and the aim of the research day
- Chairs being matched to schools in which there was no sixth form - which hampered activities related to widening participation in higher education – and in which their subject specialism was not fully capitalised upon
- lack of power of the provider to influence the schools employing Chairs and SCITTs delivering their training.

The main recommendations for improvement relate to:

- improved communication to providers of SCITT and schools, to ensure they fully understand the aims of the strand and their role
- further guidance to schools to support the effective integration of Chairs
- additional support to participants in performing their role in school

- clarifying how the research day should be used and recorded; and
- improved data collection.

3.1   About Maths and Physics Chairs

The Maths and Physics Chairs strand is delivered by The Brilliant Club, as part of their Researchers in Schools (RIS) programme[8], to recruit, train and place PhD researchers as teachers in non-selective state schools. Its delivery is overseen by NCTL. The Maths and Physics Chairs strand aims to:

- increase the number of highly qualified maths and physics recruits who train to become effective classroom teachers
- increase subject expertise by increasing the number of high-level maths and physics subject specialists in schools
- increase the number of students who progress to A Level and beyond in maths and physics and other STEM subjects, especially girls and pupils in disadvantaged schools, by enthusing, engaging and inspiring students to study these subjects.

For the 2015 to 2016 cohort, the Maths and Physics Chairs strand runs over an initial two years. In the first year, Chairs train as classroom teachers in their host school (through the School Direct Salaried ITT programme) and share their expertise with other schools, whilst continuing with their research and fostering links with business. In the second and third years, they continue their employment as qualified teachers and are also tasked with improving subject expertise in their schools, increasing A Level take-up in STEM subjects and improving university access, especially for girls and in disadvantaged schools. During the third year they have the option of completing the Research Leader in Education Award.

Participants are supported through a structured programme of training, classroom teaching and mentoring, as follows:

- year one: participants work towards gaining QTS, undertaking teacher training for the equivalent of one day per week, working in school three days per week and using one day per week off timetable to work towards the RIS aims[9] and undertake research

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[8] The RIS programme is the 'parent' teacher training scheme offered by The Brilliant Club within which the Chairs strand sits. RIS offers additional subject areas to the Maths and Physics Chairs strand including modern foreign languages (MFL) and chemistry.
[9] The RIS aims are to:

- year two: as a qualified teacher, participants complete their NQT year in their placement school, with approximately 16 hours teaching over four days per week
- year three: participants have the option to continue to work in school and can undertake the Research Leader in Education Award - a professional qualification developed by RIS to equip participants to develop their education research skills and deploy them in schools.

3.2 Methodology

As part of the process evaluation, undertaken in June and July 2016, qualitative telephone interviews were conducted with the strand provider and eight strand participants of the 38 on the strand at the time, all of whom were undertaking their first year of the strand. In terms of subject specialism, two were focussed on teaching maths and six on physics. Three interviewees were female and five were male; six were aged between 26 and 35 years old and two were aged between 36 and 45 years.

Participant interviewees were followed up in September and October 2016 to explore any further impacts and their current intentions regarding teaching as a career. Of the eight original interviewees, six returned a follow-up questionnaire or took part in a short telephone interview.

3.3 Progress to date

3.3.1 Progress to strand targets

The Maths and Physics Chairs strand was launched as a small scale pilot in 2014 as part of "Your Life" – a joint industry/government campaign to help increase the supply of engineers, scientists and computer scientists. The first Chairs took up positions in schools in London in September 2014. The strand was expanded across the country as part of the MPTSP programme. This process evaluation focused on the 2015 cohort (i.e. the cohort starting the strand in September 2015). Table 4 below provides further details on recruitment for this cohort.

- increase and disseminate subject expertise by increasing the number of high-level subject specialists in non-selective state schools
- promote research by utilising the unique skill set of researchers through a bespoke teacher training programme that develops the research skills of both pupils and teachers, with a focus on independent enquiry, evidence-based teaching and action research
- champion university access by promoting researchers as in-school champions of higher education, who support access to universities for school pupils in more disadvantaged areas.

Table 4 Recruitment data – 2015 cohort (September 2016)

Target	Recruited	Withdrawn	Progressing to Year 2 of the strand
70	55	17	38

The strand providers recruited 55 Maths and Physics Chairs to the 2015 cohort, against a target of 70. As of September 2016, of the 55 recruited, 38 (69 per cent) progressed to the second year of the strand and the remaining 17 (31 per cent) withdrew. Almost all (34) of the continuing Chairs achieved QTS during the 2015 to 2016 academic year; four Chairs have had their QTS final assessment deferred.

Of those who withdrew, five achieved QTS during the 2015 to 2016 academic year and one is continuing in teaching outside of the strand.

3.3.2 Characteristics of Maths and Physics Chairs participants

The MI dataset was analysed to identify the characteristics of the 38 Chairs continuing to Year 2 of the strand. Table 5 below illustrates the breakdown of participants by subject specialism and gender. For the 2015 cohort, the strand had 15 females and 23 males. Although a greater number of men were recruited than women, analysing the data from a small sample size of 38, it is not possible to draw any solid conclusions in terms of recruitment in relation to gender. In addition, the gender information for withdrawals was not available through the MI so it is unclear at this stage whether there is any gender weighting in terms of the frequency of withdrawals.

Of the 15 female Chairs, four were teaching maths as their subject specialism and 11 were teaching physics. Of the 23 male Chairs, 12 were teaching maths and 11 physics. As is evident, a greater proportion of women were engaged in physics teaching, whereas the men were more evenly split. Overall, the split between the two subjects was 16 Chairs teaching maths as their subject specialism and 22 Chairs teaching physics.

Table 5 Breakdown by gender and subject specialism - 2015 cohort participants continuing to Year 2 (September 2016)

	Mathematics	Physics	Total
Male	12	11	23
Female	4	11	15
Total	16	22	38

The MI recorded the undergraduate universities at which the Chairs had conducted their original degrees. These included Russell Group universities (including the University of Manchester, the University of Liverpool, Kings College London, the University of Cambridge and Durham University), newer universities (including Sheffield Hallam University, the University of Bradford and the University of Bath) and overseas universities.

3.3.3 Monitoring and internal evaluation

Quality and accuracy of monitoring data collected

The quality and accuracy of the monitoring data was explored as part of the evaluation. For the 2015 cohort, the data collected included name, subject specialism to be taught in schools, email, gender, undergraduate degree title, undergraduate degree university, Master's degree title, and PhD thesis title. This light-touch data collection allowed for analysis of participants' gender, subject specialism, undergraduate subject, and university of study, as reported above in section 3.3.2.

From 2016 onwards, data is also being collected on age, nationality, ethnicity, A Levels A*-C achieved and undergraduate subject area, in addition to the categories utilised in 2015. This will allow for a broader analysis of participants' characteristics. Further improvements could be made to data collection to include:

- information relating to withdrawals including gender, age, nationality and reasons for drop-out
- university/organisation with whom they are working to undertake their personal/academic research, and the first part of their school postcode. This would allow analysis of the distance required to travel to complete their research day, if used in this way
- data on use of the day off timetable
- data on rates of participation in the subsequent leadership programme in Year 3
- Teacher Reference Number (TRN) once participants have one – this will be essential to track participants' progression and retention in teaching using administrative datasets.

3.4   Recruitment

3.4.1 Recruitment process

The Brilliant Club - the organisation contracted to deliver the strand - stated that, despite issues around numbers of maths and physics graduates entering teaching in general, recruitment to the strand had been positive at that point (April 2016) stating that '…*It's a*

landscape of difficulty in terms of teacher recruitment, but we are finding we are getting the numbers applying so it's really for us to convert those numbers and make sure it is successful'.

Six of the eight Maths and Physics Chairs participants interviewed stated that they had already been considering teaching before they applied to the strand. This group had first encountered the scheme while researching possible teaching routes either online or via a 'teaching.gov' mentor. Four of the eight had also applied for (and, in some cases, been accepted onto) a different route into teaching in addition to the Maths and Physics Chairs strand. For the two who had not previously considered teaching, one participant *'stumbled on it by accident'* while exploring the jobs.ac.uk website, while the other found out about the strand while undertaking general job opportunity research.

3.4.2 Reasons for participation

Reasons for applying for the Maths and Physics Chairs strand for all eight participants were linked to the scheme's salary uplift and the opportunity to complete one day a week of research, as these participants indicated:

> *This programme seemed perfect because it was specifically for post-docs, the salary was higher and I got a research day.*

> *I applied for other routes, I was offered places on PGCE and Schools Direct, but chose this route because of the money.*

> *Maths and Physics Chairs has the salary uplift, which was very attractive.*

All of the participants interviewed had been undertaking salaried post-doctoral work prior to applying to the strand. This meant none of the sample had applied for the strand immediately following the completion of their PhD. This may have influenced the decision to apply for the salaried Maths and Physics Chairs strand over other options, in order to maintain some level of income consistency.

3.4.3 Drop out

As discussed in section 3.3.1, 17 out of 55 participants (31 per cent) who started the strand withdrew by the end of the first year of the three year programme. It was not in scope of this evaluation to interview participants who withdrew, so the report does not draw any firm conclusions with regards to reasons for withdrawal. Additional interviews with some of those who withdrew would help to build up a useful picture of why participants felt the strand was no longer appropriate for them. Some of the problems experienced by participants, which may have motivated others to withdraw, are reported in section 3.7 below.

3.5 Content and delivery

3.5.1 About the deliverer(s)

The Brilliant Club is a non-profit organisation founded in 2011, which aims to widen access to highly-selective universities for pupils from under-represented groups. It runs a number of programmes including 'Researchers in Schools' (RIS)[10] (to which the Chairs strand is linked) and the Scholars Programme. The Scholars Programme employs doctoral and post-doctoral researchers on a part-time basis to deliver programmes of academic enrichment to small groups of pupils.

3.5.2 Model of delivery (for the 2015 cohort)[11]

This strand recruits post-doctoral maths and physics researchers to train as teachers. The delivery model includes two compulsory years - one year of school-based ITT, followed by a further year in school as a NQT. There is also an optional third year in which Chairs can complete leadership training whilst continuing to teach. An "uplifted" salary is paid for all of these three years.

The training Chairs undertake during the first year is via the School Direct salaried route[12]. This includes the equivalent of one day per week undertaking ITT training with a regional SCITT provider[13]. In addition to this, The Brilliant Club provides bespoke training focussing on ways in which the Chairs can champion access to university.

During this first year, the remaining four days per week were split as follows: Chairs spend the equivalent of three days per week in school, while working towards the acquisition of QTS and one day per week on research. The Chairs are required to teach classes, devise lesson plans and shadow other teachers during the three days, all under the direct supervision of their school-based mentor.

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[10] For the 2015 to 2016 cohort, the scope of the RIS funding was broader than maths and physics and covered 'priority subjects'. RIS branding was used for Maths and Physics Chairs and the strand was regularly referred to as RIS by the participants interviewed.
[11] For the 2016 cohort (and beyond) the third year of the programme is compulsory and no longer an optional addition.
[12] School Direct (salaried) courses normally take a year to complete and participants are employed directly by schools.
[13] The SCITT programme is a route into teaching which allows participants to undertake training within a school environment.

In year two, the Chairs complete their NQT year while continuing with their one-day-per-week research. The third and final year is optional for the 2015 cohort and participants can undertake the Research Leader in Education Award[14] during this year.

A unique feature of the strand is the one day a week off timetable, which Chairs can use to undertake further personal/academic research, deliver activities to support pupils' access to university and work with other teachers. Two universities, Southampton and King's, supported the strand for the 2015 cohort by providing time, space, facilities and research support to the Chairs on their research days. The aims of the strand are broader than others, aiming to produce wider benefits from these very highly qualified individuals, not only to provide high-quality teaching, but also to improve pupil progression, provide support for other teachers and, in the longer-term, improve leadership in their subjects.

3.5.3 Participants' experiences of the strand

All participants interviewed reported some positive aspects of the strand, namely:

- the strand's principles and aims in reference specifically to:
  - the championing of university access for disadvantaged pupils
  - the opportunity to bring current research practice into the classroom
- working as teachers, and specifically gaining hands on, in-school experiences
- the provision of the research day.

The quotations below in Box 3.1 illustrate the positive feedback provided.

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[14] A professional qualification developed by RIS that aims to equip participants to develop their education research skills and deploy them in schools.

The strand's principles and aims

I'm very passionate about the programme and the aims. It's definitely in line with my own thinking.

I think it's a really great idea. I wanted to explore this programme when I first heard about it, it seemed to be almost too good to be true – I would get to gain teaching qualifications while continuing my research and also bring that research back into the classroom.

Working as teachers

I think I'm having real success as a teacher…the programme has made me aware of the skills I can bring into teaching.

It's been hard and I've had to be really resilient and push through but I think I am a better teacher for it.

The provision of the research day

The real appeal to me to apply in the first place was the research day. I think its best suited to a person with a PhD because of the research day.

It was the salary and the research day that appealed to me.

3.6   Strengths and success factors

All interviewees were positive about some aspects of the scheme, including identifying a number of key strand-level and personal success factors, which had enabled them to get the best from the experience. These are shown in Table 6 below, and expanded upon in the following sections.

Table 6 Key strand-level and personal success factors

Strand factors	Personal factors
• The research day • Belief in the ethos behind the strand • The support of fellow Chairs • The salary uplift (attractiveness of offer) • Strand mentor support	• Family support • Resilience and perseverance • Previous teaching experience at university level

3.6.1 Strand factors

The research day

There was significant praise in relation to the opportunity to continue conducting academic research one day a week, be that within a maths/science field or undertaking specific educational research: '*The research day allows you to have one foot in teaching and one in research which gives you the flexibility to try* [teaching] *out and see if it's for you*'. For most, this day a week had been useful in enabling participants to maintain a focus on research alongside teaching.

Support for the ethos behind the strand

A number of those interviewed discussed the concept of the Maths and Physics Chairs strand and its overall mission. It was commended for:

- its purpose and wider aims including placing research trained staff in schools
- allowing research minded individuals to maintain their research
- encouraging the spread of expertise within schools
- the expectation that time will be spent on widening participation activities in relation to higher education to encourage more pupils to explore university as a future option
- the way the training has impacted on teaching skills.

The thinking and ethos behind the strand as a way of bringing high-quality research into the classroom was a strength reported by four participants, as set out here by The Brilliant Club, and three of the interviewees:

> *As a programme with a very clear social mission around university access, and mobilising researchers to share their passion and knowledge with pupils under-represented at top universities, this is different to other ITT routes. We also attract a unique type of candidate into the profession, who are able to make an impact in ways outlined above* (Provider).

The aims of RIS are inspiring. Even though it's been hard I know I'm trying to do a good thing (Chairs participant).

I am a fan of this programme…it completely changes the way you impart knowledge (Chairs participant).

The support of fellow Chairs

The majority of participants also cited their fellow Chairs as an extremely positive source of support, reporting a sense of camaraderie. Some suggested that without the support of other Chairs they might have withdrawn from the strand during their first year.

The attractiveness of the offer to new recruits

The appeal of the research day and the salary uplift is evident, and as described in section 3.4.2, all eight participants cited the scheme's salary uplift and/or the opportunity to complete one day a week of research, as key factors in attracting them to the strand.

The support of the strand mentors

A number of Chairs mentioned the support provided by the strand mentors (staff within The Brilliant Club organisation) as being a source of much valued encouragement and information:

The mentors have been great; they've been able to answer questions as we go along (Chairs participant).

3.6.2 Personal factors

For a number of Chairs, the support of family members was cited as a personal factor supporting success. As with many teacher training programmes, some participants had found the leap into the classroom difficult at times and had turned to family for reassurance and support:

I don't think I could have done this without my partner (Chairs participant).

In addition to family support, some interviewees felt a degree of inner resilience had been required to get through tough times experienced inside and outside of the classroom. Perseverance was also mentioned as a personal trait required completing the strand, as these observations indicate:

I'm not going to lie, at times this has been tough and I've really had to dig in (Chairs participant).

For me it's been a case of 'if at first you don't succeed', I've had some difficult lessons over this last year and I've needed to go back to the drawing board and improve (Chairs participant).

Previous teaching experience within a University setting was also cited as a personal factor supporting success on the strand, however, it was also clear that for some it was difficult to compare the two, as school students had been a very different kind of audience:

I think having taught in uni got me interested in teaching in the first place but this is vastly different, more different than I'd ever expected to be honest (Chairs participant).

3.7 Learning and areas for development

Despite the positive aspects of the strand, a number of issues were raised by participant interviewees as detailed below.

The research day

The off-timetable research day resulted in challenges for a number of participants. Some reported that this day could get absorbed into meeting school deadlines, with time spent planning, marking or running extra-curricular activities. In addition, the work undertaken on the research day was varied, as indicated below, and some felt badly managed by schools. There was no expectation for Chairs to share their research with staff in their schools, so a number of interviewees mentioned that it would be possible to not do any research on that day and have a '*day off*' and that this would go '*unchecked*'. It was also felt that there was some confusion over whether Chairs were expected to be doing research in their specialist subject (i.e. maths or physics) or broader educational research. There was also a potential mismatch between the Chairs' chosen research areas and the research interests/needs of the schools themselves. In future, there is scope to have the Chairs and in-school mentors working together to identify a research area that would benefit the school.

There were further concerns regarding the use and location of the universities engaged in providing support and facilities for research (Southampton and King's) both of which were in the south of England. It was felt that, for those participants based in regions beyond London and Southampton, travel would be an issue particularly if practical scientific research such as applied physics required lab time. As it stands, if there was such an expectation, then the strand may require a wider range of university institutions covering more regions.

Communication problems

Nearly all participants discussed problems they had encountered regarding communication with their school by both the SCITT and The Brilliant Club. In particular, it was felt that the strand had not been properly explained to the school by either The Brilliant Club team or the SCITT providers at the outset. This had led to confusion in schools as to the role and level of experience of the participants, as this comment illustrates:

> *The communication hasn't been brilliant. I'm not sure where the communication broke down…our professional mentor doesn't have a clue what's going on* (Chairs participant).

As mentioned above, there were also some issues raised in regards to the communication of the purpose of the research day to the schools. A number of interviewees mentioned having personally encountered instances of teacher *'resentment'*. It was felt that, because the schools did not understand the strand, the teachers were resentful that these individuals were being paid more than many colleagues and only working what could be perceived as a three-day week in school. In fact, the strand requires Chairs to teach in school for three days a week, with one day conducting their research and a further day undergoing training, thus amounting to a full five day week. A number of interviewees stated, however, that this structure had not been communicated to their school and, as such, colleagues in school were misunderstanding the participant's working week which in some cases led to resentment. A typical comment was:

> *I don't think the school really know what the research day is for, they just see it as a day off – that's been the hardest part* (Chairs participant).

The schools allocated

A number of participants raised issues regarding the schools they were placed in. One such issue related to the age range of the pupils being taught, where a Chair had been allocated a school without a sixth form. In this instance, the interviewee felt that the school was mismatched with the aims of the strand. Participants are required to spend time exploring higher education opportunities with pupils and, in this case, the interviewee felt that doing so was difficult due to the age of the pupils:

> *They placed me in a school without a sixth form and I was expected to get the children to think about university and, in my opinion, this was a step too far, it wasn't even on their radar. I think RIS needs to be placing people in schools with sixth forms or even in colleges so that we're talking to kids thinking about university rather than Year 7s* (Chairs participant).

Another participant faced an issue in their placement school related to high staff turnover in the science department: 'S*tarting next week I will be the second longest serving science teacher'.*

Finally, another interviewee discussed the way the science department had under-utilised their subject specialism as being a source of frustration:

> *I wasn't utilised correctly or in a way that I had been to lead to believe I would be. I was a physicist in a school without physicists and they didn't make the most of that at all* (Chairs participant).

Issues regarding 'power' and influence

The final emerging issue is that of 'power', which was raised by a number of the interviewees. Most interviewees described The Brilliant Club team as 'supportive' but felt that this support was undermined by the lack of influence to make any changes in the way SCITTs and schools worked with the Chairs. As part of the Maths and Physics Chairs strand, the SCITTs worked in conjunction with The Brilliant Club to provide teacher training and development. This, for some, caused issues relating to influence and confusion over roles and responsibilities:

> *Between the school, RIS* [i.e. The Brilliant Club] *and the SCITT, it is unclear who is actually in control; there is no power to overrule the school or SCITT. The contract comes from the school and the SCITT are in control of the training - I thought RIS were in charge but I'm not sure, they didn't really have any power - I think overall it was probably the school. I think RIS tried their very best, they were very supportive, but they lacked the power when needed* (Chairs participant).

> *RIS have always been reachable and talked me through my options but they haven't directly been able to influence much - they are aware of it and supportive - but I have felt alone* (Chairs participant).

> *RIS were very supportive but there was definitely a power issue…they didn't have the power to overrule the school or the SCITT* (Chairs participant).

For those interviewees who had experienced problems with power and influence, few suggested solutions and most saw it as an unfortunate side effect of the strand's managerial structure (with employment being provided directly by the school). It was recognised that the strand providers offered as much support as they could, but lacked a sufficient level of influence over school-based decisions relating directly to participants. It is important to note here that, for this study, views of schools and SCITTs were not obtained, as discussed in sections 3.8.3 and 3.10 below.

3.8 Outcomes

3.8.1 Participants' future intentions

When interviewed in June and July 2016, seven out of the eight participant interviewees were planning to complete the second year of the strand, but subsequent intentions were unclear for each of the interviewed participants. This was due, in part, to the new contract negotiations that would need to be undertaken after their final year on the strand[15] with their current school (if their school wanted to keep them and if they indeed wanted to stay at their current school) or with a new school. There were concerns over whether a new contract would match the current salary and whether time could still be allocated for research. As a result, the majority of participants could not say with certainty whether they would be staying in teaching in the longer term:

> *I'm still thinking about* [the future], *I'm glad I chose to do this but only time will tell whether I stay in teaching* (Chairs participant).

> *I have another year so I will have to see…at this stage, yes, I am committed to teaching but it has to be a long-term commitment to teaching, I will see how it goes next year. I will have to see if the school wants to keep me after two years and what salary they are going to offer me* (Chairs participant).

> *The school want to keep me on but having one day to do research makes me a very expensive teacher per lesson I teach. I believe that teachers should be involved in research but if schools aren't buying into that then it's dead in the water – that's the difficulty I face* (Chairs participant).

Some guidance for participants, and their employing schools on next steps after the Maths and Physics Chairs strand, may be of value, since even those who wished to remain in teaching were unclear how this would work in reality.

One interviewee was planning to leave the strand (and teaching) to return to work for a previous employer. This participant did not feel that the strand had offered them what they had anticipated and although very positive about the concepts and philosophy behind the strand, they felt the implementation had not been '*fully effective*'.

The Brilliant Club offer a third year of the Maths and Physics Chairs strand that focuses on educational leadership. While the strand website states that Chairs continuing into a third year of teaching will be eligible for the '[Research] *Leader in Education Award…an*

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[15] For the 2015 cohort, they could choose to complete the strand at the end of year 2, which would mean that if they wish to stay in teaching and stay at their allocated school they will need to begin contract negotiations during this second/NQT year.

innovative professional qualification that equips participants to develop their educational research skills and deploy them within schools' only two out of the eight participants mentioned that they were considering this third year award. They did so with a degree of uncertainty as to whether they would pursue it, or whether it would achieve the outcome of supporting their move into a leadership role, as these remarks indicate:

> *There is an extra optional year of leadership training - I'm not sure how practical that is, it seems odd that they think we can be leaders in three years. I think that's very optimistic* (Chairs participant).

> *I would consider the RIS leadership course but not if I have to stay in this school. I'm unsure how the programme works in that regard (Chairs participant).*

In September and October 2016, six Chairs responded to a request for a follow-up interview or returned a short proforma. Of these six, one had withdrawn from the strand stating that the experience had been *'difficult'*. This interviewee suggested that they may have remained in teaching but their time as a Chair had '*made it impossible to consider teaching at this point*' and that '*the communication between RIS and my school had been insufficient*', as they elaborated further below:

> *I think the programme could have been so much better. If the school had just known more about it my life would have been so much easier…even my mentor in the school didn't fully understand the programme and used to tell me dealing with me was 'a massive pain' because of all the extra paper work it seemed to involve…I had colleagues saying I wasn't giving as much as other colleagues because I was only there three days a week and everybody referred to my research day as my 'extra day off'…that was really demotivating and I honestly think it would of all been so much better if the school just understood the programme* (Chairs participant).

The other five participants who responded to these follow-up questions were all still part of the Maths and Physics Chairs strand. When asked how they were feeling in regards to their careers in teaching maths or physics, responses were mixed but generally positive:

> *Very tiring and demanding but can still be rewarding. I do still feel I am having an impact on a large number of students' lives. I still have a lot to learn regarding teaching and I wonder if progress in the quality of my teaching seems to be very slow at the moment* (Chairs participant).

> *A bit unsure, but mostly positive. I don't want to spend my whole career in the classroom but I feel I'm learning a lot about the education sector at the moment* (Chairs participant).

I feel it is going well, making progress and enjoying it. Achieving QTS was a very proud achievement (Chairs participant).

At follow up, all five intended to complete the Maths and Physics Chairs strand and four of the five stated that they were considering completing the third year Research Leader in Education Award, with the remaining participant 'unsure'.

A few issues were raised at this follow-up stage, relating to opportunity to teach their specialism, and communication/organisational issues:

School refuses to let us teach our specialisms as they say they cannot timetable it. I have witnessed other non-physics science teachers teaching physics, and it's frequently awful (Chairs participant).

At the moment, the RIS course is not being described very clearly and is in a very infant stage. I am unsure I would want to spend another year if things are not properly organised (Chairs participant).

Despite these issues, respondents also reported positive experiences:

I like the benefits brought about by being a researcher in school and, therefore, plan to complete the third year of this programme. I think completing the third year of the programme would put me in a very good position to further my teaching career after year 3 (Chairs participant).

School has recognised my ability that has come from research. [I] have been given lead role on post-16 course and have had input on implementing behaviour policy into a programme called class charts (Chairs participant).

Finally, in terms of whether they would be pursuing future careers in teaching responses were mixed:

Not sure. It's likely I will continue in education, but I have not decided whether to aim for school leadership, try to work in an education wing of a company, or try more educational research (Chairs participant).

Depends on the school and whether they have openings once [my] contract expires so cannot really answer this question at this stage (Chairs participant).

Yes, I enjoy teaching as a profession and can see myself staying in a teaching career (Chairs participant).

3.8.2 Impact on skills

A number of the participants interviewed described the strand's impact on both specific teaching skills (including 'classroom management', 'lesson planning', 'relating to young people' and 'teaching methods') and more general transferable skills (including time management, patience, resilience, perseverance, content delivery and confidence):

> *Working with the kids here has definitely made me a more patient person* (Chairs participant).

> *I have grown in confidence massively* (Chairs participant).

3.8.3 Outcomes for schools

The focus of this initial evaluation was on the experiences of the participating Chairs. If subsequent research is undertaken, it is important that the views of schools and SCITT partners are sought, to draw out their experiences and outcomes.

3.9 Early indications of potential for additionality

3.9.1 Competing initiatives

There are no initiatives that can be directly compared to the Maths and Physics Chairs strand. Some participants had considered more traditional routes into teaching such as PGCE. However, the structure of the strand, the salary uplift and the opportunity to undertake personal research while training is not offered elsewhere. This remains a key strength of the strand.

3.9.2 Additionality

It is important to note that, as for all other strands, the methodology of this qualitative research was not designed to robustly measure additionality i.e. what has been achieved that would not have been achieved in the absence of the strand. However, it has been possible to explore early perceptions and indications of possible additionality which are reported below.

Participants were asked what they would be doing if they were not currently participating in the Maths and Physics Chairs strand:

- four thought that they would be continuing in academia and teaching on undergraduate programmes and supervising post-graduate students
- two reported that they would be pursuing teaching through a different avenue such as a PGCE

- one was withdrawing from the strand and returning to their previous employer
- one was unsure.

The Maths and Physics Chairs strand offers schools an opportunity to interact with the wider research community by placing research active individuals into the classroom as teachers. For the participants interviewed, this was something that they felt set the Maths and Physics Chairs strand apart from other teacher training opportunities. Some Chairs felt that their doctoral studies allowed them to explore research techniques with pupils in a new way that they may not have experienced previously:

> *I think I've got a lot of insight when it comes to doing project work and trying to solve problems - that's what I've been doing for years now* (Chairs participant).

> *There has been some opportunity for me to share my own research with colleagues in school, not a great deal of time, but some. I want to make sure what I'm telling them is really relevant though because I want to make a difference and not just waste their time* (Chairs participant).

For one Chair, in particular, the influence they have had in school related specifically to gender:

> *I have worked a lot with some of the older girls in school and I have been told that I have made a difference to the way they think about science now which is really great.* (Chairs participant).

3.10 Summary and next steps

Interviewees identified that the key strengths of this strand are:

- the salary uplift and research day, which are hugely appealing to applicants
- the ethos behind the strand, of bringing high level maths and physics researchers into schools
- the support of other Chairs.

However, participant interviewees suggested a number of areas for improvement:

- communication: the schools need to be better informed about the purpose of the strand and the experience level of the participants so that they can better support them, utilise their skills and avoid potential resentment from other teachers
- power and influence: The Brilliant Club needs to consider its role in terms of influence and to what degree they can support participants who find themselves in difficult situations with either the schools or the SCITT. Clarity over power and improved communication between the participants and The Brilliant Club would

also reduce the likelihood of participants being pressed to use the research day for school tasks such as planning and marking

- use of time: activity undertaken during the research day should be better recorded to ensure all participants are getting the opportunity to undertake useful research (as deemed useful by both the Chair and their school) and to share findings (particularly when participants are completing educational research, as interviewees felt sharing educational research findings with other Chairs would improve teaching and educational understanding for all participants and this learning could have a positive impact on the classroom).

The evidence from the evaluation suggests that NCTL and the Brilliant Club should consider the following enhancements to the strand:

- ensure that SCITTs and schools are committed to the strand and clear about their roles, and that the schools share aims and objectives with relevant staff (e.g. managers and colleagues of Chairs) to ensure that the strand is fully understood and accepted and Chairs can perform their role effectively. This requires improved communication and could include developing or refreshing a shared memorandum of understanding and a set of Key Performance Indicators, including in relation to:

  - the role of Chairs in terms of class teaching, raising pupils' aspirations for university study, curriculum design, university/employer links and teacher professional development so that the range of benefits for the school are understood and shared
  - much clearer understanding by all involved on the expected aims of the research day, including making sure the research: links to school priorities; is of benefit to the school; is shared with others; is understood by, and useful for, teaching staff

- ensure clarity amongst all those involved in the Maths and Physics Chairs strand in relation to mapping the career path beyond the three years of the strand, including the expected future employment and role of 'post-Chairs', to support retention of Chairs both within the three years and beyond. This could include guidance, provided for participants, and their employing schools, on next steps after completing the Maths and Physics Chairs strand

- review the spread of universities participating in the strand across the country to ensure all participants have easy access to an institution or other organisation which can support their research.

NCTL should also consider:

- gathering data from host schools and SCITTs to explore the issues relating to communication, power and authority from their perspective, and to explore views on the effectiveness of Chairs and their impacts on teachers and pupils

- gathering additional MI to provide a fuller set of data on participating Chairs and those who withdraw after starting. For the 2016 to 2017 academic year, the strand provider is collecting a broader range of information which could be analysed to further understand the characteristics of both active participants and those who start the strand and then chose to withdraw. MI data collection should be augmented to include additional data as outlined in 3.3.3 above
- analysing the characteristics of those who do not complete the Maths and Physics Chairs strand and their reasons to support the development of strategies to improve retention
- gathering objective and/or independent data on the achievement of the wider objectives of the Maths and Physics Chairs strand such as exploring: impact on A Level STEM uptake by pupils and widening university participation; number and impact of CPD sessions delivered by Chairs; the impact of research; and impact on school-business links
- gathering evidence of the impact of their research on schools. This could be gathered by a combination of MI data and as part of any subsequent evaluation of the roll out programme
- in the context of the early difficulties in recruitment, retention and strand experiences highlighted in this report, placing a focus in any future evaluation on exploring these issues, for example by examining cost, recruitment and retention data, ideally compared with other routes at similar stages of development/implementation alongside alternative ways of gaining highly qualified input to schools such as placement, mentoring or STEM Ambassador schemes.

These areas for development are currently being considered by NCTL.

4   Return to Teaching (RTT)

Key findings

The RTT strand aims to support teachers who are not active in the state funded sector to return.

As of the end of September 2016, 63 returners supported by the strand had been successful in securing teaching jobs in state-funded schools, above the target of 50 for the academic year 2015 to 2016. The two Return to Teaching Advisors (RTTAs) who were in post in the 2015 to 2016 academic year supported a total of 541 eligible returners up until the end of September 2016, indicating a conversion rate of 11.6 per cent of eligible returners who have gone on to secure a teaching post. The process evaluation included qualitative interviews with one RTTA and ten participants who had received support

Almost all interviewees were positive about the advisory support they had received, praising the:

- prompt contact
- useful advice on courses
- general careers advice, which included skills audits, application advice and interview preparation.

However, many reported difficulties with the pre-existing provision (not funded by RTT) to which they had been signposted by their RTTA. Interviewees struggled to obtain classroom experience or mentoring support from schools, particularly if they were not also engaged in TSST. They also noted the variable quality and suitability of pre-existing courses and resources.

Of those interviewed, one of the ten had successfully returned to teaching by securing a permanent teaching post (reflecting the overall conversion rate); they had received support from RTT and TSST, but also felt that luck had played a part. Two more returners had secured temporary teaching posts.

Although returners interviewed were aware of some pre-existing sources of support, they were of the view that there were no or few other competing signposting and support services available to meet their needs: none of those interviewed mentioned the alternative school-based Supporting Returning Teachers (SRT) pilot, nor commercial/return to teaching fee paying services.

Recommendations for improvements include:

- consider ways for providing placements for potential returners
- source/provide courses with more integrated classroom experience/observations and the opportunity for a reference

- incorporate a promotion and brokering role with schools
- improve marketing messages to better manage the expectations of returners about the support offered.

4.1 About Return to Teaching

The RTT strand aims to support teachers who are not active in the state funded sector to return. Participants could currently be in a variety of circumstances, including not working at all, working in other fields or teaching in the independent sector. They are offered one-to-one support to return to teaching maths and physics in state-funded schools. Potential returners make contact with, or are put in touch with, an RTT advisor (RTTA). (At the time of the research, there were two RTTAs. See section 4.5 for more details.) RTTAs make an initial assessment of enquirers to see if they are eligible for support. If so, they identify individual needs and then - dependent on what is available - they can provide some support themselves (for example by email and phone) and direct participants on to other pre-existing support, as outlined below. Please note that this other pre-existing support is *not* funded as part of the RTT strand. Once a returner is ready to apply for jobs, advisors will help them find vacancies, prepare applications and prepare for interview.

The RTT strand is part of a wider 'Get into Teaching' initiative which includes specific provision and greater support to inactive teachers of English Baccalaureate (EBacc) subjects, particularly languages, who wish to return to the profession. In the 2015 to 2016 academic year, there was also a separately funded school-led Supporting Returning Teachers (SRT) course being piloted, which some returners chose to switch to and in so doing were released from RTT.[16] However, within the MPTSP, the RTT strand is unique as it is the main route for returners to re-enter the profession to teach maths and physics.

4.2 Methodology

As part of the programme process evaluation, qualitative telephone interviews were conducted in June and July 2016 with one provider (an RTTA) and ten randomly selected

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[16] The school-led SRT course (also called the RTT pilot programme) was piloted in 60 lead schools in the 2015 to 2016 academic year. This was designed to provide school-based tailored support to qualified teachers of EBacc subjects who are currently not working but wish to return to teaching. During the year, 41 maths and physics returners who originally registered with the advisor-led RTT strand were released to the SRT course to be funded and supported through a participating school. Registrants to the NCTL's returner's database were also able to search for participating schools online and join directly.

teachers who had received some support from the RTTAs during the 2015 to 2016 academic year.

Returner interviewees

Of the ten returner interviewees, five were men and five were women. Six were focused on maths and four on physics. Half of the interviewees were also enrolled on Teacher Subject Specialism Training (TSST), three in maths and two in physics (see Table 7).

Table 7 Characteristics of interviewed returners

Gender profile of all interviewees		Age profile of all interviewees	
Female	5	26-35	1
Male	5	36-45	4
		46-55	5
Total	**10**	**Total**	**10**

RTT subject profile		Subject profile of RTT interviewees who attended TSST	
Maths	6	Maths	3
Physics	4	Physics	2
Total	**10**	**Total**	**5**

Time spent out of teaching varied across the group, from four to 20 years, reflecting the group's range of training, background and career profiles. Four interviewees were maths or physics trained, although one had not subsequently taught at all after completing ITT. Three had trained to teach in another science or had general science teaching experience. Two returners had science PhDs, whilst three were former teachers of other subjects (RE, PE and ICT - two of whom had physics or maths A Levels, one did not). Their reasons for leaving teaching (or in the case of one returner, not starting) were related to: career breaks to care for children or other family members; ill health; choosing to pursue other careers or training; or a combination of these over several years or decades.

Interviewees were at different stages of the return process. At the time of the interviews, three were in temporary teaching posts, two were in teaching assistant (TA) roles and two were doing supply teaching. Others were caring for family/not in paid work, working in another field and one person had already secured a permanent full-time teaching post following engagement with RTT.

Participant interviewees were followed up in September and October 2016 to explore any further impacts and their current intentions regarding teaching as a career. Of the ten

original interviewees, nine returned a short follow-up questionnaire or took part in a short telephone interview.

Given the small sample size, it is important to note that most of the interviewees were supported by just one of the two RTTAs. Therefore, these findings are not generalisable to all strand participants, but are likely to be indicative of the wider issues RTT recruits are facing in seeking support to return to the profession.

4.3. Progress to date

4.3.1 Progress to strand targets

The RTT strand target for the number of returners securing a teaching post by the end of September 2016 was 50 (this included returners who had successfully gained employment during the first year of the strand in the 2014 to 2015 academic year). As of 30th September 2016, 63 teaching applications submitted by returners supported by the strand had been successful, overshooting this target. Of these, 14 had successfully gained employment in the summer term of 2015 but, due to the way in which targets were originally agreed, these were included cumulatively as part of the first full year's target figure for 2015 to 2016.

The two RTTAs who were in post in the 2015 to 2016 academic year supported a total of 541 eligible returners up until the end of September 2016 (including those supported in 2014/15), indicating a conversion rate of 11.6 per cent of eligible returners who have gone on to secure a teaching post. Although the numbers being supported rose steadily throughout the year, by July those indicating that they did not intend to return in September increased substantially (to nearly 60 per cent of those being supported at that point), indicating the reduced potential for conversion at this stage.

It should be noted that those returners supported during the 2015 to 2016 academic year but not yet employed may still return to teaching at some stage, indicating the conversion rate could improve as time goes on.

4.3.2 Characteristics of Return to Teaching participants

Monitoring and internal analysis

Overall data on numbers supported and successful is presented in 4.3.1.

Looking at differences by subject, analysis of monitoring data provided by the strand manager and RTTA shows that two-thirds of the eligible returners supported between 2014 and 2016 had been seeking maths posts, with one third focusing on physics. The number who applied for teaching posts and were successful in the 2015 to 2016

academic year varied slightly for maths and physics: of those who applied for physics posts, 53 per cent were successful, with a 43 percent success rate in maths.

The gender balance of supported returners in general was 60 per cent female and 40 per cent male. However, a slightly higher proportion of women went on to secure employment, with 44 of the 63 successful returners being female (approximately 70 per cent), and 19 (30 per cent) being male.

The age profile of successful returners was analysed by the RTTA lead at the end of July 2016. Of the successful returners at that time, their ages ranged from 25 to 64 years, with a mean age of 43 years.

When schools provided feedback and the information was available, RTTAs categorised the reasons why returners were unsuccessful at interview. The most common reason recorded was that other candidates were stronger at interview, and that returning candidates did not have enough experience prior to applying.

Analysis by region indicated that the majority of returners receiving support were located in, or looking to return to teach in, London (17 per cent), the South East (17 per cent), the North West (15 per cent) or the South West (14 per cent). Smaller proportions of supported returners were based in the other regions. Three per cent were applying from abroad (mostly from the US and other EU countries[17]). About half of the returners were looking for part-time or flexible working (49 per cent for physics; 45 per cent for maths)[18]. A small number (less than two per cent) expressed a preference for supply teaching as their desired outcome of the RTT support[19].

4.3.3 Monitoring and internal evaluation data

MI data was generally completed to a good standard and contained information on TRN, date of birth, QTS, gender, year, RTT case status (cases closed/open etc), subject and region/LA. However, RTTA notes on contact, progress, employment outcomes and

[17] Overseas trained teachers (OTTs) are eligible for the scheme even if they have never taught in England previously, if they are from the US, Canada, Australia, New Zealand or an EEA country and have been assessed as having QTS by NCTL.
[18] In addition to the MI data on full-time/part-time *preferences of prospective returners*, separate and incomplete information was recorded by RTTAs in note form on *successful* returner outcomes. This gives a partial indication of part/full time or temporary/permanent posts secured. The most notable trend from this partial data is that 30 out of the 60 for whom information was available had found temporary or supply posts, which suggests that the majority of returners did not find permanent employment. In addition, 19 out of 33 females for whom information was available had secured part-time posts and out of the eight males, three had secured part-time positions.
[19] The MI data available for the evaluation does not record the current employment activity of the returners whilst being supported, so it is not possible to comment on the proportions doing supply teaching in the interim. However, as this small sample of interviewees might indicate, supply teaching may represent a larger part of some returners' reality and experience than the two per cent figure may suggest.

reasons for non-success were more variable. For example, it is recommended that MI is collected on the returners' employment status at the start of their support, as this is important in terms of tracking their progress. Similarly, notes recorded on successful returners' employment outcomes should be captured more routinely, to indicate whether part-time, full-time, permanent, temporary or supply roles are secured, to assist with monitoring and tracking. More detailed notes and information collected on non-success of applications and interviews could also identify where additional support may be needed by returners, to better prepare them for the recruitment process.

This MI data was routinely reported to the NCTL for monitoring against NCTL's Key Performance Indicators (KPIs) for RTT. Both the advisors and NCTL periodically summarised and analysed the MI data provided for this evaluation. These summaries and analyses generally indicated where data was incomplete or missing, and in most cases explanations were given for this, such as changes made to the way information was recorded over time on the strand. This was helpful and enabled the analysis of returners' characteristics and some of their outcomes to support the evaluation.

The MI spreadsheets and data summaries provided for the evaluation did not include information on returners who also participated in TSST. This additional information should be included and reported alongside outcomes in the future as this may have a significant bearing on the overall success rates of the strand. RTTAs would have to collect this information directly from returners, or through contact with TSST providers.

4.4   Recruitment

Recruitment process

Nearly all of the 10 participants who were interviewed reported that internet searches were their main route for seeking support to return to teach and they had registered for RTT support via links to, and from, DfE and DirectGov websites. A few had seen press and TV ads and fliers in the Institute of Physics (IOP) and union magazines, whilst none mentioned the social media campaign as their route in. One participant interviewee met the RTTA at a teacher recruitment event.

Several interviewees had previously sought and registered for various forms of support, such as university-run return to teaching courses and other government websites for returning teachers over a number of years, with limited success, before finally getting in touch with an RTTA. As two returner interviewees commented:

> *I was interested in getting back to teaching so tried all sorts of avenues, but couldn't get information or further details for a long time. I was considering applying for the EBacc* [Returners] *scheme, but couldn't get hold of anyone. I emailed but got no reply. By the time I received a reply it was too late, I had*

already missed the starting dates… I was surprised when the RTT Advisor called (RTT participant).

I have been trying to return to the profession since 2008/9 and I've made various unsuccessful attempts to register on different sites several times, but I found websites awkward to navigate and often nothing happened as a result of any interest I registered (RTT participant).

4.4.1 Reasons for participation and expectations of RTT

Interviewees reported a range of reasons for registering for RTT and, as a result, had varied expectations of the support. About half of the participants reported that their previous attempts to return to the profession (through supply teaching or unsuccessful applications) indicated that they needed subject knowledge enhancement and recent classroom experience. The RTT was seen as a route into helping them improve their skills and employability. Others had been away from teaching for varying periods and understood the need to update their knowledge and experience, so were exploring options and support for returning:

I registered for RTT because I knew from the supply agency that I needed support, experience, and retraining to get up to speed. RTT seemed like the only route back in (RTT participant).

I wanted my skills updating, to understand current developments in education, have more currency and to be in a better position to look and apply for supply work (RTT participant).

The range of expectations varied, from not knowing what to expect, being confused by what they were signing up for when they registered, to not expecting much and being pleasantly surprised by the amount of personalised support on offer, as the following quotes illustrate:

I was just exploring different options, did not really have any expectations (RTT participant).

I decided to register to get more information and support about teaching physics without a degree... [The RTTA] *explained I could do TSST and guided me through the process, helped me make the decision, sent details, gave me CV and application advice… I really didn't expect so much personal support - I got more than I expected - lots of ideas* (RTT participant).

Although RTT is an advisory and support service, a minority of interviewees – particularly those who had previous experience of teacher refresher courses or retraining - had expectations of more structured support through schools or substantive training courses.

Interviewees were disappointed at the lack of classroom opportunities and the considerable effort needed to follow leads themselves, for example to find placements, access suitable courses and mentors (see also section 4.7 for further discussion of these issues).

Awareness of the negative press coverage of the teaching profession led two interviewees to want to experience the classroom again before deciding on their next steps. Another returner was disillusioned that the '*inspirational and aspirational adverts*' did not reflect the reality, and reports of a shortage of maths and physics teachers led them to expect that RTT would be '*an easy route in - but it isn't*'.

4.5   Content and delivery

4.5.1 About the deliverers

During 2015 to 2016 there were two RTTAs, who worked for Teleperformance UK, the organisation contracted by NCTL/DfE to deliver RTT. The helpline is accountable to NCTL for meeting the RTT Key Performance Indicators (KPIs).

4.5.2 Model of delivery

For the RTT strand, there is just one model of delivery, which entails providing tailored one-to-one support, advice and signposting, delivered by RTTAs over the telephone and via email throughout the support period. Returners are sent information on subject-specialism resources and professional development. This includes websites, taster or refresher courses run in their area, local schools offering shadowing opportunities, job opportunities and mentors. Advisors also help with skills audits, feedback on CVs, applications, interview preparation and generally act as a 'sounding board' for returners seeking support as they embark on this route into teaching.

4.5.3 Participants' experiences of the strand

Interviewees' experience of RTTA[20] support and communication was generally highly positive. Contact with their advisor was described as prompt, regular and responsive throughout the period of support, which ranged from a few weeks to over an academic year or more at the time of the interviews. The returners received detailed information and advice on local courses, resources, vacancies and leads for them to follow up. The

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[20] In the following quotations, the RTTAs are referred to as 'they' or 'the advisor' so that the individuals cannot be identified by their gender.

skills audit, CV and application advice and feedback, and support for interview preparation, were all reported to be very helpful, as these interviewees commented:

> [The advisor] *was very good; [they] gave personal, responsive support and very detailed information. It was just what I needed (RTT participant).*

> [The advisor] *also helped me write teaching resources for a job interview and identified resources for lesson observations, as well as telling me about recruitment and careers fairs, and even put me in touch with one-to-one career counselling support which was very helpful (RTT participant).*

As well as the relevance of the information and advice, it was the tailoring of this support and personalised approach that meant returners' specific circumstances and needs were generally well understood and responded to appropriately. This was most evident for those facing particular challenges around flexible and part-time working, health concerns, or other barriers to accessing employment opportunities, as illustrated by the following quotes in Box 4.1.

Box 4.1: Experience of support in tackling personal challenges and circumstances

Part-time/flexible working

I would prefer to teach small groups or part-time, but there aren't many opportunities to do this. Most jobs are full-time or require a degree in maths which I don't have, but [the RTTA] *understood that and advised that doing TSST can help overcome this.*

I'm looking for a part-time job, but there are not so many local opportunities. [The advisor] *calls and emails every few weeks and months, which keeps things in my mind. If a possible part- time job comes up* [they] *would let me know and help with my application.*

Most important was helping me talk through my current post and the pressure to work full-time… [The RTTA] *supported me through the decision to leave as a result.*

Health-related barriers

I have [a specific condition]*, which is a concern for me, so* [the RTTA] *gave me good advice on this and other health issues. [They] helped me prepare for interview questions, particularly about my health…the advisor responded very quickly and efficiently - often getting back to me within short timescales with feedback and advice.*

I have health issues and so does my [spouse]… [the RTTA] *understood the difficulties these pose but still supported and believed in me.*

Understanding personal set-backs, barriers and instilling confidence

I didn't need training, just someone to speak to. The RTTA helped me see I was not the only one…It was healing talking to [the RTTA]*, being understood, despite my confounding experience…so that I could see that* [my unsuccessful applications] *weren't something personal –* [that] *gave me confidence and reassurance.*

[The advisor] *helped me to understand I had the skills to return* [through RTT careers counselling]*, which has made re-entering teaching more likely. I'm more confident and happy to attend an interview as a result.*

Apart from one evaluation participant who reported a negative experience of advice received about a disability issue, all comments about the advisors and their support were generally very positive and interviewees were highly appreciative of their efforts.

However, the experience of returners when following up the advisors' advice and information was much more mixed, with marked differences between those who had enrolled on TSST and those who had not. The main difficulties identified by interviewees included: schools' unresponsiveness to mentor and placement requests; limited access to, and scope of subject knowledge taster courses; and limitations of the online resources

and websites for subject enhancement, which were beyond the scope of the DfE-funded RTTA support as outlined above. These are discussed in more detail in section 4.7 below (issues and areas for development).

4.6   Strengths and key success factors

As highlighted above (in Box 4.1), participants interviewed on the RTT strand rated the support they received from their advisor highly in terms of helping them deal with the challenges they faced in returning to teaching. The RTTA was described as a *'sounding board',* that meant returners felt listened to and understood. Their often difficult or frustrating experiences were validated and they were encouraged and advised in ways that were tailored to their specific needs and circumstances, as this interviewee reported:

> *If it wasn't for* [my advisor] *I would have thought I was out of teaching.* [They] *helped me see that my past experience is valuable and opened my options; they helped me air and work through a lot of concerns* (RTT participant).

As another participant interviewee remarked: '[The RTTA] *did everything [they] could have done within their relatively limited personal role'.*

Overall, the key strengths of the RTTA support include:

- prompt response to emails and calls
- regular updates with new opportunities
- clear and detailed information about possible schools, contacts, resources and courses
- friendly, professional and well-informed manner
- signposting to TSST, which interviewees found offered more effective forms of classroom experience compared to taster courses or shadowing through RTT
- timely help with CVs, skills audits, applications and interview preparation
- developing a good understanding of the specific barriers, constraints and needs of each individual returner – 'excellent counsellor' and 'sounding board'
- on-going advice on teaching topics for staff in TA, teaching or supply roles
- some useful contacts made with mentors and schools (although problems were also reported with this – see section 4.7 below).

Returners were asked about the personal and circumstantial factors that helped them to get the most out of the RTT strand. A number of these were identified, including:

- passion and interest in the subject
- previous skills and experience
- confidence, determination, motivation, tenacity to overcome considerable frustrations

- having a current post that enabled practice of new skills (including from TSST) and opportunities to extend their experience
- time or resources to enable returners to undertake unpaid work/placements
- informal contacts and networks with local schools to access shadowing and informal job opportunities.

4.7 Issues and areas for development

Whilst returners' experience of the personalised support was generally very positive, many reported difficulties in following up on the leads and suggestions made by the advisor. Particularly for those not engaged in TSST, participants frequently described schools as unresponsive to their attempts to request mentors, shadowing opportunities or placements. The short taster courses, online resources and websites that returners were signposted to for subject enhancement were often described as being limited in terms of access, convenience, scope and usefulness. These issues, and the frustrations and disappointments they created, are illustrated by the quotations below in Box 4.2.

Box 4.2: Wider challenges faced by participants

Schools' unresponsiveness to placement and mentor requests

No local schools could offer me a placement.

I had no luck with mentors or experience in local schools.

Schools near to me were not responsive – there's not enough buy-in for supporting returners like me.

Barriers to accessing support beyond the RTTA

My school couldn't give me time off [from my TA role] *for* [attending courses], *the travel distances were prohibitive so there just wasn't enough access to the subject knowledge that I needed.*

The useful bits and pieces were poorly managed and poorly targeted beyond [the RTTAs] *signposting. I was expected to follow everything up on my own, just finding your own way.*

Variable quality of pre-existing online subject support

The [physics subject knowledge] *website was difficult to navigate – I was directed there for subject knowledge but it was not helpful – I* [searched the internet] *instead.*

I was sent a link to the Knowledge Hub website but couldn't find anything useful or interesting. Went on Google instead and asked a friend about resources.

It is important to note that most respondents made it clear that they did not attribute these difficulties to the RTTA, and described how the advisors had also been supportive in helping them deal with the frustrations and problems that were 'downstream' with other providers and schools – and therefore outside of the advisors' direct control.

Therefore, in terms of development, there were four main types of issue raised. Two were specific to the RTT strand, relating to the service provided and the courses participants were signposted to. Others - raised by the advisor interviewed and participants - were outside the scope of the strand and related to a lack of responsiveness from schools, and the characteristics and situations of the returners themselves.

In terms of the service provided, findings suggest that there are some areas for development of the service:

- returners' use of ad hoc routes to finding RTT support suggests that the advertising is not always reaching the right audience and targeting could be improved
- two interviewees reported delays and confusion before the advisor made contact (this may be an issue relating to the early development of the service that has since been resolved)
- awareness and buy-in from schools (in terms of their willingness to provide mentors or shadowing/placement opportunities and employ returners), appears to be limited at best and a barrier for many, according to both the advisor and participants interviewed. Data from the interview with an RTTA suggests that they are planning to adopt a stronger brokering role, highlighting the benefits of returners to schools and liaising more with schools, where possible.

One-day subject-specialism courses were said to be useful but insufficient for those requiring more intensive training (e.g. 'converters' returning to teach another subject/phase, or those out of teaching for longer). In addition, they did not provide opportunities to be observed teaching and to secure a reference, as these quotations indicate:

> *Compared to previous university-based, accredited returners courses, there's not enough structure or credibility…it's all too bitty, like it's done on the cheap and you have to find your own way…a one-day course is not enough, it's useless for getting you up to speed* (RTT participant).

> *I expected more classroom contact. There are no opportunities for a proper placement where you can be observed and gain a reference* (RTT participant).

In addition, access to these courses (not funded as part of the RTT strand) was problematic for some when they were cancelled at short notice, run at inconvenient times

or were at a distance that made travel prohibitive. This led to difficulties in getting time off to attend and lost pay. Most interviewees found these courses to be useful tasters, but some had difficulty putting any new knowledge/skills into practice without appropriate classroom opportunities and practical experience. As one participant reported:

> *The two* [maths] *courses were useful but I can't put them into practice - the work was too high a level for the group I was supporting as an HLTA* [higher level teaching assistant] (RTT participant).

Two interviewees had previous experience of more substantive provision for teachers returning to the profession or changing specialism. These offered 'solid classroom' experience and an opportunity to develop their skills and subject knowledge in a meaningful way. Both indicated that their experience of the courses they had been signposted to via their RTTA compared poorly to these intensive, coherently structured, well-funded, accredited courses. The courses their adviser had referred them to were viewed as insufficient in meeting the needs of returners currently in a similar position.

In terms of improving subject knowledge, some interviewees also reported that the physics and maths subject knowledge websites and resources they were signposted to were difficult to navigate (see Box 4.2). They found this frustrating and that it was more effective to search the internet for the topics they were looking for.

Whilst highlighting and encouraging the take-up of local courses and use of resources and websites, RTTAs could be clearer about the possible issues some returners may experience when accessing these, to better manage their expectations and reduce their subsequent frustrations. In addition, further thought should be given to how these courses and resources could be improved and promoted to better meet the needs of returners. For example, two interviewees suggested that more structured subject enhancement courses could be delivered effectively through an Open University-style website/MOOC (Massive Open Online Course) with online tutors for those who cannot access courses in their locality or at convenient times.

A key difficulty identified by the majority of the returners interviewed, and also noted by the advisor, was being given the impression by the media and NCTL adverts that their skills were in demand and schools were 'desperate' for maths and physics teachers, only to find schools unresponsive to their contacts. This included contacts requesting the opportunity to visit, observe/shadow staff, access to a mentor or to apply for jobs. The time and effort invested versus outcomes (described as *'constantly going round in circles'*) was frustrating for many:

> *I had a lot of frustration looking for a local mentor, I just needed a contact, but only received vague leads or I would leave messages, but they were too busy to return my calls. Schools seem overstretched* (RTT participant).

This led to a minority of interviewees reporting feeling resentful and undervalued, especially those who felt there should be some allowance for expenses or paid internship provided as part of the strand:

> *The principle of unpaid work is an issue. It's contradictory and hard, working for free to get experience for a job where your skills are in demand, but you're thrown in at the deep end without support…a stipend to go into school would mean the Government was putting their money where their mouth is* (RTT participant).

> *There's a crisis in teaching, teachers are undervalued and that is reflected in the placements and internships, which should be paid and properly supported.* (RTT participant).

Difficulty in finding schools in which to gain practical classroom experience of teaching their subject was also noted by returners on TSST. Some returners who were interviewed held the perception that heads and staff were negative towards returners and thought that the fact that they had previously left the profession showed a lack of commitment. This is how some accounted for their experiences of school unresponsiveness and their view was that they had a lower chance of getting to interview than other applicants ('*blacklisted*', as one interviewee reported). These other returners commented:

> *It's been really difficult for me to get a job in teaching, despite my previous experience. I've applied to 20-30 schools, but not got an interview. The opportunities are stacked against returners but, from talking to the advisor, I know it's not only me* (RTT participant).

> *School staff are resentful of returners who left…so they judge returners more harshly at interview* (RTT participant).

This suggests that, for the strand to be effective, there is an important role in raising the profile of RTT with schools. RTTAs could liaise more directly with schools in order to overcome their apparent reluctance or unresponsiveness to returners and 'broker' returners' access to schools.

In many cases, the characteristics and situations of returners also resulted in barriers to them finding suitable teaching posts. Many were looking for part-time roles, for reasons including childcare and family commitments, being older, and/or health-related issues. As one interviewee commented:

> [I was in a part-time temporary post] *but felt under pressure from the headteacher and mentor to work full-time. They kept asking 'why aren't you applying?' but the RTT advisor was more understanding, which was a good counterbalance* – [the advisor] *respected and supported my choice* (RTT participant).

Particular problems were reported by returners based in rural areas in relation to accessing schools and courses that were within reasonable travelling distance. This restricted the number of opportunities and posts that they were able to consider. This - together with the uneven distribution of available opportunities (including TSST) across a range of geographical areas - was also a key barrier cited by the advisor.

4.8 Outcomes

4.8.1 Outcomes for participants

Participants reported a number of positive outcomes from RTT advice and support, including:

- increases in confidence in their abilities as a teacher - having been out of the profession, sometimes for several years:

  [The advisor] *was influential and supportive.* [They] *gave me feedback on my CV when I was applying for other jobs.* [They] *gave me confidence and said I would be welcomed back* (RTT participant).

- development of self-evaluation skills and more awareness of their strengths and weaknesses:

  [The advisor] *helped me to understand I had the skills to return* [through RTT careers counselling]*, which has made re-entering teaching more likely* (RTT participant).

- improved networks due to returners contacting schools to explore signposted options as well as to proactively seeking out their own opportunities:

  [The advisor signposted me to TSST]…*I dipped in and liked the buzz of meeting other teachers and forming new networks and contacts in the profession - it was good to be back in the fold with others that were returning* (RTT participant).

- improved job application skills such as improved CVs, application writing and interview skills and better performance in interviews.

Being able to discuss their experiences, strengths and areas for development, whilst being provided with useful advice and feedback, enabled participants to reflect and make informed decisions about their next steps:

  The best thing about the advisor was [them] *being like a 'counsellor'* – [they were] *excellent,* [they] *phoned me,* [were] *very good at keeping in contact, updating me on courses… and gave supportive feedback on my CV when applying and*

suggested I get a non-academic reference. [They] *gave me confidence to believe I would be welcomed back* (RTT participant).

4.8.2 Other factors influencing outcomes

The five interviewees who also took part in TSST reported more positive journeys and in some cases, outcomes (see 4.8.3). Further analysis of monitoring data in the future would be required to assess any differential and combined impacts of both.

Another finding is that informal networks and contacts, luck and serendipity also seem to play a role in the journeys of returners who have a positive outcome:

> *I was lucky - I made contact with my old school and they offered me emergency sick cover. They were in a crisis, but then they kept me on part-time, then full-time without an interview* (RTT participant).

For a few, however, their experience of schools through taster visits or recent supply teaching confirmed that they did not want to return to teaching:

> *Staff morale was an issue and challenging behaviour of pupils makes it a difficult job…I prefer supply teaching or a TA post - you can walk away from school more easily… The pressure on results impacts on everything and everyone* (RTT participant).

4.8.3 Participants' future intentions

In June and July 2016, interviewees were asked about their current employment status and future intentions, which was followed up with a short questionnaire distributed via email and/or a brief telephone call in September and October 2016.

The following bullet points summarise the outcomes for the interviewees and their future intentions[21], as they stood in September 2016:

- three returners who accessed RTT support and also participated in TSST found the combination of support highly effective in increasing their *'currency'* and gaining the confidence and practical experience to successfully apply for posts. One of these found a permanent full-time teaching position but reported that 'luck' and 'serendipity' had played an important role in securing the position. In terms of the other two, one had found a temporary teaching post and one was working as a TA
- two other returners were in temporary teaching posts in the autumn term

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[21] Some details have been changed to protect the anonymity of the interviewees

- the remaining five returners did not expect to return to teaching in the near future. Three were currently caring for family or not in paid work due to difficulties they experienced in accessing family-friendly or flexible/part-time teaching opportunities. One found rural location was a barrier to accessing opportunities and another had started a business unrelated to teaching.

4.9 Early indications of potential for additionality

4.9.1 Competing initiatives

TSST was known to, and engaged with, by returners. However, it was seen as additional or complementary to RTT, rather than a competing initiative for those who could access local providers and commit the time to the training. Through having a more structured, school-based experience and subject enhancement, most RTT interviewees who had participated in TSST felt the combined experience was more beneficial than RTT alone. Although returners were unaware of the Paid Internships strand which targets undergraduates, several commented that some form of funded placement or paid internship as part of RTT would better value their commitment to returning to the profession and tackle some of the barriers faced in doing so, by creating an opportunity for up-to-date classroom experience.

Other routes that were mentioned to a lesser extent as possible alternatives or competing initiatives were PGCE providers, supply teaching and general teacher recruitment government websites. Returners had had varied and limited success with these other routes during their previous attempts to return to the profession. In addition, many of these were not considered to be applicable to participants of this strand, given their need for a specific maths and physics focus. Whilst returners were aware of some pre-existing sources of support, including mentors, ambassadors, and websites, they thought there were no or few other support services available to meet their needs in the more holistic way offered by RTT.

After engaging with RTT, one returner with a PhD realised there was an opportunity to earn £30,000 through the Chairs strand, which increased their frustrations related to the lack of funding or stipend on the RTT route, as mentioned above.

None of those interviewed mentioned the alternative school-based SRT pilot, nor commercial/ return to teaching fee-paying services.

4.9.2 Additionality

It is important to note that, as for all other strands, the methodology of this qualitative research was not designed to robustly measure additionality i.e. what has been achieved

that would not have been achieved in the absence of the strand. However, it has been possible to explore early perceptions and indications of possible additionality which are reported below.

Overall, participants were mixed in their assessments of whether they would have achieved the same outcomes in the absence of the strand due to the lack of anything similar. Most felt that the RTTA support was positive and as helpful as it could have been, but their outcomes were thwarted by the difficulties they had in accessing schools, adequate classroom-based training or experience and other opportunities beyond the advisor. For most, it was the increased confidence and encouragement they gained through their advisor that enabled them to better deal with the frustrations and challenges of moving forwards. Some interviewees felt that any progress they made towards returning to teaching or positive employment outcomes achieved related more to their determined efforts, good luck or informal contacts - rather than to the support of the advisor or the strand itself. Many of those interviewed reported that the lack of opportunities for classroom experience, the insufficient subject enhancement available and the perceived negativity of schools towards returners meant that the RTTA support had been insufficient for them to secure employment in teaching.

The additionality of the advisor support is hard to measure and isolate from the other support needed further downstream to enable returners to re-enter the profession. In the cases of the three successful job outcomes, their perception of the overall influence of the RTTA on their employment status was also mixed. For the two interviewed returners who secured temporary posts, one felt that the RTTA had possibly expedited the process rather than changed the outcome (which was an informal 'retro-fitted' job with no other applicants, found through the returner's own networks). They believed they would have achieved this without the advisor's support. The other temporary post was secured a week after speaking to the advisor, who the returner felt was understanding and encouraging, rather than directly instrumental in the application process. However, one of the returners - the permanent post holder - attributed their success to the direct support of the RTTA combined with TSST. They had joined TSST on the RTTA's advice and believed that the useful up-to-date classroom experience and confidence gained, coupled with the advice on the application and interview process, was critical to their employment success.

It is not possible to extrapolate or generalise findings about additionality from this small sample of returners. However, findings from the interviews suggest that availability and quality of support downstream from the advisor - not funded as part of RTT - is a key barrier to returners' success, and therefore to the goal of recruiting additional maths and physics teachers.

4.10 Summary and next steps

The *delivery* of RTTA support was reported by almost all interviewees to be positive: prompt contact, useful advice on courses and good general career advice such as the skills audit, application advice, interview preparation, confidence-building and acting as a sounding board to help address their difficulties. However, the *content* of the RTT strand was not seen as sufficient to overcome the main obstacles facing inactive teachers. In particular, the overall impact of the RTTA support was experienced as limited due to a lack of opportunities for participants to gain the skills and experience they needed in order to return to teaching, such as up-to-date experience in schools and classrooms, support from mentors and easily-accessible and good-quality taster courses or subject enhancement resources.

The main areas interviewees suggested for improvement to the strand included:

- consider ways of providing classroom experience with the opportunity for a reference as part of the strand. As well as signposting to TSST, this could include: paid or unpaid internships; courses with integrated classroom experience; and opportunities to observe effective teaching
- improve the quality and navigability of online resources and courses related to subject knowledge. Consider a MOOC (massive open online course) or Open University style online modules or tutoring in place of mentoring – these could continue when returners are in posts to support retention. In the meantime, RTTAs should manage returners' expectations and the possible limitations of the signposted opportunities in fully meeting their needs
- incorporate a promotion and brokering role to schools to increase school buy-in and responsiveness by: raising awareness of returning teachers' benefits and liaising directly with schools to secure appropriate work-experience for returners
- assess the quality and geographic access/patterns in terms of course locations, schools offering opportunities, mentors etc. as these may be unevenly spread and investigate options for tackling gaps in provision
- consider reviewing the marketing messages from NCTL to better manage the expectations of returners - in reality it is not as smooth and straightforward to return to teaching as some anticipate and competition for jobs can still be strong
- consider how awareness of RTT might be improved amongst former teachers.

These areas for development are currently being considered by NCTL.

5. Teacher Subject Specialism Training (TSST)

Key findings

TSST offers subject-specialism training in maths or physics to non specialist teachers and teachers wishing to return to the profession. In the 2015 to 2016 academic year (Year 1 of the programme), 98 providers recruited an estimated 2,978 participants to TSST programmes (against a target of 3,000 participants). The process evaluation included an online survey of teachers participating in TSST during the 2015 to 2016 academic year (882 responses) and qualitative telephone interviews with 15 providers and 20 participants.

The programme was very well received by participants, with 90 per cent of the survey respondents reporting that they would recommend TSST to others. Key success factors include:

- the content and the focus on improving subject-specific pedagogy and subject/curriculum knowledge
- practical sessions and practical tips for teaching
- free training tailored to local need
- delivery by good or outstanding current teachers with up-to-date experience
- differentiation of training sessions to cater for participants with different levels of prior knowledge/experience
- certification which was attractive and aided recruitment
- having opportunities for participants to practice what they have learnt, or observe good or outstanding maths or physics teaching.

Positive outcomes were reported by participants, particularly in terms of improved confidence and subject and pedagogical knowledge, and for those already teaching maths or physics, the ability to apply their new subject and pedagogical knowledge in the classroom. Higher proportions of physics participants said that TSST had improved the way they worked with pupils to a 'large' or 'very large' extent, while maths participants reported more of a change in their subject knowledge. Some TSST participants had already secured new jobs teaching maths/physics and the survey showed early modest increases in the number of hours spent teaching maths and physics since completing TSST.

Almost half of the survey respondents (47 per cent) said they would not have done any subject-specialism training in the absence of TSST – one measure of additionality for this strand. This increased to 61 per cent of survey respondents who had not taught maths or physics before, indicating that TSST particularly enables new non-specialist teachers to train to teach maths and physics.

Recommendations to improve strand delivery and outcomes include:

- share learning from good practice in relation to the success factors across providers

- offering further guidance to providers about how to engage strategic partners who could help them to offer certification or academic awards
- securing buy-in from participants' employers to ensure that support is in place (for example a commitment to release staff to attend and, where possible, opportunities to observe or practice teaching maths or physics).

5.1 About TSST

TSST aims to improve the maths and physics subject knowledge of existing non-specialist teachers who schools are deploying to cover their recruitment gaps. TSST can also be delivered to other teachers who could potentially teach maths or physics in addition to their main subject, as well as teachers who want to retrain as maths or physics teachers and teachers wishing to return to the profession. TSST is designed and delivered by lead schools[22] who offer a range of delivery models, with the majority of programmes being delivered over two or three terms. Lead schools were first invited to apply for grant funding to run the training during the 2015 to 2016 academic year as part of the STEM package commitment to train 15,000 non-specialist teachers over five years.

The School Workforce Census (SWC)[23], which includes data on the deployment of non-specialist teachers, defines this group as teachers who do not have a post A Level qualification in their subject (in the case of TSST, maths or physics). The November 2015 School Workforce Census showed the proportion of hours taught by teachers without a relevant post A Level qualification was 18 per cent for maths and 25 per cent for physics.

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[22] Also referred to as providers in this report.
[23] https://www.gov.uk/government/statistics/school-workforce-in-england-november-2015 (Tables 12 and 13).

TSST is available to non-specialists in the teaching workforce who are in need of subject-specialism training including:

- current, non-specialist teachers of maths and physics (i.e. those who did not train to teach these subjects). For the purposes of TSST, this group can include teachers with a post-A Level qualification in the subject, so long as they did not also complete ITT in this subject
- non-specialists wanting to start teaching maths or physics (who are currently teaching other subjects)
- returners wanting to re-join the profession, including teachers who have and have not taught maths or physics in the past
- teachers without QTS in academies and other staff e.g. higher level teaching assistants (HLTAs) who are teaching whole classes of pupils.

It is an expectation of NCTL that participants on the programme are teaching, or will be timetabled to teach, whole classes of pupils in secondary maths and/or physics. Teaching assistants and individuals undertaking initial teacher training (ITT) may undertake the programme at the discretion of the provider, however they are not eligible for NCTL funding and do not count towards participant numbers collected by NCTL.

Physics TSST is only available to secondary school teachers, however maths TSST may also be offered to KS2 teachers who will be supporting the transition of pupils from KS2 to KS3 maths.

5.2 Methodology

5.2.1 Interviews

As part of the early process evaluation, undertaken between May and July 2016, qualitative interviews were conducted with 15 schools providing TSST (six offering maths, four offering physics and five offering both maths and physics TSST) and 20 teachers, each of whom had participated in one of the TSST programmes (eight physics and 12 maths). Seventeen of the TSST participants interviewed also answered a short set of follow-up questions in September and October 2016.

Interviewees varied in their backgrounds. There were a range of ages and levels of experience teaching maths or physics, including some who had never taught the subject and one returner. Physics TSST participants tended to be specialists in other sciences (such as biology or chemistry), whereas maths TSST participants came from a wider range of specialisms (such as PE, electronics and geography).

5.2.2 The online survey

An online survey was sent to people who had participated in maths or physics TSST during the 2015 to 2016 academic year. The survey gathered participants' views on: the TSST programme; their experience of teaching maths or physics; and their perceptions of the outcomes and impacts realised as a result of their participation.

TSST participant details were held by individual providers, rather than centrally, so the survey was forwarded by the providers to their participant lists by email. Respondents were asked to complete the survey in relation to the subject in which they were receiving TSST training (i.e. maths or physics).

A total of 893 complete, useable responses[24] were received, from 90 of the 98 providers. Eleven responses were subsequently excluded from the analysis as their answers indicated that the individuals were not eligible to participate in TSST based on the NCTL criteria (for example, because they were on ITT/PGCE, or because they were involved in running or supporting others to complete the course), and therefore were not eligible for the survey. This resulted in a dataset of 882 responses. Characteristics of the sample are described in section 5.3.4. It was not possible to compare the representativeness of the survey (in terms of characteristics such as gender and teaching experience) against the entire 2015 to 2016 cohort due to quality issues with the MI (discussed in section 5.3.2).

Full tabulated responses to the survey can be found in Appendix B.

5.3 Progress to date

5.3.1 Progress to strand targets

In the 2015 to 2016 academic year (Year 1 of the programme), 98 providers (known as lead schools) recruited an estimated 2,978 participants[25] to commence TSST programmes (against a target of 3,000 participants). Around three quarters of the individuals recruited started maths TSST, and around a quarter started physics. Providers were either single schools or a school leading a consortium of schools, who worked with a range of strategic partners such as universities, in the development and/or delivery of the training. Providers are able to develop the

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[24] Partially complete responses and duplicate responses were removed from the dataset prior to analysis.
[25] The total number of recruited participants was estimated by NCTL using progress reports and end of project reports submitted by providers. Data relating to the number of participants completing TSST was under review by NCTL at the time of writing and any future publication of figures derived from this data will be subject to an assessment of robustness and quality.

programme in line with local needs and, as a result, there is a diverse range of provision (also see section 5.5).

5.3.2 Characteristics of TSST participants

As part of the evaluation, the research team were given access to the MI dataset, compiled from returns from providers, as well as analysis carried out by NCTL. Although NCTL estimated a total of 2,978 individuals were recruited to TSST programmes during the 2015 to 2016 academic year, NCTL were only supplied with MI for 2,734 individuals by 94 out of the 98 providers (also see section 5.3.3). The MI supplied was incomplete and there were a number of data quality issues. The MI mainly pertains to progress through the course, and subject of interest. Demographic information such as gender, age and length of service was not provided. The MI requested the TRN for each participant, however this field was often not completed accurately, if at all, which has limited the possibility of matching the data to existing datasets (such as the SWC), which hold such information on an individual level. As outlined in section 5.3.3, the providers interviewed as part of the evaluation reported that collecting TRNs was difficult and time consuming, which likely contributed to the incomplete data returns.

The survey administered as part of the evaluation collected some demographic information. However, due to the limitations of the MI, it was not possible to check the representativeness of the achieved sample against the population of the 2015 to 2016 TSST cohort. Below, in section 5.3.4, the characteristics of the respondents of the TSST survey are summarised.

5.3.3 Monitoring and evaluation

Almost all of the providers interviewed said that they were completing the MI spreadsheet requested by NCTL. Several of the providers commented that collecting TRNs was time consuming, and that the template was difficult to complete due to the specified format. Furthermore, they reported that they were asked for additional information after they had completed the first data collection, which meant they had to collect further data from participants. NCTL have made changes to the data collection and monitoring process for the 2016 to 2017 academic year, particularly in response to the varied quality of returns from providers.

Collection of internal feedback data

All of the providers interviewed reported that they were collecting their own feedback and monitoring data including:

- data on attendance

- baseline and end-point assessments of skills and/or knowledge
- baseline and end-point perception data such as confidence to teach
- teachers' reflections on the course, for example usefulness of resources, quality of teaching.

The frequency of feedback gathering varied by provider, from after every session to one or two times during the course. As discussed in section 5.5.2, providers reported using the information gathered to inform the development of their training and to tailor the provision to the current cohort of participants.

For the 2016 to 2017 TSST programme, NCTL has introduced a participant pre- and post-training online survey. The aim is to assess perceptions and progress as a result of participating in TSST.

5.3.4 Characteristics of the survey sample

The majority of the 882 respondents were female (63 per cent) and around a third were male (35 per cent) (two per cent did not respond). There was a mix of age ranges in the sample: half of the survey respondents were aged between 35 and 54 (49 per cent); while two in five (43 per cent) were aged 34 or under. Only five per cent of respondents were aged 55 or above (two per cent did not respond). Most survey respondents worked full-time or 0.9 full-time equivalent (FTE) (82 per cent).

Three-quarters of the sample reported that their main TSST subject was maths (78 per cent), compared to just under a quarter (22 per cent) who had undertaken physics TSST.

Teaching experience

The majority of TSST participants responding to the survey (87 per cent) had QTS. The interviews conducted over the summer indicated that some of the attendees of TSST courses without QTS were teachers completing ITT, TAs and HLTAs[26].

More than half of the survey respondents had been a teacher for six years or more (54 per cent). The remainder were relatively new teachers - just less than a quarter (24 per cent) had been teaching for two years or less and a further fifth (21 per cent) had been teaching between three and five years.

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[26]As noted in section 5.1, where participants were not eligible for the programme (for example TAs or individuals undertaking ITT) they were able to undertake the training at the discretion of the provider, however they were not funded and did not count towards participant numbers.

Most respondents had taught some maths or physics by the time they completed the survey (78 per cent). Fifty-eight per cent had been teaching maths or physics for five years or fewer, and 20 per cent for six years or more. Around a fifth had not taught maths or physics to date (21 per cent).

When overall length of service and experience of teaching their TSST focus subject are compared (Figure 1), it shows that 75 per cent of those who had been a teacher for two years or less had been teaching maths or physics for at least some of that time, compared to 88 per cent of those who had been teaching for 21 years or more.

Figure 1 Total length of time teaching (any subject) split by length of time teaching TSST subject of focus (maths or physics)
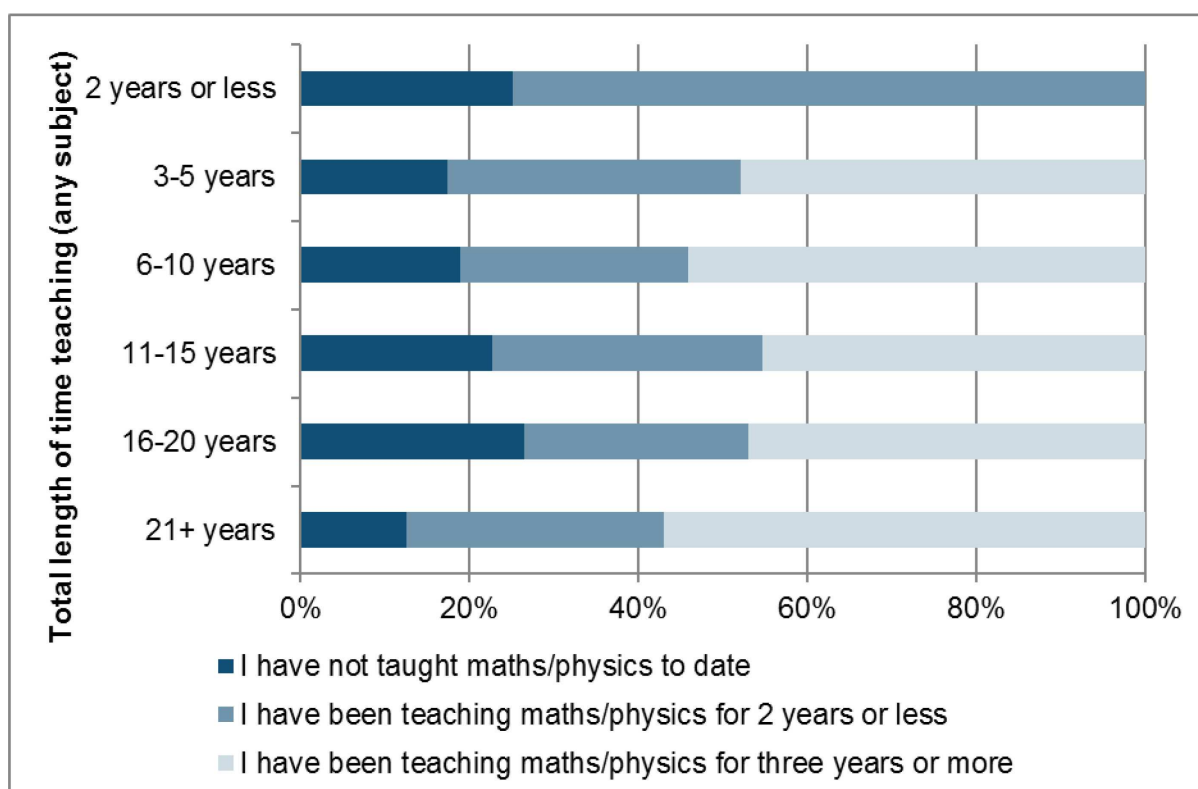
A total of 880 respondents answered this question.
Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Returners

Attracting returning teachers was also intended to be one of the areas of focus for TSST providers when recruiting to the course. A minority of the survey respondents, (seven per cent), were returning from a career break and, of these, only 22 individuals had been involved in one of the Returner programmes listed in the survey. Interviews with TSST providers indicated that only a few of them targeted returners during their recruitment to the course, because they were not sure how to contact them; a minority of providers were aware of the Return to Teach support

available, and that the RTTAs could signpost returners to TSST courses. Some of the providers questioned whether returners would make up a larger proportion of their cohorts in future years: '[There is] *not a huge pool of returners to bring in'*.

Furthermore, the difficulty of targeting and successfully recruiting the right type of returner (also see section 5.4.1), who would get the most out of the training and give the most back to the school system was highlighted by another provider:

> [The target market of returners for TSST is] *those that feel like they have become detached from the system and they want to dip their toe back in the water and build up their confidence. They are not the people that have walked away from teaching because they couldn't cope with it any more or they detested it.*

Current teaching role

Respondents were asked about their current teaching role, in particular the subject(s) they currently taught and about their experience of teaching maths or physics to date.

Respondents taught a wide range of subjects (Table 8). Overall, the most commonly taught were maths (48 per cent), physics and biology (24 per cent each), chemistry (23 per cent), PE (20 per cent) and general science (18 per cent). Just over two in five indicated that they taught one subject (42 per cent) and around one in five said they taught two subjects (21 per cent) or three subjects (18 per cent).

Of those attending maths TSST, 60 per cent were already teaching maths, with 34 per cent describing it as their 'main/specialist' subject[27]. Of the physics TSST participants, 78 per cent of these respondents were already teaching physics, but only 11 per cent described it as their main or specialist subject. This was broadly echoed in the teaching experience of the participants interviewed.

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[27] 'Main/specialist' subject was the phrase used in the survey question; any future survey of TSST participants should ask about main and specialist subject separately as they can be different ('main' subject relating to their timetabled subject and 'specialist' relating to their subject/pedagogical knowledge).

Table 8 Subjects taught by respondents (multiple response)

Which subjects do you currently teach?	%
Maths	48
Physics	24
Biology	24
Chemistry	23
Physical Education (PE)	20
General Science	18
English	12
Computer Science	12
Geography	11
Religious Education (RE)	10
Design &Technology	9
History	9
Art	8
Modern Foreign Languages (MFL)	5
Business	5
Other	18
No response	2
N =	882

More than one answer could be given so percentages may sum to more than 100.

A total of 867 respondents answered at least one item in this question.

Source: NFER TSST survey summer 2016.

Prior qualifications/subject knowledge

Analysis by TSST subject of focus showed that participants on the physics TSST were more likely to have an undergraduate or postgraduate degree in their TSST subject than maths TSST participants (Figure 2).

Overall, nearly three-quarters of the survey respondents (73 per cent) did not have a degree or post-A Level qualification in their TSST subject. The highest prior level of qualification in participants' TSST subject was A Level for 26 per cent, AS level for one per cent, and GCSE for 46 per cent.

Just over a quarter of all respondents (26 per cent) had an undergraduate degree or above in their TSST subject. Although this group had a higher level of qualification, the survey did not record data on whether they had *trained to teach* maths or physics. It is possible that they had studied only the subject content, rather than subject pedagogy and, consequently, would still have benefitted from this element of TSST. It is recommended that a question addressing this be added to any future surveys of TSST participants.

Figure 2 Highest qualification in TSST subject of focus
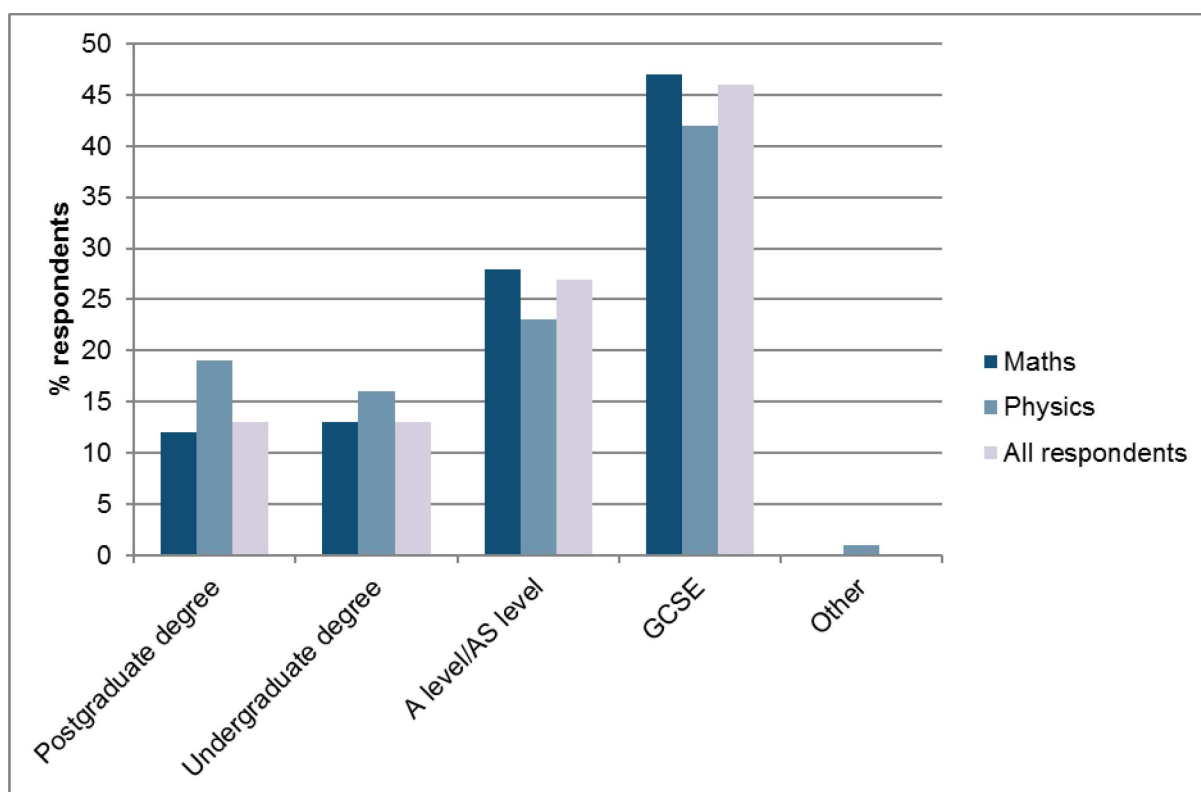
A total of 881 respondents answered this question; maths N=685 and physics N=196.
Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Length of time participants had taught maths/physics

Almost half (46 per cent) of TSST participants with a bachelor's degree level qualification or higher in their TSST subject had been teaching maths or physics for three years or more, compared to a third of participants with an A Level or below (34 per cent; Figure 3). Further analysis indicated that the reasons for attending TSST, and the self-reported outcomes, were similar between these two groups. The only difference of note was that a higher proportion of participants with an undergraduate degree or above in maths or physics (78 per cent) said TSST had increased their confidence in running practical sessions compared to those with an A Level or below (66 per cent). Consequently, it appears that teachers with a higher level of prior subject knowledge are using TSST either as a refresher in terms of boosting their subject knowledge, or as a way of developing their pedagogical knowledge of maths or physics if they completed their ITT in a different subject, as discussed above. Further research into the motivations of this group may provide further clarity.

Figure 3 Length of time teaching maths/physics by their (prior) highest qualification in their TSST subject of focus
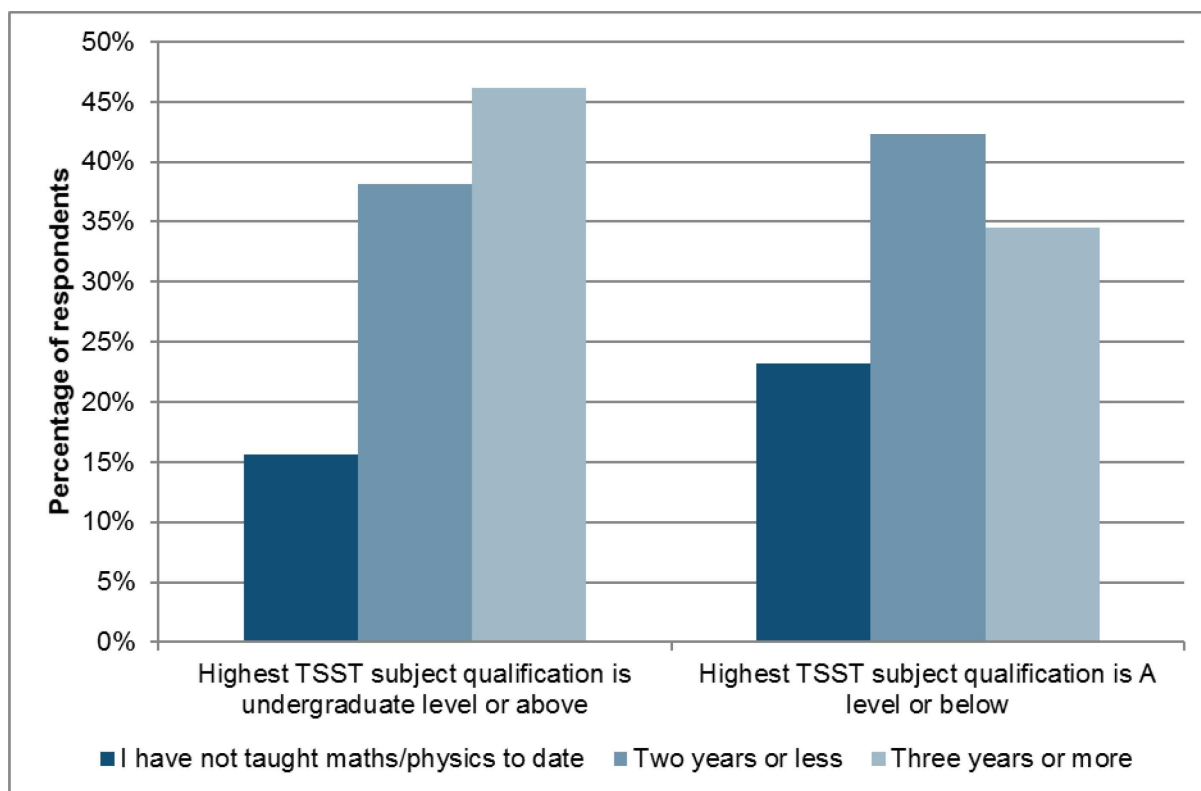
A total of 874 respondents answered this question.
The chart is based on data from respondents who indicated their prior highest qualification in maths or physics.
Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

5.4 Recruitment

5.4.1 Recruitment process

All of those applying for TSST were offered a place, subject to them meeting the eligibility criteria listed in 5.1.

The providers interviewed tended to aim to recruit around 20 participants each and, for the most part, they achieved this target. Providers offered a range of delivery models to enable participants to access the programme, for example by offering different ways of engaging teachers (e.g. twilight sessions or Saturday training) or offering accelerated training for those joining the course at a later time point.

Providers were expected to offer certification, a professional award or Masters credits as part of their programme. Providers of physics TSST, who were interviewed, tended to mention the Institute of Physics (IOP) enabled, community

approval process for TSST physics programmes led by the IOP. Interviewees from providers using the IOP scheme felt that this aided recruitment as it gave the course additional credibility. Some of the maths providers interviewed did not know where they could gain a similar professional award, or how to go about this, and would have welcomed more guidance. One provider, who offered both maths and physics TSST, described their particular experience:

> *Recruitment for physics was never going to be an issue once you've got the IOP onside. If you want physics training you are going to go to the IOP* [so having their stamp of approval was helpful]. *Maths had nothing like that. We contacted the national centre for mathematics; we contacted institutes… none of them offered any kind of approval or any kind of Masters credits. That affected recruitment because on the other side* [physics] *I was able to say we have this course that is approved by the IOP.*

NCTL may wish to consider further signposting for TSST providers towards suitable strategic partners who could help them to offer certification or academic awards for TSST, and providing more guidance to providers on how to engage these partners.

Some of the providers felt that, in future years, recruitment would become more difficult, particularly for schools that had mainly focused on recruiting from within their own networks:

> *Because we have the secondary schools that are key to our partnership, they naturally come to us. They are a captive audience. If that wasn't the case we might be competing to recruit with other TSST* [providers].

One provider who was interviewed would particularly like to see consideration of reach and location in the central decision-making process about which schools/providers will receive funding to run TSST in future years. In contrast, some providers located in close proximity had tackled overlap of geographical target recruitment areas by agreeing to split the subject focus with another school or by sharing recruitment.

Provider interviewees reported using a range of strategies to advertise the course, including: targeting their local school networks and alliances, fliers, social media or the school website. A few providers reported that their existing reputation for delivering CPD locally was the key factor to successful recruitment; this was also mentioned by some of the participants. Some providers consulted with schools in their local network to assess demand, and to inform the development of their course, such as in relation to preferred delivery models and timing. For example, one provider explained that they decided to run their training during twilight sessions after discussions with local schools in special measures because: *'We couldn't be taking*

[teachers] *out of school* [to attend TSST] *because their schools had problems with recruitment and the schools didn't want them being out of school for any length of time'.*

A minority of providers mentioned actively targeting returners by: liaising with the RTTAs (although this was detailed in the operational handbook issued to all schools, not all providers who were interviewed recalled being briefed about this strand); using fliers; and one visited the local job centre. However, many felt that this was a difficult group to reach.

Some providers offered TSST to people not eligible for NCTL funding such as TAs or those undertaking ITT[28]. One provider explained that they offered TSST to this group because they felt TAs should '*be aware of common misconceptions*' when supporting pupils in class. Furthermore, another provider offering physics TSST highlighted the benefits of offering the training to trainee teachers:

> *At the moment it is super clear that this strand is for practising teachers and returners… so* [those with] *QTS, but we actually added our trainees on because they needed it…they actually benefitted from it a great deal especially the practical side of things...It really would be useful for them as they are already receiving such a lot of training around pedagogy of teaching but to receive this kind of fine-tuned subject knowledge on how to teach it* [and] *how to deliver a practical on it.*

Finally, there was a timing issue during the initial recruitment of teachers and schools – if recruitment took place after schools had committed to their CPD plan for the academic year, it was harder for providers to recruit:

> *The biggest challenge for recruitment was that people weren't ready for it to be built into their CPD programme. We were notified we were going to be able to run with this in July which would have meant people could build it into their CPD programmes for the following year.* [But] *people had already committed to delivering other stuff.*

5.4.2 Why participants applied/took part

In most cases, survey respondents had volunteered to take part in TSST (60 per cent), rather than being asked or told to participate by their school or other organisation (39 per cent). Both the survey and interviews showed that the main

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[28] Providers would have done this at their own cost. Section 5.1 above sets out the eligibility criteria for TSST funding.

reasons for taking part in TSST were predominantly related to developing confidence and knowledge teaching maths or physics (Figure 4), and more specifically to:

- improve subject knowledge of maths/physics (92 per cent of the whole sample 'agreed' or 'strongly agreed')
- build confidence teaching maths/physics (91 per cent of the whole sample 'agreed' or 'strongly agreed')
- improve pedagogical knowledge in maths/physics (88 per cent of the whole sample 'agreed' or 'strongly agreed').

Overall, responses in relation to reasons for participation were broadly similar for maths and physics participants. Exploring the most highly-rated reasons for participation by TSST subject focus showed that, while views around improving knowledge were similar across maths and physics TSST participants, significantly more of those doing physics (97 per cent) stated that they wanted to build their *confidence* in teaching the subject, than maths participants (90 per cent).

Other commonly stated reasons included 'to improve my future career options', to which just less than three-quarters of teachers (70 per cent) 'agreed' or 'strongly 'agreed'. Looking at differences by maths and physics showed that a significantly higher proportion of maths participants agreed with this statement (72 per cent) than physics participants (62 per cent). More context for this finding was found during the participant interviews, when participants explained that they saw attending TSST as a way of expanding their CV and future career options if, for example, hours in their main subject were being decreased (also mentioned by 29 per cent of the survey sample). As one participant interviewee explained: '*It's a long time since I've done maths and I'm aware that there is a shortage of maths teachers, so I thought it might increase my employability*'.

Two-thirds of the survey respondents (68 per cent) 'agreed' or 'strongly agreed' that they wanted 'to improve [my] skills in running practical sessions'. It is important to note that, although improving skills in practical sessions was rated as a reason by significantly more physics participants (86 per cent of physics TSST 'agreed' or 'strongly agreed'), as might be expected due to the nature of the subject and the amount of time spent on practicals in lessons, this feature of the course was an important draw for maths participants too (63 per cent of whom 'agreed' or 'strongly agreed' with this statement). This also came out strongly in the in-depth interviews with both participants and providers, particularly around the attraction of practical course content: '*I was told that it would include lots of practical ideas and resources as well as covering the theory*'.

Figure 4 Reasons for participating in TSST
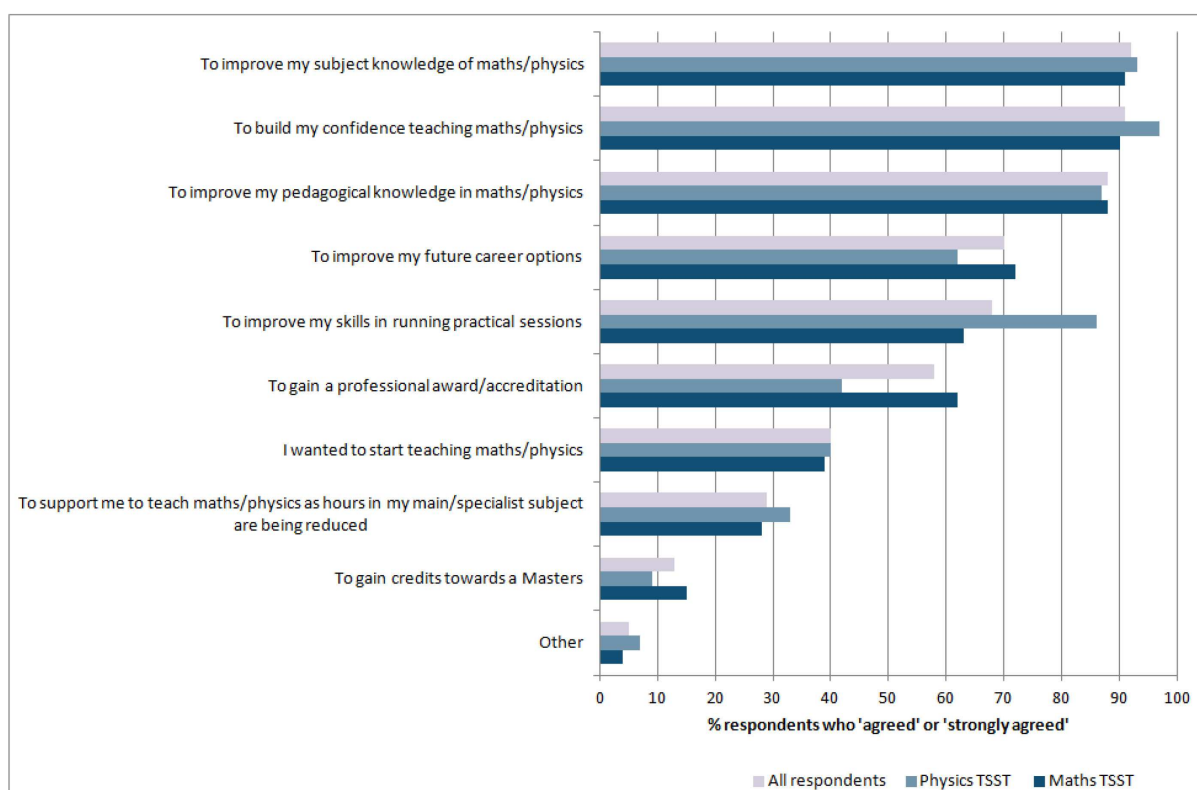
A series of single response questions.
Due to rounding percentages may not sum to 100.
A total of 880 respondents gave at least one response to these questions.
Source: NFER TSST survey summer 2016.

As part of their application for funding to offer TSST, providers were expected to arrange for some form of certification for participants completing the training, whether this was Masters level credits, a professional award or other certification. Gaining a professional award or accreditation was cited as a reason for participation by 58 per cent of the survey respondents, but by a much larger proportion of the maths TSST participants than those participating in physics TSST (62 per cent maths; 42 per cent physics). This could be linked to the higher proportion of teachers reporting that they participated in maths TSST in order to improve their career options, as described above, as an award or accreditation can be useful when applying for jobs. Only 13 per cent took part to gain credits towards a Masters degree, although this could be, in part, down to the fact that not all providers offered Masters credits.

Finally, the interviews highlighted another reason, not listed in the survey, which was that the course was free to attend, as mentioned by a participant and a provider below:

Free training was amazing (TSST participant).

Also [a lot of the participants] *asked if they could do it rather than being told by the school that they had to do it. They are doing it because they want to do* [it] *rather than because the school need them to do it…so it wouldn't have been funded by the school probably (*Provider*).*

5.4.3 Non-completion

Providers reported a low level of non-completion by participants, which tended to occur mainly if job roles or personal circumstances changed. Two providers highlighted that, if a school had sent a teacher on the course without the teacher being particularly keen or engaged, then that participant was more likely to drop out. This was particularly the case when the course was held outside of teachers' contracted hours, for example during twilight or weekend sessions:

We have got some who have trained to teach another subject but have been thrown into [teaching] *maths who are struggling with their confidence, or who are already delivering maths but don't feel they have the subject knowledge for it. Interestingly, those ones have stayed the course. We have some whose schools pushed to do it, their school said they needed more support in maths, they turned up for a bit and then went…. For recruitment, it has to be people that want to do it because it is such a commitment of time. It can't be people whose schools say you're not very good at teaching maths, because those people don't want to come. The people that want to come are the people who are thinking each week 'I'm struggling here so I need a bit more confidence'.*

The quality of the content and delivery was thought to be critical to keeping participants engaged and in encouraging them to attend the whole course, which usually takes place over two to three terms. One provider explained their view:

My view is that it [TSST] *is a good idea, and schools also think it is a good idea, otherwise I wouldn't have 16 participants. And the participants valued it because they were still there at the end and the attendance has been really good. And the initial evaluations we've had were positive. So I think we have done a good job and I think that participants had a good deal.*

5.5 Content and delivery

5.5.1 About the providers

In order to deliver TSST, providers (lead schools) are required to apply to NCTL each year outlining their subject(s) of interest (maths and/or physics) and how they intend to recruit and deliver the course. All lead schools were rated good or outstanding in their most recent Ofsted inspection and demonstrated experience of

designing and delivering high quality professional development as part of their application.

Reasons for offering TSST included that it was aligned to their existing programmes of training and development, and that they had recognised a growing use of non-specialist teachers in maths and physics. Furthermore, some providers described a 'moral responsibility' to share knowledge and invest in the development of the school workforce:

> We've got a really, really strong suite of maths teachers, all of whom are good or outstanding, and we felt that as a Teaching School we have got a moral responsibility to develop that across the Alliance and local area… If the maths department is weak [in a school] then the impact on the outcomes for students is colossal …There are so many non-specialist teachers, so many people that have been teaching maths a long time, and perhaps have lost their way a little bit in terms of teaching methods [and we felt] that whilst we have the expertise it was important we share it.

Many of the providers interviewed had experience of running maths and/or physics training prior to TSST, and they drew on their local reputation when developing and advertising the programme to potential participants.

Providers worked with a range of strategic partners (such as other schools or a nearby university) to design and deliver their programmes. Interviewees explained that the content was developed either in consultation with universities (although in most cases not delivered by the university), or was based on existing Subject Knowledge Enhancement (SKE) provision that the school/provider had developed. The providers who were interviewed tended to use one or more of the following approaches in combination:

- cover the whole syllabus for a key stage or key stages
- focus on commonly misunderstood concepts
- carry out a skills/knowledge audit at the start of the course and tailor the content accordingly.

As one provider reported:

> We started with the basics of how do you teach algebra because a lot of them were defaulting to the way they were taught themselves and, if they were not maths specialists, they were probably taught using algorithms and a few tricks, and we didn't want them passing it on to the pupils…it was about pupil understanding, getting the pupils to understand the mathematics or understand the physics.

5.5.2 Model(s) of delivery

Since providers have been able to design their own training, this has led to wide variation in models of content and delivery, often tailored to local need (see Box 5.1). Providers who were interviewed reported that having this flexibility was a key to the success of the design and delivery of TSST.

Box 5.1: Examples of TSST delivery models offered by providers interviewed

A two-phased approach – phase 1 offered to current non-specialist teachers, delivered fortnightly through the year. Phase 2 was delivered in June, and offered to non-specialists who knew that they would start teaching maths from the following September and aimed to help them prepare for the change.

Delivery to whole departments within a school – this allowed a focus on that school's priorities, and also helped providers to meet their recruitment targets.

Two different cohorts, with differing delivery models, in order to address barriers to participation and to reach more teachers. In this case, one cohort attended twilight sessions and the other attended full- or half-day sessions in the holidays.

A one-to-one delivery model, involving the course provider running sessions with individual teachers around their free-periods in school, to target individual strengths and weaknesses.

Running the training in twilight sessions was by far the most common model experienced by survey respondents (56 per cent; also see Figure 5), and provider and participant interviewees noted that this avoided or minimised the need for lesson cover, though there were occasions when sessions clashed with other commitments such as parents' evenings. However, full-day sessions were almost as common, with 46 per cent of survey respondents reporting that they had attended training delivered in this way. Some providers used two or more facilitators during the face-to-face sessions, either as a way of differentiating the content, or to simply provide additional support and experiences to draw on during delivery.

All providers who were interviewed offered face-to-face sessions, and half of the providers also provided participants with a mentor or buddy, although they reported that uptake of the mentor support by participants varied. Only 15 per cent of the survey respondents said they had received mentoring or coaching as part of TSST. When they were used, mentors were usually deployed to support and challenge participants between sessions, for example by reviewing their progress and working through challenging topics. However, several provider interviewees highlighted that the mentors needed to be well briefed on the role expected of them, trained and

supported to fulfil the role, and engaged in the process for this to be a valuable addition to the TSST provision.

The flexibility for providers to develop their own course content and delivery method meant that they were also free to consult with their target audience, the schools and teachers, and adapt the programme accordingly. All of the providers reported doing this to some extent at some point during the course, usually before the course commenced and then throughout the training using discussion or feedback forms. This also supported their ability to differentiate the content for their intake of teachers, which comprised of participants with a range of experience of teaching maths/physics. This included those currently teaching as a non-specialist, those who had never taught maths/physics and, in a few instances, returners (who in some cases were a maths/physics specialist previously). While participant interviewees generally valued learning as part of a diverse group of teachers, a few participants felt that more could be done to support those with weaker subject knowledge, for example by offering additional subject knowledge sessions to this group.

Figure 5 Forms of delivery of TSST training experienced by survey respondents
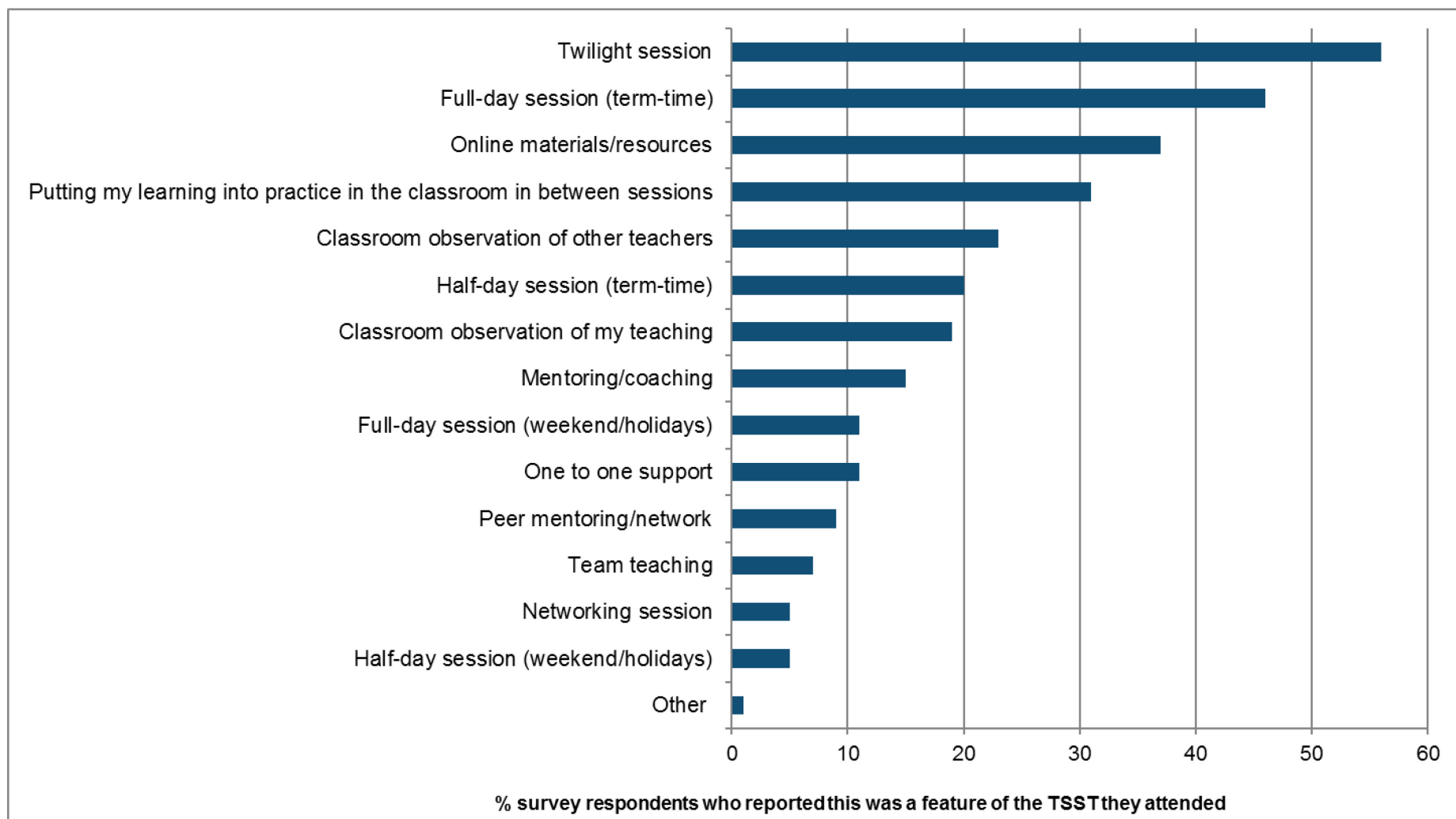
% survey respondents who reported this was a feature of the TSST they attended

More than one answer could be given so percentages may sum to more than 100.
A total of 876 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

Around three-quarters of the survey respondents indicated that their individual learning needs had been identified in some way at the start of the course, while nearly a quarter (24 per cent; 25 per cent on maths TSST and 21 per cent on physics TSST) said they were not aware that their needs had been assessed (see Table 9). The most common methods for assessing individual needs that respondents were aware of were by having a discussion with other participants led by the course leader (40 per cent) and a skills audit (39 per cent). This was a multiple-response question, so more than one method of assessment may have been used by providers.

Table 9 How individual learning needs were assessed at the start of the training

How were your individual learning needs identified at the start of the training?	%
Discussion with other participants led by course leader	40
Skills audit	39
One-to-one discussion with course leader	19
Formal test	13
Other	2
I'm not aware that my needs were assessed/identified	24
No response	1
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of 877 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

5.5.3 Participants' experiences of the strand

Overall impressions of TSST were that it was *'brilliant'* and *'really good'* (TSST participant interviewees). The vast majority (90 per cent) of survey respondents said that they would recommend TSST to others, indicating that TSST was very well received by participants across all providers. Only two per cent said they would not recommend the course, and seven per cent were not sure. This picture was similar across both TSST subjects, and also did not vary by the amount of experience participants already had in teaching maths or physics. Two of the participants who completed a follow-up interview in autumn 2016 remarked:

> *I really enjoyed taking part in the TSST course and I would recommend it to any head in the local area as a worthwhile course to send appropriate teachers on.*

> [TSST was a] *good course that was not too time consuming and has had a positive impact on my confidence in delivering what is not my first subject.*

Teachers were very positive about the content and delivery of TSST, with around nine in ten survey respondents rating the following as 'very good' or 'good':

- subject knowledge (94 per cent)
- delivery of the training (91 per cent)
- subject-specific pedagogy (88 per cent).

Responses did not generally differ greatly by subject, although a slightly higher proportion of physics TSST participants rated these elements of the course as 'very good' compared to maths participants (for example, 65 per cent of physics TSST participants rated the subject-specific pedagogy as 'very good' compared to 52 per cent of maths participants). Similarly, TSST participants who had been teaching the subject for three years or more tended to rate the content and delivery more highly, compared with participants with less experience of teaching maths or physics (74 per cent of those with three or more years' experience of teaching maths/physics rated the subject knowledge provided by the course as 'very good' compared to 66 per cent with two years or less experience and 65 per cent of participants with no experience of teaching maths or physics).

Face-to-face sessions were delivered by school staff, university staff or consultants (for example, ex-teachers). Sessions run by current teaching staff were rated most highly because they were able to draw on their up-to-date classroom experience in the sessions. TSST participant interviewees recognised the additional value of current classroom knowledge, and appreciated accessing resources and lesson plans that had been tried and tested in the classroom recently. Furthermore, they felt it gave TSST more credibility when the course leader was outlining what does and does not work in lessons. As one participant interviewee explained: *'I always value someone being open and honest and talking from their own experience, it really helps you accept what they are saying is real'*. A common point, raised in provider and some participant interviews, was that the *quality* of the delivery was key to the success of the programme.

The most common challenge experienced by participants in undertaking TSST was the amount of time required (27 per cent), closely followed by a lack of opportunities to practice what they had learned in a classroom setting (25 per cent) and the scheduling of sessions at a time that they could not attend (23 per cent) (Table 10). As might be expected, a higher proportion of respondents who were not currently teaching maths or physics (42 per cent) reported that lack of opportunities to practice was a challenge, compared with those already teaching the subject (21 per cent).

Note that only around two-thirds (64 per cent) of respondents answered the question about challenges faced, which suggests that a third did not experience any challenges during their participation in TSST.

Table 10 Challenges faced when undertaking TSST

Have you faced any of the challenges below in undertaking TSST?	%
Amount of time required to undertake TSST	27
Lack of opportunities to practice what I have learned in a classroom setting	25
Scheduling of sessions at times when I cannot attend	23
Insufficient time to reflect and make changes to practice	11
Difficulty gaining agreement from my school to attend	5
Cover not being arranged	4
Other (please specify)	7
No response	36
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of 564 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

5.6 Strengths and success factors

Participants particularly valued learning *'how to teach'* maths or physics, for example learning about how to make the content engaging and interesting for the age groups they taught, acquiring tips and strategies for explaining the concepts, and having access to resources and a network of teachers with whom they could discuss ideas and share resources. The most useful elements of the training, mentioned by participants in response to an open question in the survey[29], were related to participants' reasons for attending the course and key learning points from the training as outlined below. The quotations in Box 5.2 illustrate the views of participants taking part in the survey and interviews.

TSST's focus on improving pedagogy (reported by 26 per cent in survey open question)

In addition to valuing the way TSST worked to improve subject-specific pedagogy in a broad sense, participants mentioned that they liked the fact that the course taught them how to address misconceptions held by pupils and how to teach different key stages and abilities. Maths TSST participants were slightly more likely to mention this than those on physics TSST (27 per cent compared with 22 per cent). Respondents with more experience of teaching maths or physics were more likely to mention the focus on pedagogy as a strength of the course: 29 per cent of teachers

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[29] The elements listed were coded from a fully open question, to which survey respondents wrote their answer rather than ticking a box. Due to the open nature of the question, and the way people tend to answer open questions, the percentages are likely to be lower than if a list of tick boxes were presented.

with three years or more experience of teaching maths or physics, compared with 25 per cent of those who had taught it for two years or less and 22 per cent of teachers with no experience of teaching the subject.

TSST's focus on improving subject/curriculum knowledge (reported by 22 per cent in survey open question)

Respondents were keen to improve their subject knowledge, both as a pure subject, but also in relation to change to the new curriculum. More maths TSST participants mentioned the focus on subject and curriculum knowledge as a strength of the training than physics participants (23 per cent and 18 per cent respectively), possibly because physics TSST participants tended to have a higher qualification in the subject, as discussed above in section 5.3.4. There was no particular variation by length of experience of teaching maths or physics.

The availability of practical sessions and practical ideas for teaching maths/physics (reported by 22 per cent in survey open question)

The inclusion of practical sessions was mentioned by a much higher proportion of physics participants than maths (45 per cent and 15 per cent respectively). This is likely to be related to the intrinsic differences in the way that the two subjects are taught, and the importance of practicals in delivering physics in the classroom. These respondents valued the practical nature of the sessions, and the 'hands-on experience' on offer. In addition to talking about learning how to teach practical sessions and activities, respondents valued *receiving* tips that they could apply themselves when teaching, from teachers who had run the practical sessions many times in the past and who knew the potential pitfalls. As a provider commented:

> *Delegates hugely valued the* [physics] *practical sessions. What to do when things go wrong because things do go wrong.*

A further eight per cent of the survey respondents said that their TSST course offered demonstrations or the opportunity to observe or be observed, which they felt was key to the success of the programme.

The resources/materials provided (reported by 14 per cent in survey open question)

Respondents were positive about being provided with, or signposted to, resources they could use in their own teaching. This was particularly the case for the maths participants; 17 per cent of maths respondents mentioned the resources, compared to only four per cent of physics respondents. This may be related to more physics TSST participants having higher pre-course qualifications in the subject, or the relative focus on resources rather than practicals in maths TSST compared to

physics. There was a similar level of response across the groups with different levels of experience teaching maths or physics.

The opportunity for networking and learning with other similar teachers
(reported by ten per cent in survey open question)

Some respondents particularly valued that they were training in a group with other non-specialist teachers in a similar position teaching maths/physics. They felt that it was a safe environment in which to ask questions, discuss issues, ideas and concerns.

Other key strengths of TSST, identified in the interviews, included:

- it being free, local training
- delivery by current teachers with up-to-date experience – this overlaps with the practical nature of the course, mentioned above
- accreditation (where available)
- it being an effective way of training new non-subject-specialists before they started teaching the subject, and widening the career prospects of some:

  It is advantageous to be teaching maths [while doing TSST], *but some of those people* [considering a subject change] *would not be in the position of considering applying for job* [if they had not done TSST]…*because they've done something that checks their maths knowledge...and lets them weigh up if they want to do this next step in their career* (Provider).

Box 5.2: Participant views on effective features of TSST (from survey and interviews)

The focus on improving pedagogy

Learning about teaching maths in new ways and helping realise things about teaching maths that would not have previously been considered. Introduced to a number of new mathematical concepts that I had no subject knowledge of and how to teach them.

The most useful area for me was understanding how maths is taught today. This was covered in depth and useful techniques and theory was discussed. The course itself was extremely well taught and enjoyable. I really feel I gained much from it.

The face-to-face sessions going through a lot of typical pitfalls when teaching physics and mistakes that can be made, as well as going over some of the changes to the new spec. The online material [was] *very interesting.*

New pedagogical ideas to help develop schemes of work in physics.

The focus on improving subject and curriculum knowledge

The review of maths that I have not studied for about 40 years.

Subject knowledge and looking at topics and changes to curriculum.

Going over basic physics concepts, being taught content.

I wanted to make sure that all the gaps in my knowledge were filled.

The availability of practical sessions and practical ideas for teaching maths/physics

Trying out practical activities that we can use in class.

Practical advice for teaching maths.

How to conduct the practical work in physics.

A fantastic aspect of it was all of the ideas for demonstrations and all of the practical ideas, just all of the engaging ways of teaching relatively boring stuff to kids…that was really interesting.

5.7 Learning and areas for development

As outlined above, teachers were very positive about TSST in terms of the delivery, content and overall experience. Participants only had relatively minor suggestions to enhance the programme further, as described below. Suggestions for improvements were varied, and some might only be relevant to a few providers due to the different delivery models being used. It should also be noted that improvements were being made to the programme on an ongoing basis, both at an overall strand level, and at a provider level.

The most frequently mentioned suggestion for improvement was for providers to offer more opportunities to practice or apply learning, including more observations (mentioned by 12 per cent of survey respondents). Participants who had experienced this as part of their TSST course really felt that this added value to their learning. This was also recognised by some of the providers. For example, one provider felt that participants not currently teaching the subject, and especially those not currently in a permanent school (such as returners and supply teachers), struggled *'because tasks were set to apply what* [they had] *learned and they are not always in a classroom enough to apply it'*. Individual examples of ways around this were described, such as the provider or participant's school offering opportunities to observe or teach a lesson, but these were rare. Participants not already teaching maths or physics would value opportunities to observe and to teach being incorporated within all TSST provision, as this interviewee who was hoping to return to teaching explained: *'What was missing for me was the opportunity to see outstanding physics practitioners in action'*. In addition, the returner, who was positive about the course content and delivery, felt that this was an important gap when trying to return to teaching:

> *The issue is that you can't practice what you have been taught…In terms of what has stopped me getting the most from the training it is the lack of opportunity to gain classroom experience which is ideally needed…You need this experience teaching pupils – it is key. Otherwise, when you apply for jobs they will say that you don't have recent teaching experience and can't demonstrate that you can still teach* (TSST participant).

Although, as described above in section 5.5.2, most survey respondents indicated that their individual learning needs had been identified at the start of the course, a small but notable proportion of participants (10 per cent of survey respondents) mentioned this as an issue. It is important that providers tailor the course to the needs of the group, for example by conducting a skills and knowledge audit. Some participants emphasised that it was not sufficient to identify their learning needs, action must also be taken as a result. Linked to this, the pace of the course and individual sessions was felt to be too fast by ten per cent of the survey respondents,

some of whom would like more time on the course. Suggestions from participants included offering additional SKE sessions to those who need it.

On the whole, participant interviewees were positive about the content and areas covered by TSST. However, ten per cent of the survey respondents would like TSST to cover even more on pedagogy. In addition, a small number of participants (in both the survey and the interviews) reported that they would like to see Key Stage 5 included in the training in the future.

Practical or logistical changes were suggested by one in ten survey respondents, and also mentioned by interviewees. However, the suggestions for change were very varied and included requests relating to their specific course, such as changes to the type and timing of sessions and the location of courses. It would not be appropriate for TSST providers to make generic changes in terms of logistics, other than to ensure that they listen to participants and their schools, to minimise barriers to participation where they exist. Providers, either in local groups, or nationally with the support of the NCTL, may wish to consider ways of improving the matching of participants to the most suitable TSST course, for example by looking at models of delivery within a local area and ensuring that there are (for example) both twilight and full-day TSST models on offer, so that participants can select the delivery model that best suits them. Improving the TSST online directory of provision to allow participants to search by delivery model may also improve participant satisfaction.

Formal support from the participant's school (such as mentoring or opportunities to practice teaching maths or physics) was not a requirement to attending TSST, although in the NCTL Operational Handbook providers were encouraged to consider how they would secure commitment from headteachers to release staff. Indeed, some participant interviewees reported that their school was not aware that they had applied for the course. However, the providers and participants taking part in the evaluation felt that support from the participant's school was important for: agreement for time off to attend sessions if required; access to the maths or physics department and their staff; and to ensure opportunities were provided to observe and teach maths or physics (particularly if participants were not currently teaching the subject). Not all participant interviewees had this support in place, and some providers reported that they were looking at making this a requirement in future.

A key challenge was the timing of the course. Providers reported that, if sessions were still running over the exam period, they had to adjust the programme to take account of this. However, the flexibility afforded to providers meant that they were able to accommodate these changes.

As TSST is developed by individual providers, there is inevitably variation in the content and style of delivery which, as discussed above, is one of its strengths.

Overall, feedback from the survey and from the interviews indicates that the courses are well received and judged to be meeting expectations. Quality assurance of provision is overseen by NCTL through termly progress reports and an end of programme impact report. Furthermore, providers are asked to outline their quality assurance processes as part of their application to offer TSST, and are responsible for ongoing quality assurance of their training programme. This is supported by the requirement to offer certification, professional award or Masters credits, but not all providers have yet managed to meet this requirement (particularly in maths), and some providers interviewed would welcome further support in accrediting their TSST programme as discussed in section 5.4.1. Feedback from this evaluation and direct from schools has led to NCTL introducing a national working group of schools and key stakeholders (such as subject-specialist organisations). The working group is looking at the quality and consistency of TSST provision at a national level and will implement a number of measures to reinforce this element of the programme.

Although a Knowledge Hub was set up to provide a communication forum for lead schools, and contact details were circulated following the start up meetings for the programme, some providers said they would welcome more opportunities to learn from other TSST providers and to be able to compare strengths and weaknesses. This included learning how other providers approach recruitment, content and delivery.

5.8 Outcomes

5.8.1 Outcomes for participants

Participants reported increases in confidence, knowledge and ability to deliver engaging lessons as a non-specialist teacher as a result of their participation in TSST, both in the survey and the interviews. In addition, they felt more able to discuss and answer pupils' questions about tricky topics. As one physics-specialist interviewee reported: '*I'm more open to questioning from the pupils because I'm more able to answer them*'.

Almost all respondents reported that TSST had increased their knowledge and confidence in teaching maths or physics to at least 'a small extent' (see Figure 6). In particular, almost two-thirds felt that TSST had, to 'a large extent' or 'a very large extent':

- increased their confidence teaching maths or physics (66 per cent)
- increased their subject knowledge (63 per cent) and helped them to apply their new subject knowledge in the classroom (61 per cent)
- met their individual learning needs (61 per cent).

More than half of all respondents felt that TSST had, to 'a large extent' or 'a very large extent':

- led to improvements in their teaching practice (58 per cent)
- increased their pedagogical knowledge (56 per cent) and helped them to apply their new pedagogical knowledge in the classroom (54 per cent)
- increased their ability to answer questions from pupils (55 per cent)
- led to improvements in their pupils' understanding and progress (55 per cent).

The vast majority of respondents who had attended physics TSST reported that the course had increased their confidence in undertaking physics practicals to some extent (96 per cent from 'a small extent' to 'a very large extent'), with seven in ten respondents stating that it had increased their confidence to 'a very large extent' or 'a large extent' (70 per cent).

Overall, participants from maths and physics TSST held similar views about how TSST had made an impact on them. However, higher proportions of physics participants tended to say that TSST had improved the way they work with pupils to 'a large extent' or 'a very large extent', while maths participants had seen more of a change in their subject knowledge:

- significantly more maths participants (65 per cent) felt that TSST had 'improved [my] subject knowledge to 'a large extent' or 'a very large extent' than physics participants (54 per cent)
- there were also significant differences between the subjects in how TSST was perceived to have impacted on participants' ability to work with pupils:

  - 62 per cent of physics participants and 53 per cent of maths participants felt that TSST had 'increased [my] ability to answer questions from pupils'
  - 63 per cent of physics participants and 52 per cent of maths participants felt that TSST had 'led to improvements in [my] pupils' understanding and progress'.

Maths participants' relative high rating of impacts on their subject knowledge may be related to two factors: the focus of some maths providers on supporting participants to develop their subject knowledge in line with the new maths curriculum; and maths TSST participants tending to have lower prior qualifications in maths than physics participants had in physics, as discussed above in section 5.3.4.

Figure 6 The extent to which survey respondents felt that TSST had improved elements of their teaching

Legend:
- To a very large extent
- To a large extent
- To a moderate extent
- To a small extent
- Not at all
- Not applicable
- No response

Categories (y-axis, top to bottom):
- TSST increased my confidence teaching maths/physics
- TSST increased my subject knowledge
- TSST helped me to apply new subject knowledge in my classroom
- TSST met my individual learning needs
- TSST led to improvements in my teaching practice
- TSST increased my pedagogical knowledge
- TSST led to improvements in my pupils' understanding and progress
- TSST increased my ability to answer questions from pupils
- TSST helped me to apply new pedagogical knowledge in my classroom

x-axis: % respondents (0 to 100)

A series of single response questions.
Due to rounding, percentages may not sum to 100.
A total of 877 respondents gave at least one response to these questions.
Source: NFER TSST survey summer 2016.

Survey respondents reported a range of more specific changes to their teaching practice as a result of their attendance on TSST, in addition to those reported in Figure 6 above. The most frequently cited changes (in a response to an open question) were:

- 'I have made changes to teaching methods/pedagogy' (35 per cent)
- 'I have better subject/terminology knowledge, and confidence in my knowledge' (13 per cent)
- 'I use new/more practicals/activities' (in both maths and physics) (12 per cent)
- 'I use new resources/websites/equipment' (covered in TSST) (nine per cent)
- 'I am more confident in delivering lessons' (seven per cent)
- 'I am better able to explain concepts to students/engage in discussion' (six per cent)
- 'I plan lessons differently' (five per cent).

Changes to teaching methods included encouraging pupils to use problem solving and reflection methods in the classroom, being better able to break topics down, and having a focus on making sure that pupils understand a topic before moving on to the next subject area. The interviews suggested that TSST participants currently teaching maths or physics are able to make changes to their teaching practice almost immediately. This includes applying changes in delivery style, adapting and improving schemes of work or running more engaging physics practicals, following demonstrations they have seen in training. These interviewees' comments illustrate these outcomes:

> *I've been mindful of the things I been taught and tried to incorporate them into the lessons…It* [TSST] *has given me more confidence in terms of how to teach maths and I have gained personally in terms of my subject knowledge* (TSST participant).

> *I've got more confidence using practical equipment* [in physics]…*I have a wider range of teaching strategies* (TSST participant).

> *Participants are able to deliver maths lessons competently. We have done a third of the observations…I'm delighted with the outcomes and we have seen evidence of change. Headteachers are also happy with the outcomes. We have transferred examples of teaching approaches to participants and we have seen a great understanding of maths and increased confidence and passion that is being transferred to students* (Provider).

The challenge for participants who were not yet teaching the subject was to sustain their learning for future opportunities – six per cent of the survey respondents said that they had not been able to make any changes to their teaching practice because they were not teaching maths or physics at the time. However, there were other ways in which the learning from TSST had a benefit: two per cent had incorporated the learning into their teaching of other subjects.

In addition to the survey and the interviews undertaken during the 2015 to 2016 academic year, follow-up contact was made with 17 of the 20 participant interviewees once the new 2016 to 2017 academic year had started. The aim was to explore further impacts of TSST on their role and teaching (Box 5.3, also see section 5.8.2 below).

Box 5.3 Reflections on the impact of TSST

Teachers who participated in the follow-up contact in autumn 2016, in the academic year after they had completed TSST, were all very positive about the impact of TSST on their teaching. Common points raised are included below.

TSST had improved their knowledge, especially of changes to the curriculum, as two of the interviewees explained:

> *TSST has had massive impact on the way I teach physics… in particular* [in improving my] *understanding and knowledge of the changes to the new GCSE.*

> [Attending TSST] *increased confidence and subject knowledge as well as improved knowledge and understanding of misconceptions and the importance of addressing these.*

TSST had improved participants' confidence, particularly when they were questioning students in class and, for physics TSST participants, when they were running practicals and demonstrations:

> *I am just teaching Key Stage 3 mainly*, [but] *the TSST course gave me an insight into what sort of thing the students will be facing at GCSE which has an impact on my teaching. It has helped with my confidence in that I have some up-to-date knowledge. It has helped with my questioning and challenge setting.*

> *Definitely my knowledge and confidence were the main things that improved as a result of the TSST course…. My confidence using demonstrations and setting up practicals has also increased dramatically.*

Participants reported that they had access to more resources and practical ideas for teaching and, as a result, their teaching methods now included more practical activities, project based teaching and problem solving:

> *It has made my teaching practice much more practical-orientated when I teach certain abstract concepts.*

For some participants, TSST had helped them to reflect on their teaching more widely and apply learning in other subjects that they were teaching.

5.8.2 Changes to role

Although, for many TSST participants, it was too early to say how much maths/physics teaching they would be doing next year (the survey and main interviews were conducted during the summer term and respondents may not have had their timetables confirmed for the next academic year by this point), some had already secured new jobs teaching maths/physics or increased their hours. As one provider reported: *'Several of our* [participating] *teachers will deliver maths next year'.* The follow-up contact with 17 of the 20 participant interviewees provided an opportunity to see how, if at all, their role had changed as a result of TSST in the academic year after they had completed TSST. For 13 of these participants, their role was the same (four people), or slightly expanded in terms of teaching slightly more hours, or to a higher ability or key stage (nine people). Two of these participants explained the impact they felt TSST had made on their career:

> *TSST played a role* [in getting a promotion], *there is massive crossover of physics in some of the* [engineering] *units I teach. The way the course was presented, I now deliver lessons in that way…I wouldn't be in the position I'm in now without TSST, I wouldn't have the confidence to teach the units I teach now as there is a large academic slant on physics in these topics even though it is a vocational course.*

> *I'm teaching more higher-level maths now since doing the course. I was teaching lower ability students last year. I'm also now mentoring other teachers that have not taught maths before.* [All of this is] *because I've been on TSST.*

Three of the participants who participated in the follow up were still not teaching the subject, but one of them said they would be later in the 2016 to 2017 academic year. The remaining two both explained how they were using the learning from TSST within their existing subjects, for example one was applying what they had learned in maths TSST to improve their delivery of the maths components of biology GCSE and A Level.

In June/July, respondents to the survey were asked about changes to their teaching role during and after their attendance at TSST training. More specifically, they were asked about changes in the number of hours they were teaching maths or physics at three different time points, and the key stages they were teaching. The questions did not explicitly link changes in role to their attendance in TSST, so any conclusions about causality should be made with caution. However, it is possible to see some indications of how TSST participants' roles are starting to change.

Two-thirds of respondents (66 per cent) knew that they would be teaching maths or physics from September 2016[30], and a further quarter (23 per cent) did not know yet[31].

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30 Three-quarters of respondents had taught maths or physics prior to the survey, as reported in section 5.3.4.

Only 11 per cent knew they would definitely not be teaching maths or physics from September 2016.

Of those who knew they would be teaching maths or physics next year, most of them (84 per cent) said that this would be in their present school and 15 per cent reported that they would be joining a new school.

Number of hours teaching maths or physics

The survey findings show early modest increases in the number of hours spent teaching maths/physics by TSST participants (Figure 7).

The overall mean[32] number of hours spent teaching maths or physics per week in 2015 to 2016, across the whole sample, increased from **6.5** hours at the start of the 2015 to 2016 academic year (before attending TSST) to **7.9** hours at the end of the 2015 to 2016 academic year (during/after attending TSST) (see Figure 7). The chart also shows the changes in the number of hours taught by sub-groups of interest. Of particular note is the increase in hours taught by respondents who had been teaching maths or physics for two years or less – from 7.8 hours before the course started to 10.6 hours by the end of TSST. Considering that these increases occurred within a single academic year, for which the timetable was likely to be fixed at the start, it appears that schools employing TSST participants are already utilising the new skills and knowledge gained by their teachers.

31 Note that the survey was conducted during the summer term and as such respondents may not have had their timetables confirmed for the next academic year by this point.
32 Some data cleaning was carried out to remove particularly high values (36 hours and above) as these were considered outside the realistic range of a school teaching week. The mean includes where the number of hours was zero, not just cases where they had been teaching.

Figure 7 Mean number of hours spent teaching maths/physics per week in the 2015 to 2016 academic year
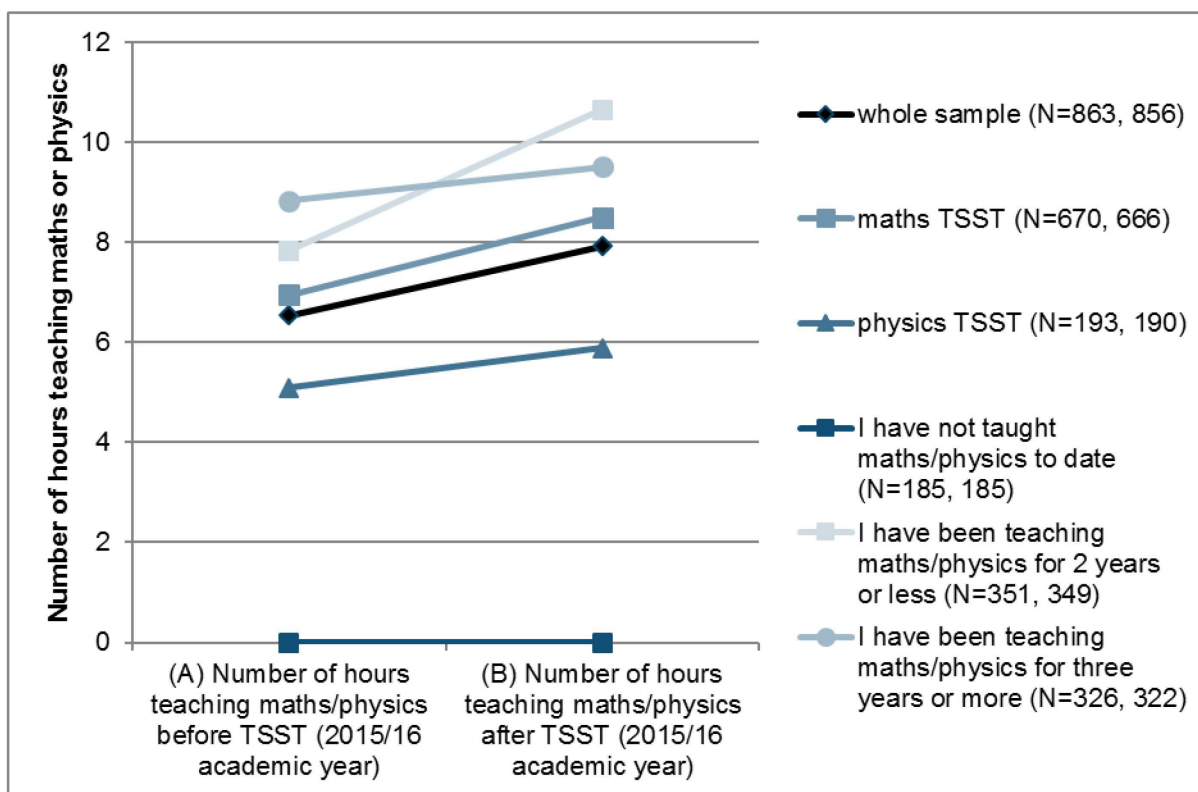
This chart is based only on data from respondents with a valid response at both time points. The number of responses (N) at each time point is indicated as follows within the legend: (N= timeA, timeB). Variations in the N at different time points are due to fluctuations in non-response.
Source: NFER TSST survey summer 2016.

Respondents were also asked about the hours they would be teaching maths or physics in the forthcoming academic year (see Figure 8) – this was an estimate, because at the time of the survey in June/July 2016, many participants would not have known their timetable for the 2016 to 2017 academic year. It should be noted therefore that the results are slightly different to those presented in Figure 7, because each chart is only based on the number of respondents (N) with a valid response for the set. Data on hours from September 2016 was only available for 55 per cent of the sample (the remainder of the sample were unsure of the number of hours, or did not answer the question), which is why the comparison between hours in 2015 to 2016 and hours in 2016 to 2017 is based on a smaller number of respondents.

Of the respondents for whom data was available for September 2016 onwards, the mean number of hours teaching maths or physics increased from 7.8 hours before TSST to 10.0 hours from September 2016. Again, in terms of the sub-groups, the largest increase was seen in teachers who had been teaching maths or physics for two years or less, from 9.2 hours before TSST to 12.6 hours in the following academic year. Respondents who had not been teaching maths or physics at all in 2015 to 2016 reported that they would be, on average, teaching 2.5 hours of maths or physics per week from September 2016 after their TSST course.

Figure 8 Mean number of hours spent teaching maths/physics per week; predicted change from the 2015 to 2016 academic year to the 2016 to 2017 academic year
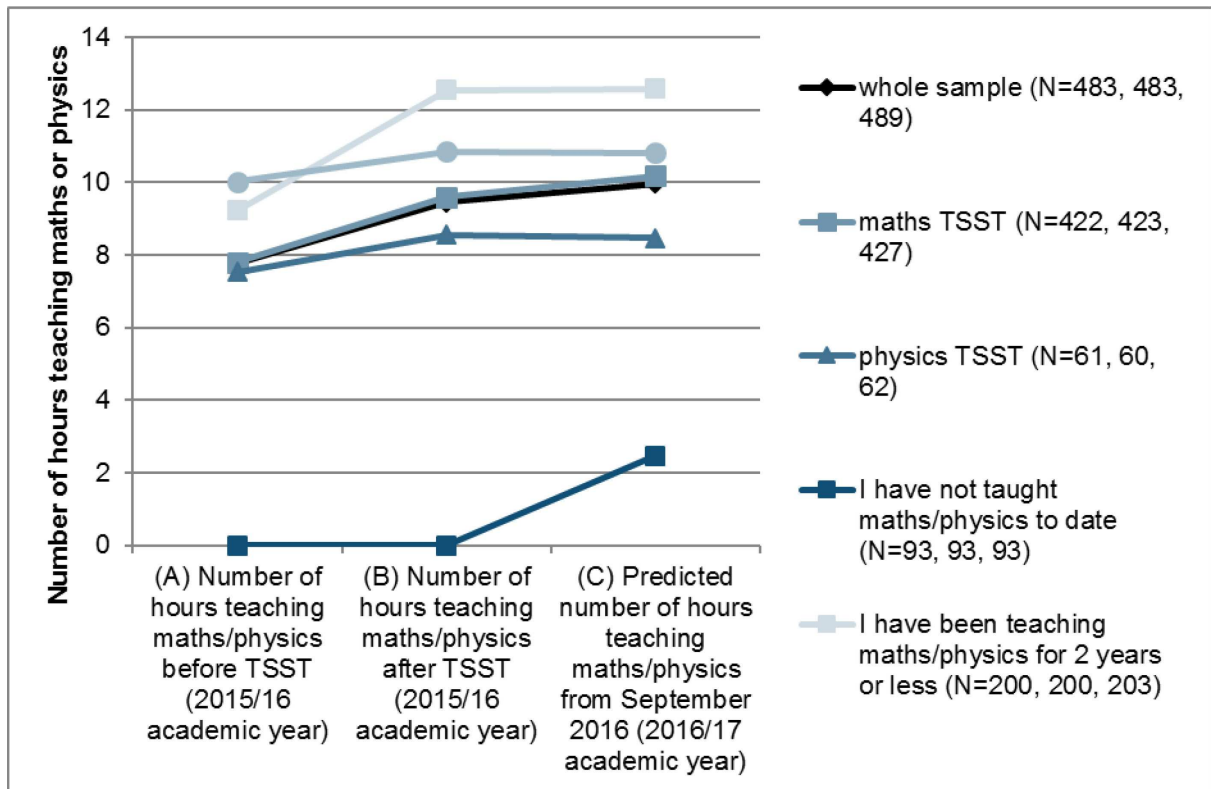

This chart is based only on data from respondents with a valid response at all three time points. The number of responses (N) at each time point is indicated as follows within the legend: (N= timeA, timeB, time C). Variations in the N at different time points are due to fluctuations in non-response.
Source: NFER TSST survey summer 2016.

Respondents who were not sure about the number of hours they would be teaching maths or physics from September 2016 (N=179) were asked to provide their best estimation of what would happen, shown in Table 11 below. Almost half (45 per cent) thought that they were likely to be teaching more hours of maths or physics from September 2016 than in 2015 to 2016, while a third thought that the number of hours was likely to stay the same (32 per cent).

Table 11 Estimation of the number of hours teaching maths or physics from September 2016

If you aren't sure of the exact number of hours you will be teaching maths/physics from September 2016 yet, please tick the statement below that best reflects what you think will happen:	N	%
I am likely to be teaching more hours of maths/physics from September 2016 than I did in 2015/16	80	45
I am likely to be teaching fewer hours of maths/physics from September 2016 than I did in 2015/16	7	4
The number of hours is likely to stay the same as 2015/16	57	32
I have no indication yet	32	18
Total	176	100

Due to rounding, percentages may not sum to 100.

A filter question: all those who answered 'I don't know how many hours yet' to the question: 'Approximately how many hours will you teach maths/physics from September 2016?'

Source: NFER TSST survey summer 2016.

Changes to the key stages taught

More respondents indicated that they were teaching up to Key Stage 4 (KS4) maths/physics after participating in TSST, than they were before the course (44 per cent were teaching to KS4 before TSST compared with 55 per cent after TSST) (Table 12). It should be noted that this figure does not include respondents who did not know their timetable for the coming year, and so this percentage does not necessarily represent all TSST participants[33].

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[33] Table 12 only includes data from respondents who indicated that they were or would be teaching maths/physics at each time point. In the case of their teaching from September 2016, 301 of the full sample of respondents (Q14) were filtered out from this analysis, 201 of whom did not (yet) know if maths/physics would be on their timetable for the following academic year. A follow up of this sample after the 2016 to 2017 academic year has started would provide this information.

Table 12 Highest key stage to which respondents taught maths or physics

Highest key stage taught	Before TSST (2015/16 academic year) (%)	After TSST (2015/16 academic year) (%)	From September 2016 (2016/17 academic year) (%)
I did not teach maths/physics at this time	12	6	-
I don't know which key stages yet	-	-	5
KS2	15	14	15
KS3	22	18	18
KS4	44	55	55
KS5	4	4	6
No response	3	3	2
Total %	100	100	100
N	695	695	581

Due to rounding, percentages may not sum to 100.

A filter question: all those who indicated that they were or would be teaching maths/physics at that time point.

Source: NFER TSST survey summer 2016.

5.8.3 Outcomes for schools

The immediate outcomes from TSST relate to improving individual teachers' abilities to deliver effective maths and physics lessons, and their confidence and knowledge in teaching the subjects. Beyond that, providers and participants could see likely benefits for the wider teams within schools employing TSST participants:

> *The outcomes you'll see is that people we have will be employed in maths teaching posts, I think the schools that have sent people will see an impact, because the teachers are more confident, so lessons are calmer, the standards are better. I think you'll also see, fingers crossed in a few years, an impact on results as well…because people are more confident, better teachers…* (Provider).

One provider highlighted benefits to schools involved in the development and delivery of TSST:

> *Having teachers who are currently teaching physics day in day out to a wide variety of children with different abilities and different backgrounds will just give an edge to* [TSST]…*and when my colleagues sit down to think about the programme it will improve their teaching too…my colleagues are very excited to try out some new experiments that they have wanted to develop and I think this will give them the opportunity with the group of participants. The funding will allow us to purchase some of the materials to do this, which will also benefit our school…you get a double benefit.*

It was beyond the scope of this research, and too early to gather information on these wider outcomes, but a subsequent evaluation could gather views from schools employing TSST participants in order to better understand the impacts on schools.

5.9 Early indications of potential for additionality

5.9.1 Competing initiatives

Providers did not see much external competition other than SKE courses which, in their view, do not include the pedagogical element of TSST, seen by providers and participants as vital to the success of the programme. Providers highlighted that a key strength of TSST was that it is free at the point of access, which is not always the case for competing SKE courses: '*A local school with a good reputation offering a free course is attractive'* (Provider). Although NCTL said they had encouraged providers to work together to avoid overlap and competition, some providers felt that the main competition was actually from other TSST providers within the local area. They commented that this could send a mixed message to applicants and thinned each provider's pool of potential participants rather than increasing it.

TSST participants who participated in the interviews did not seem to be aware of much in the way of alternative CPD, other than SKE courses or internal inset training or shadowing subject specialists within their own school. The minority of participant interviewees who mentioned that they had considered other types of subject-specialism training (such as those offered by Science Learning Centres, Learning Partnerships and A Levels) indicated that they had chosen TSST because it met their needs better than the alternative, in terms of content or convenience (for example in relation to the timing or location of the course).

Provider interviewees felt that what was unique about TSST was its coverage of '*how to teach'* the subject, with training delivered by expert teaching practitioners with current classroom knowledge:

> *The quality of the training, delivered by teachers who are teaching in the classroom there and then, not university lecturers who have not taught maths* [in a classroom for a long time]. *It's people actually teaching in a classroom, teaching day in day out who are up-to-date with all the latest specifications and the latest methods in teaching in an outstanding department… I think it would be hard to find that on any other programme* (Provider).

5.9.2 Additionality

It is important to note that, as for the other strands, the methodology of this research is not sufficient to robustly measure additionality i.e. what has been achieved that would not have been achieved in the absence of the strand. In the case of TSST, it was not

possible to measure the number of additional hours of maths and physics being taught by non-specialists that completed TSST. However, it has been possible to explore early perceptions and indications of possible additionality which are reported below.

The main aim of TSST was to improve the subject and pedagogical knowledge of non-specialist teachers by offering teacher subject-specialism training and, as such, one measure of additionality for this strand relates to the number of non-specialist teachers completing training who would not have done so otherwise. It was possible to gather an indicative measure of this, through the self-reported participant survey.

More than nine in ten survey respondents had not undertaken any other maths or physics training at the same time as TSST (91 per cent) (Table 13). Respondents who had completed some additional training at the same time as TSST mentioned attending SKE courses (13 people). Course providers mentioned included charities/private providers, universities and schools (13, nine and six people respectively).

Table 13 Incidence of other subject-specific training undertaken at the same time as TSST

Have you undertaken any other maths/physics subject-specific training at the same time as TSST?	N	%
Yes	72	8
No	805	91
No response	5	1
Total	882	100

Due to rounding, percentages may not sum to 100.

Source: NFER TSST survey summer 2016.

Almost half of respondents said they would not have done any subject-specialism training in the absence of TSST (47 per cent), suggesting that TSST has encouraged many non-specialist teachers of maths and physics to undertake subject-specialism training who would not have done so otherwise. Only a small proportion, around one in six respondents (16 per cent), said that they would have taken some subject-specialism training if TSST had not been available, and a further third did not know if they would have (36 per cent).

This varied by the amount of experience teaching maths or physics - those already teaching maths or physics were more likely to say that they would have done some subject-specialism training in maths or physics than participants with no classroom experience of the subject. This was particularly the case for participants new to teaching maths or physics, as a fifth (21 per cent) of participants with two years' experience or less said they would have done some training in the absence of TSST, compared to one in seven (14 per cent) of participants with three years' experience or more and one in twelve (eight per cent) of participants with no experience of teaching maths or physics (see Figure 9).

It appears that TSST is particularly enabling new non-specialist teachers to train to teach maths and physics: three out of five participants who had not taught the subject before (61 per cent) said that they would **not** have done some other form of subject-specialism training, compared to half of those who had been teaching the subject for three years or more (49 per cent) and two-fifths of those with less than three years' experience (39 per cent).

Of those who said they would have done some training, SKE was the most frequently mentioned, by 12 people. Furthermore, in the interviews, participants said that if they had not completed TSST, they would have talked to staff within their own schools and read books on the subject instead. One provider explained:

> *The informal feedback suggests there are people who wouldn't have done anything if it wasn't for this. They were quite happy to carry on as they were, but because this was offered they saw it as a different opportunity and one that could fit with what they are doing…I am of the view that the majority wouldn't have done SKE* [as an alternative] *if it wasn't for the fact that this* [TSST} *was offered and funded locally… The costs would have been prohibitive for a lot.*

Figure 9 Whether respondents thought they would have taken subject-specialism training in the absence of TSST, by length of time teaching maths/physics
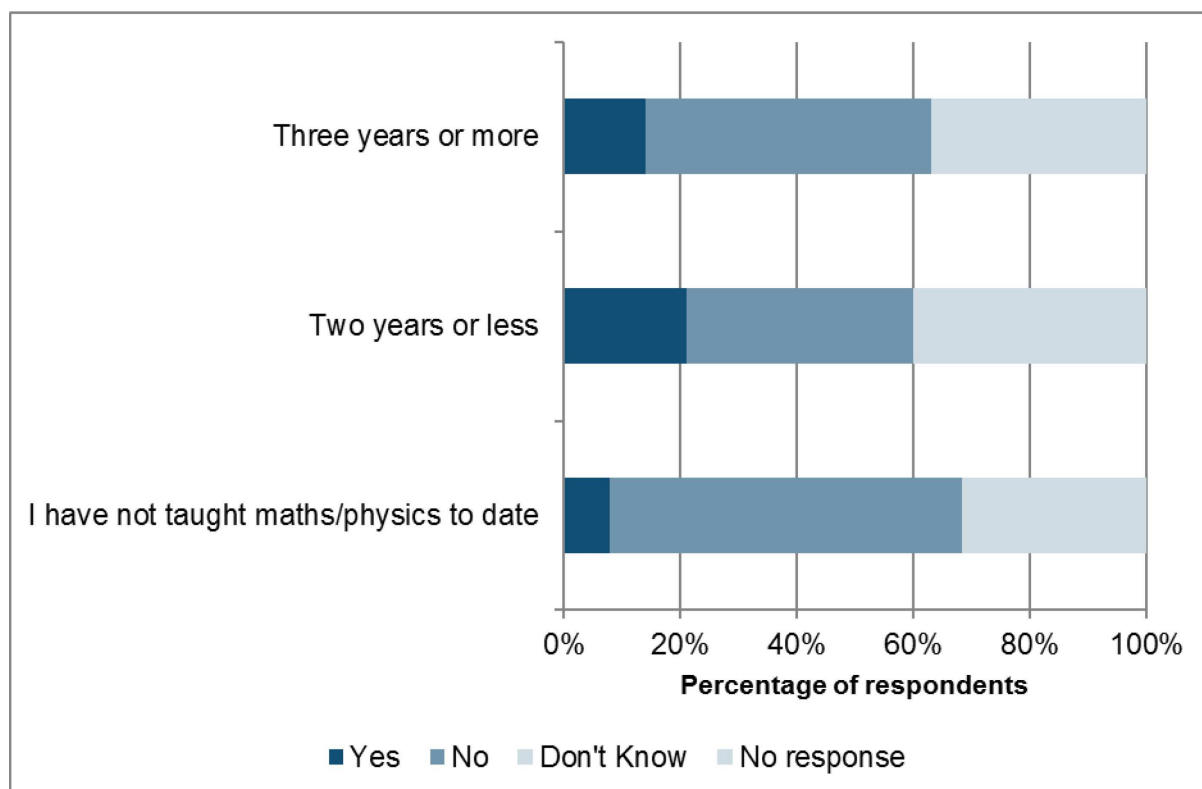
Due to rounding, percentages may not sum to 100.
A total of 877 people answered this question.
Source: NFER TSST survey summer 2016.

5.10 Summary and next steps

Provider and participant interviewees alike were very positive about TSST and the way in which it had supported non-specialist teachers of maths and physics to improve their subject knowledge and pedagogy, increase the number of hours they teach these subjects and to take on higher key stages. Teachers reported that they were more confident and knowledgeable since completing the training and that they had been able to increase their pupils' understanding of the subject. Almost half of TSST participants surveyed indicated that they would not have done any subject-specialism training in the absence of TSST. This increased to three-fifths for those participants with no experience of teaching the subject. However, although the target of 3,000 for 2015 to 2016 was almost met, some of the providers interviewed thought that, in future years, recruitment would become more difficult once they had drawn on all potential local recruits through existing networks.

For almost half of TSST participants responding to the survey, their highest prior level of qualification in their TSST subject was GCSE. In contrast, more than a quarter of respondents to the survey had a prior qualification in their TSST subject at undergraduate level or above. This latter group appeared to be using the course to

refresh their subject knowledge or to gain pedagogical knowledge if they had completed their ITT in a subject other than maths or physics.

Maths and physics TSST participants tended to have similar views on TSST overall. However, there were some significant differences, with more physics participants rating the impact on how they work with pupils more highly than those on the maths course, and maths participants rating the impact of TSST on their subject knowledge more positively than physics participants.

The evaluation identified a number of areas of good practice that should be continued where they are already occurring, and considered by any providers not currently incorporating them. These elements include:

- offering opportunities to observe outstanding teaching of maths or physics, and where possible, opportunities for participants not currently teaching maths or physics to put their learning into practice in the classroom
- allowing a break in the TSST programme around exam periods
- using current good or outstanding specialist teachers of maths and physics to deliver the courses
- securing buy-in from participants' employers to ensure that support is in place (for example a commitment to release staff to attend and, where possible, opportunities to observe or practice teaching maths or physics)
- ensuring that differentiation is in place, in particular to cater to participants needing additional subject knowledge. Providers may wish to consider additional (optional) subject knowledge sessions for participants needing extra support in improving their subject knowledge.

Based on the evidence from the evaluation of year 1 of the programme, the recommendations for NCTL and individual TSST providers include:

- developing TSST for Key Stage 5
- supporting non-specialist teachers to share the learning from TSST (such as new ways to deliver practical sessions) within their school
- scheduling the recruitment period to coincide with the start of the school year, when schools make decisions about which training to offer staff (recruitment was delayed in the 2015 to 2016 academic year due to a delay in confirming the funding of the programme).

In addition, NCTL should consider:

- offering more guidance to providers about brokering a form of recognition, professional award or certification, in particular for maths TSST
- improving the online directory of provision so that participants can look for TSST courses by, for example, model of provision (full-day, twilight) that best suits them

- the spread and reach of TSST providers to minimise overlap by competing TSST provision in a single area – for example by conducting a mapping exercise of where provision is located across England to inform where gaps need to be filled, for maths and physics as separate subjects
- offering (more) opportunities for providers to come together to discuss and learn from each other
- as part of the work to improve the process for collecting MI, clearly communicating in more depth the purpose of the data requested, and the importance of accuracy, particularly if the intention remains to match it to other databases using TRNs, which some providers found burdensome to collect. Better understanding by providers of why data is needed and how it will be used (e.g. to match to the SWC) may improve their engagement with the exercise. NCTL may also wish to consider also collecting demographic information directly from providers, rather than depending on a good match to other databases.

These areas for development are currently being considered by NCTL.

6 Conclusions and recommendations

This section provides some overall conclusions in terms of the progress of the four MPTSP strands as well as some recommendations for their future development.

6.1 Conclusions

The conclusions below draw together the findings of the four strands in relation to: strand effectiveness; structure of provision and delivery models; outcomes for strand participants; future supply, reach and demand; early indications of additionality (i.e. whether outcomes would have been achieved in the absence of strands); and monitoring data.

6.1.1 Effectiveness of content and delivery

Qualitative evaluation data suggests that there is variation on the effectiveness of the four strands. Paid Internships and TSST are perceived to be working particularly successfully, with early perception data suggesting that they have the potential to yield additionality. In addition, the survey of TSST participants provides more robust evidence that this strand is performing well and demonstrating additionality, by improving participants' self-reported confidence and knowledge and leading to early modest increases in the number of hours spent teaching maths and physics.

Key success factors include:

- well-conceived content and delivery – allowing flexibility to local/participants' needs
- universal buy-in to aims
- existing provider expertise, including drawing on expertise from partners e.g. universities and subject associations
- market demand
- schools' autonomy in recruiting participants
- effective promotion, drawing on local networks and partnerships
- good communication between strand lead, providers and participants
- effective management of participants' expectations
- high quality delivery
- provision of real classroom experience.

Participants were positive about the delivery of RTT and praised several aspects of the RTTA service; however, the content was seen as insufficient as inactive teachers often required more support than that available through RTT to overcome barriers to returning. Specific issues for RTT largely related to the variable quality and availability of pre-existing resources and training and the shortage of classroom experience opportunities to which participants are signposted, neither of which were funded by the strand.

Maths and Physics Chairs appears to be working less effectively from the viewpoint of interviewed participants, as discussed below.

6.1.2 Structure of provision and role of schools

The structure of provision and the role of schools differ by strand, with central placement of schools within delivery models and headteacher/senior leader engagement perceived to be vital to effective delivery.

Where schools are *providers* delivering training and are committed to the strands' aims, there has been considerable success. For example, the success of Paid Internship and TSST are primarily related to the fact that schools are highly engaged with delivering the model and can see how they will benefit in the longer-term.

In contrast, some of the issues identified by returning teachers and schools participating in RTT seem to be related to the fact that schools are not directly involved as providers or beneficiaries, but are being asked to offer shadowing and placement opportunities for potential returners, without receiving any reimbursement or direct benefit.

In the case of Maths and Physics Chairs, schools are employing Chairs but are not the provider which has resulted in schools' lack of engagement in, and understanding of, the model. This is linked to the provider's lack of influence or control over schools. This has meant that some Chairs have experienced a lack of support from their schools, resulting in difficulties in being accepted by teaching colleagues and in performing their role effectively. Positive engagement from all three core parties (the provider, schools and the SCITTs delivering teacher training) is needed to ensure the success of the strand. Further research is needed on these issues, in particular to gather the perspectives of those stakeholders who were not included in this research, such as the schools employing the Chairs, and participants who withdrew from the strand before completion. Furthermore, subsequent research could gather evidence on the effectiveness of the Maths and Physics Chairs strand in meeting its core aims of producing effective teachers, who support the development of other teachers and undertake high quality research which is valued by schools.

It is important to note that the school-led system and, in particular, the development of academy chains in sometimes quite dispersed geographical areas, opens up new possibilities for these four strands and others in the MPTSP to be harnessed in innovative ways. For example, it would be possible for academy chains to provide a variety of experiences for Chairs across a group of schools, and to use their expertise across the chain. Similarly, school groups could provide placement experiences for returners. Any subsequent evaluation could investigate this further.

6.1.3 Outcomes for strand participants

Early evaluation data suggests that two of the strands are resulting in the desired outcomes for participants and have achieved good levels of recruitment and retention. TSST has been well received by participants, who report that the course is meeting its stated aims of increasing their subject-specific knowledge and pedagogy, and their confidence to not only deliver the content, but also to field questions and lead discussions with pupils. Furthermore, TSST providers and participants have identified likely benefits to schools in terms of improved results, although a longer-term evaluation is needed to better understand the impacts on schools. Paid internships have also been well received due to the intensive nature of the placements in schools and the authentic experience of teaching. The internships appear to be leading to applications to ITT, although further follow up on a larger scale will be needed to confirm this.

However, the RTT and Maths and Physics Chairs strands are experiencing less initial success. For Maths and Physics Chairs, retention is an issue. The withdrawal rate was 31 per cent in the 2015 to 2016 cohort and, while participants are not obliged to commit to teaching after they have completed the strand, many of the participants interviewed were unsure whether they wished to stay in teaching in the longer-term. Participants cited issues around communication and authority and a subsequent evaluation should investigate whether these early problems can be resolved.

While RTT has met its overall recruitment target for 2015 to 2016, it has had a lower than anticipated conversion rate, partly due to schools being reluctant to offer shadowing and placement opportunities and/or to employ returners.

Outcomes appear to vary for different types of participant and their place in the teaching supply chain e.g. entry to ITT, entry to teaching, re-entry to teaching, changes in role within teaching. There is some evidence that employers in general, and schools in particular, can favour those in the early stages[34] (e.g. young undergraduates with few commitments, who are willing to work full-time and are cheaper to employ) whilst older returners with family commitments seeking part-time roles have reported finding it difficult to secure teaching posts. This appears to have affected the relative success of different strands, with RTT particularly affected.

TSST is the only strand where it has been possible to look at differences in outcomes by subject. Although general views of the impact of TSST on their teaching were similar, there have been some slight differences by subject, with more physics participants rating the impact on their confidence and teaching methods more highly than those on the

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[34] Harris, Douglas N., et al. (2010). Mix and match: What principals really look for when hiring teachers. *Education. 5*(2). 228-246.
Redman, T., & Snape, E. (2002). Ageism in teaching: Stereotypical beliefs and discriminatory attitudes towards the over-50s. *Work, Employment & Society*, *16*(2), 355-371.

maths course, and maths participants tending to rate the impact of subject knowledge more positively than physics participants. During this early process evaluation, the numbers of interviewees have been too small to robustly assess differences by subject and gender for the other strands. In terms of gender differences, these are emerging in relation to RTT where some respondents, primarily females, are looking for part-time working and are finding this difficult. However, these differences are not easy to disentangle, and intersect with other characteristics and issues such as age and family circumstances. It will be important to explore differences by maths/physics and gender in future research, particularly following ITT, and as participants progress into and within teaching, since evidence shows that that gender gaps open up as teachers move further in their careers[35].

6.1.4 Future supply, reach and demand

In terms of future supply for the strands, there is likely to be an ongoing pool of undergraduates in maths and physics for Paid Internships and it will be interesting to track recruitment to the strand for future cohorts. However, the supply for the other three strands is less certain.

TSST could encounter a supply problem once the first cohorts of participants have undertaken the training, and some areas have already experienced competition for participants, which is being managed with varying success by individual providers. It seems likely that there will be areas without provision (e.g. rural areas and areas of deprivation). A geographical mapping exercise of TSST provision across the country could inform decisions about future contracting of providers. In addition, analysis could be carried out to estimate the size of the pool of teachers eligible in future years, in order to inform planning of subsequent cohorts.

RTT, whilst apparently drawing on a large population of inactive teachers, may in the medium term exhaust the supply of former teachers who are both interested in, and suitable, for returning to teaching, especially if the conversion rate remains at about 11 per cent. Consideration could be given to transforming this strand or linking it into a school-led model, as discussed below.

Maths and Physics Chairs appears to have relatively modest recruitment targets given the target market of all those with a PhD in maths or physics. However, the fact that this strand has experienced difficulties in meeting recruitment targets, and retaining some participants, suggests that the number of those with the required PhD in maths or physics, as well as the appropriate attributes and motivation, may be insufficient to meet the recruitment targets.

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[35] Earley, P., Higham, R., Allen, R., Allen, T., Howson, J., Nelson, R., & Sims, D. (2012). *Review of the school leadership landscape*. NCSL.

In terms of capacity and reach of all of the strands, and as mentioned above in regards to TSST, it will be important for all strand leads to map the geographical spread of provision to ensure that it reaches deprived and disadvantaged areas. These are likely to be areas with the most acute issues in recruiting maths and physics teachers.

It will also be important for any future evaluation to monitor the extent to which schools as 'customers' of the teacher supply package are interested in recruiting or training teachers through the strands, and whether this differs in relation to, for example, schools in different circumstances.

6.1.5 Early indications of additionality

This primarily qualitative research can give an indication of whether the strands are *likely* to meet the aim of training and recruiting additional teachers who would not otherwise have entered the profession. A more scientific, quantitative evaluation is required to more robustly measure additionality. However, three of the four strands evaluated appear to be showing potential for a good level of additionality.

In terms of Paid Internships, data from the small number of interviews undertaken suggests that the majority of these participants would not have achieved the same outcomes in the absence of the strand due to a lack of similar options. However, it is not possible to gauge at this stage what proportion will apply to ITT who would not have done so otherwise.

Regarding Maths and Physics Chairs, there are no competing initiatives with a salary uplift and the opportunity to undertake personal research while training. In addition, the qualitative interviews with Chairs suggest that most would not have gone into teaching in the absence of the strand. However, retention is a current issue.

In terms of TSST, almost half of the survey respondents said they would not have done any subject-specialism training in the absence of TSST. However, further research is needed to more robustly measure the number of *additional* hours of maths and physics being taught by non-specialists who have completed TSST.

Regarding RTT, this research was not able to detect indications of additionality. The advisor support has been helpful and well received but conversion rates and outcomes have been lower than initially anticipated, and those returners securing teaching posts identified determination, luck and serendipity as key to their success - more so, in some cases than the advisor support. The effectiveness of the strand could be improved by expanding its role in brokering classroom experience opportunities, since participants reported that their lack of recent teaching experience was viewed negatively by potential employers.

6.1.6 Monitoring information

The quality of monitoring information differs by strand and, for most strands, positive changes have been made or are being proposed for current and future cohorts. Issues have generally related to lack of consistency in the data collected by providers, data that is essential not being collected, and additional data being requested by NCTL once providers have already collected data from registrants.

6.2 Recommendations

The recommendations below have been grouped into the following themes: content and delivery; recruitment and engagement; collection of monitoring data; and further research. They are intended to pick up general themes which relate to all of the four strands evaluated here. Strand-specific recommendations, primarily related to RTT and Maths and Physics Chairs, are also included following this.

6.2.1 Programme-wide recommendations

Content and delivery

- Consider specifying and requiring a level of accountability and commitment from participants, their school, and providers of the strands. For example: agreement within schools over expectations and usage of the research day in Maths and Physics Chairs (also see below); in TSST, securing a commitment to attendance from participants and a commitment to support/time to attend and to offer opportunities to practice from senior leaders (if participant is employed).
- Ensure that classroom experience and observation of good/outstanding teaching are an integral feature of all strands.
- Where strands are working well, explore ways in which provision can be extended to other target audiences (for example other university year groups in the case of Paid Internships) or extended to offer wider support such as training in higher key stages (e.g. Key Stage 5) in the case of TSST.
- Facilitate wider sharing of the learning and benefits of strands with all those involved, including providers, participants, schools and ITT providers. This could be extended to include the other four strands of the MPTSP.
- Where a strand has more than one provider, ensure there are opportunities (workshops, seminars) for providers to discuss ideas and experiences, and to learn from successes and challenges beyond their own provision.

Recruitment and engagement

- Carry out analysis to estimate the size of the pool of trainees and teachers who are both eligible and suitable to participate in the strands to inform planning of subsequent cohorts.

- Where it is possible that supply for strands may tighten in future (TSST, Maths and Physics Chairs and potentially RTT), plan for actively managing future provision and supply in terms of ensuring that provision:

  - is available in deprived and geographically isolated areas which may have the most severe recruitment issues – this will require mapping existing provision to identify gaps
  - fits the needs of under-represented groups (e.g. teachers wishing to work part-time).

- Review messaging to potential participants of all strands to ensure it matches their needs and prior experience, and manages their expectations about what the strand will and will not offer. This particularly applies to RTT, for which further research into local employment opportunities would be beneficial to support RTTAs in providing specific localised messaging.
- Review messaging to schools to encourage support for all strands, but especially RTT and Maths and Physics Chairs. In terms of Maths and Physics Chairs, for example, previous participants could act as ambassadors of the strand, helping both potential Chairs and schools (and SCITTs where applicable) to understand the benefits of the strand and how to run the strand effectively for all concerned. In addition, for RTT, the involvement of schools that have successfully employed returners could be used as case studies or school advocates to encourage other more sceptical schools to get involved.

Collection of monitoring data

- There is room for improvement in the collection, completeness and accuracy of monitoring data.
- High quality data collection systems, with inbuilt checks to reduce human error, should be set up to make it as easy as possible for providers submitting the data. This should include pre-specified response categories, where appropriate, to facilitate ease of data collection and analysis. NCTL has already begun work on this. For example, for TSST, NCTL has introduced a new way of collecting the data for providers from 2016 to 2017, to increase the quality of the MI submitted.
- NCTL should ensure that data requirements are outlined to providers prior to recruitment so that providers know what they need to collect from registrants, participants and those who withdraw, and at what time points data will need to be reported to NCTL.
- NCTL may wish to consider collecting early returns of data from providers/schools so that they can check that data is being collected and collated in line with requirements.
- Where there is an expectation that the information will be matched to other datasets, such as the SWC, providers need to be provided with clear instructions about the requirements for data collection to support matching to these datasets.

Matching whole cohorts of participants will not be possible if the quality and completeness of data is poor.

Further research

Longer-term assessment of the effectiveness and impact of these strands is vital and should include the areas detailed below.

- The evaluation findings presented here make some assumptions about views/expectations of schools. Therefore, it is very important to undertake further research with schools as 'customers' of each strand, in terms of:

  - their interest in recruiting or training teachers through the strands and any differences related to school characteristics and circumstances
  - perceptions of the teaching quality and effectiveness of trainees and teachers recruited through the strands
  - in relation to Maths and Physics Chairs, views on the value and practicalities of employing teachers in a hybrid teaching/research role.

- Explore each strand's success in (as appropriate): converting interns into trainee teachers (Paid Internships); recruiting/retaining effective teachers who are able to have an impact on pupils' outcomes (all strands); participants' progression and promotion to leadership positions (TSST and Maths and Physics Chairs).
- Where participant withdrawal occurs, explore reasons for drop out to inform future developments.
- With quantitative survey data, explore participant differences by maths/physics and gender.
- Explore the overall value for money of all strands with other routes for attracting highly qualified maths and physics candidates into teaching, such as bursaries and scholarships.

6.2.2 Strand-specific recommendations

More detailed strand-specific recommendations can be found at the end of each chapter. However, a summary is provided below.

Paid Internships

This strand is working very effectively. However in terms of key recommendations:

- providers should ensure successful recruitment by publicising the internships via universities
- the processes for collecting management information could be streamlined
- strand leads should consider facilitating a workshop to enable providers to share examples of what works and effective practice (this could include recruitment, content and delivery, monitoring and payment systems).

Maths and Physics Chairs

In further developing the Maths and Physics Chairs model of delivery:

- ensure that SCITTs and schools are committed to the strand and clear about their roles and that the schools share aims and objectives with relevant staff (e.g. managers and colleagues of Chairs) to ensure that the strand is fully understood and accepted and Chairs can perform their role effectively. This requires improved communication and could include developing or refreshing a shared memorandum of understanding and a set of Key Performance Indicators, including in relation to:

  - the role of Chairs in terms of class teaching, raising pupils' aspirations for university study, curriculum design, university/employer links and teacher professional development so that the range of benefits for the school are understood and shared
  - much clearer understanding by all involved on the expected aims of the research day, including making sure that the research: links to school priorities; is of benefit to the school; is shared with others; is understood by, and useful for, teaching staff

- ensure clarity amongst all those involved in the Maths and Physics Chairs strand in relation to mapping the career path beyond the three years of the strand, including the expected future employment and role of 'post-Chairs', to support retention of Chairs both within the three years and beyond. This could include guidance, provided for participants, and their employing schools, on next steps after completing the Maths and Physics Chairs strand
- review the spread of universities participating in the strand across the country to enable all participants to have easy access to an institution or other organisation which can support their research.

NCTL/DfE should also consider:

- gathering data from host schools and SCITTs to explore the issues relating to communication, power and authority from their perspective, and to explore views on the effectiveness of Chairs and their impacts on teachers and pupils
- gathering additional MI to provide a fuller set of data on participating Chairs and those who withdraw after starting. The strand provider is now (2016 to 2017 academic year) collecting a broader range of information which could be analysed to further understand the characteristics of both active participants and those who start the strand and then chose to withdraw
- analysing the characteristics of those who do not complete the Maths and Physics Chairs strand and their reasons to support the development of strategies to improve retention
- gathering objective and/or independent data on the achievement of the wider objectives of the Maths and Physics Chairs strand such as exploring: impact on A

Level STEM uptake by pupils and widening university participation; number and impact of CPD sessions delivered by Chairs; the impact of research; and impact on school-business links

- gathering evidence of the impact of Chairs' research on schools. This could be gathered by a combination of MI data and as part of the independent evaluation of the roll out programme
- in the context of the early difficulties in recruitment, retention and strand experiences highlighted in this report, placing a focus in the evaluation on exploring these issues, for example by examining cost, recruitment and retention data, ideally compared with other routes at similar stages of development/implementation alongside alternative ways of gaining highly qualified input to schools such as placement, mentoring or STEM Ambassador schemes.

RTT

The main recommendations for improving the effectiveness of the RTT strand include to:

- consider ways of providing classroom experience with the opportunity for a reference as part of the strand. As well as signposting to TSST, this could include: paid or unpaid internships; courses with integrated classroom experience; and opportunities to observe effective teaching
- improve the quality and navigability of online resources and courses related to subject knowledge. Consider a MOOC (massive open online course)/Open University style online modules or tutoring in place of mentoring – these could continue when returners are in posts to support retention. In the meantime, RTTAs should manage returners' expectations and the possible limitations of the signposted opportunities in fully meeting their needs
- incorporate a promotion and brokering role to schools to increase school buy-in and responsiveness by: raising awareness of returning teachers' benefits and liaising directly with schools to secure appropriate work-experience for returners
- assess the quality and geographic access/patterns in terms of course locations, schools offering opportunities and mentors (for example) as these may be unevenly spread and investigate options for tackling gaps in provision
- consider reviewing the marketing messages from NCTL to better manage the expectations of returners - in reality it is not as smooth and straightforward to return to teaching as some anticipate and competition for jobs can still be strong
- consider how awareness of RTT might be improved amongst former teachers.

TSST

The strand is working well, and participants and providers report that teachers completing the training have better subject knowledge and confidence to teach maths and physics. Key recommendations for TSST include to:

- share learning from good practice across providers (for example providing opportunities to observe or practice teaching maths/physics and differentiation of content for participants with different levels of experience)
- offer further guidance to providers about how to engage strategic partners who could help them to offer certification or academic awards
- secure buy-in from participants' employers to ensure that support is in place.

All of the areas for development outlined above are currently being considered by NCTL.

Appendix A Glossary

CPD: continuing professional development

DfE: Department for Education

EBacc: English Baccalaureate

HLTA: higher level teaching assistant

IOP: Institute of Physics

ITT: initial teacher training

KS2, KS3, KS4, KS5: Key Stage 2, Key Stage 3, Key Stage 4, Key Stage 5

LA: local authority

MFL: modern foreign languages

MI: management or monitoring information

MOOC: massive open online course

MPTSP: Maths and Physics Teacher Supply Package

NCTL: National College for Teaching and Leadership

NQT: newly qualified teacher

PGCE: Post-graduate Certificate in Education

QTS: qualified teacher status

RIS: Researchers in Schools programme

RTT: Return to Teach

RTTA: Return to Teach Advisor

SCITT: School Centred Initial Teacher Training

SEN: special educational needs

SKE: subject knowledge enhancement

SRT: Supporting Returning Teachers course (also called RTT pilot programme)

STEM: science, technology, engineering and maths

SWC: School Workforce Census

TA: teaching assistant

TRN: teacher reference number

TSA: Teaching School Alliance

TSST: Teacher Subject Specialism Training

Appendix B TSST survey basic frequencies of response

B1.1 Demographic information

Table 14 Gender

Q34 - Your gender	N	%
Male	305	35
Female	556	63
No response	21	2
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 15 Age

Q35 - Your age	N	%
24 or under	56	6
25-34	327	37
35-44	231	26
45-54	206	23
55+	42	5
No response	20	2
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

B1.2 Teaching experience

Table 16 Qualified Teacher Status (QTS)

Q4 - Do you have QTS (Qualified Teacher Status)?	N	%
Yes	771	87
No	111	13
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 17 Full-time or part-time working

Q6 - Do you work full-time or part-time?	N	%
0.9 FTE or Full-time	727	82
0.7 or 0.8 FTE	60	7
0.5 or 0.6 FTE	51	6
0.3 or 0.4 FTE	14	2
0.1 or 0.2 FTE	15	2
No response	15	2
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 18 Length of service

Q7 - How many years have you been teaching?	N	%
2 years or less	212	24
3-5 years	184	21
6-10 years	186	21
11-15 years	141	16
16-20 years	83	9
21+ years	72	8
No response	4	0
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

B1.3 Returners

Table 19 Incidence of returners

Q8 - Are you returning from a career break from teaching?	N	%
Yes	62	7
No	820	93
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 20 Incidence of those involved in a Returners programme

Q9 - Have you been involved in a Returners programme?	N
Yes, the STEM/Maths and Physics Returners programme	18
Yes, the EBACC Returners programme	4
No	40
Total	62

Due to rounding, percentages may not sum to 100.
A filter question: all those who answered 'yes' to Q8 - Are you returning from a career break from teaching?
Source: NFER TSST survey summer 2016.

Table 21 Subjects taught by respondents (multiple response)

Q10a which subjects do you currently teach?	%
Maths	48
Physics	24
Biology	24
Chemistry	23
Physical Education (PE)	20
General Science	18
English	12
Computer Science	12
Geography	11
Religious Education (RE)	10
Design &Technology	9
History	9
Art	8
Modern Foreign Languages (MFL)	5
Business	5
Other	18
No response	2
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of *867* respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

Table 22 Main/specialist subject taught

Q10b - Which is your main/specialist subject?	N	%
Maths	233	26
Physical Education (PE)	119	13
Biology	105	12
Chemistry	68	8
Computer Science	44	5
Business	33	4
Design &Technology	31	4
Physics	33	4
English	28	3
General Science	27	3
Primary or Early Years	29	3
Geography	21	2
Modern Foreign Languages (MFL)	16	2
Music/dance/drama	21	2
Art	6	1
History	8	1
Religious Education (RE)	8	1
Other	26	3
No response	26	3
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 23 Length of time teaching maths/physics

Q11 - For how many years have you been teaching maths/physics (if at all)?	N	%
I have not taught maths/physics to date	185	21
1 year or less	220	25
2 years	143	16
3-5 years	153	17
6-10 years	91	10
11-15 years	52	6
16-20 years	22	2
21+ years	14	2
No response	2	0
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 24 Highest maths/physics qualification

Q5 - What is your highest level maths/physics qualification?	N	%
Postgraduate degree (Masters/Doctorate)	118	13
Degree/HND/HNC	108	12
Some Maths/physics modules as part of a degree of another specialism	10	1
GCE 'A' level/Scottish/Irish/Higher Grade/Vocational Level 3	225	26
AS level	13	1
GCSE/GCE O level/School Certificate/NVQ level 2	402	46
None of these	4	0
Uncodeable/irrelevant/miscellaneous	1	0
No response	1	0
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

B1.4 participation in TSST

Table 25 Main subject focus of TSST

Q2 Main TSST subject	N	%
Maths	685	78
Physics	197	22
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 26 Process by which they applied to TSST

Q17 - Which statement best reflects how you came to apply for TSST?	N	%
I was told/asked to participate by my school	328	37
I volunteered to take part/put myself forward	531	60
I was invited/ it was suggested to me by an external individual or organization	7	1
My school informed/offered me the course	4	0
Return to teach recommended it/through RTT	11	1
Uncodeable/irrelevant/miscellaneous	1	0
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 27 Reasons for attending TSST

Q18 What did you or your school hope to achieve from your participation in TSST?							
	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)	Not applicable (%)	No response (%)	Total (%)
To build my confidence teaching maths/physics	57	34	5	1	0	1	1	100
To improve my subject knowledge of maths/physics	60	32	4	2	1	1	1	100
To improve my pedagogical knowledge in maths/physics	48	40	9	1	0	1	1	100
To improve my skills in running practical sessions	32	36	20	5	2	3	3	100
To gain a professional award/accreditation	26	32	22	9	3	5	3	100
To support me to teach maths/physics as hours in my main/specialist subject are being reduced	15	14	16	14	9	30	3	100
I wanted to start teaching maths/physics	22	18	18	8	4	27	3	100
To gain credits towards a Masters	5	8	21	18	12	32	4	100
To improve my future career options	34	36	14	4	2	8	2	100
Other (please specify)	4	1	0	0	0	1	93	100
N = 882								

A series of single response questions.
Due to rounding percentages may not sum to 100.
A total of 880 respondents gave at least one response to these questions.
Source: NFER TSST survey summer 2016.

B1.5 Content and delivery

Table 28 Types of training undertaken through TSST

Q19 Which type(s) of training have you undertaken through TSST?	%
Twilight session	56
Full-day session (term-time)	46
Online materials/resources	37
Putting my learning into practice in the classroom in between sessions	31
Classroom observation of other teachers	23
Half-day session (term-time)	20
Classroom observation of my teaching	19
Mentoring/coaching	15
One to one support	11
Full-day session (weekend/holidays)	11
Peer mentoring/network	9
Team teaching	7
Half-day session (weekend/holidays)	5
Networking session	5
Other (please specify)	1
No response	1
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of 876 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

Table 29 How individual learning needs were assessed at the start of the training

Q23 How were your individual learning needs identified at the start of the training?	%
Discussion with other participants led by course leader	40
Skills audit	39
One-to-one discussion with course leader	19
Formal test	13
Other	2
I'm not aware that my needs were assessed/identified	24
No response	1
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of 877 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

B1.6 Participants' experiences of the strand

Table 30 Would participants recommend TSST?

Q31 - Would you recommend TSST to other teachers/schools?	N	%
Yes	794	90
No	18	2
Not sure	63	7
No response	7	1
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 31 Quality rating of TSST

Q21& Q22 How would you rate the following elements of TSST?							
	Very good (%)	Good (%)	Average (%)	Poor (%)	Very poor (%)	No response (%)	Total (%)
Subject knowledge content of the TSST training	69	25	2	1	0	2	100
Subject specific pedagogy (i.e. methods of teaching maths/physics) content of the TSST training	55	33	9	2	1	0	100
Delivery of the TSST training	62	29	6	1	1	0	100
N = 882							

A series of single response questions.
Due to rounding percentages may not sum to 100.
A total of 880 respondents gave at least one response to these questions.
Source: NFER TSST survey summer 2016.

B1.7 Strengths and success factors

Table 32 Most useful elements of the TSST training

Q24 What elements of the TSST training have you found most useful/have had the biggest impact? (open question)	N	%
The focus on improving pedagogy	227	26
The focus on improving subject/curriculum knowledge	195	22
The course included practical sessions and practical ideas for teaching	193	22
The resources/materials provided	126	14
The opportunity for networking and learning with other similar teachers	87	10
The experience/knowledge of course leader/quality of delivery was high	72	8
It provided demonstrations/the opportunity to observe or be observed	68	8
It improved my confidence	42	5
The availability of individual support/mentor	37	4
The course was tailored to the needs of the group (in some cases by skills audit)	17	2
The opportunity for reflection and applying learning between sessions	15	2
Having the time focussed on the subject	14	2
Nothing was useful/other negative comment	7	1
other	10	1
Other generic positive comment	21	2
Irrelevant/uncodeable/vague	8	1
No response	117	13
Total =	882	100

More than one answer could be put forward so percentages may sum to more than 100.
A total of 765 respondents gave at least one response to this question.
Source: NFER TSST survey summer 2016.

B1.8 Learning and areas for development

Table 33 Challenges faced when undertaking TSST

Q20 Have you faced any of the challenges below in undertaking TSST?	%
Amount of time required to undertake TSST	27
Lack of opportunities to practice what I have learned in a classroom setting	25
Scheduling of sessions at times when I cannot attend	23
Insufficient time to reflect and make changes to practice	11
Other (please specify)	7
Difficulty gaining agreement from my school to attend	5
Cover not being arranged	4
No response	36
N =	882

More than one answer could be given so percentages may sum to more than 100.
A total of 564 respondents answered at least one item in this question.
Source: NFER TSST survey summer 2016.

Table 34 Elements of TSST that could be improved

Q25 – What could be improved about TSST? (open question)	N	%
Provide more chances to practice/apply learning (incl. observations)	110	12
Make practical/logistical changes	92	10
Cover more on pedagogy	88	10
Have more time/sessions/slow the pace	85	10
Tailor the course to the needs of the group/do a skills and knowledge audit	85	10
Provide more/better resources	53	6
Ensure online assessments match content and work correctly	47	5
Better teaching/mentoring	40	5
Cover more subject/curriculum knowledge	34	4
Provide more practical ideas/tips for the classroom	22	2
Facilitate networking/sharing of resources with other participants	18	2
Offer certifications/accreditation/MSc credits	9	1
Have a shorter course	4	0
other	6	1
Nothing could be improved/other positive comment	57	6
Irrelevant/uncodeable/vague	28	3
No response	241	27
Total =	882	100

More than one answer could be put forward so percentages may sum to more than 100.
A total of 641 respondents gave at least one response to this question.
Source: NFER TSST survey summer 2016

BG1.9 Outcomes

Changes to role

Table 35 Teaching status of maths and physics from September 2016

Q14 - Will you be teaching maths/physics from September 2016?	N	%
Yes	581	66
No	99	11
I don't know yet	201	23
No response	1	0
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 36 Location of maths/physics teaching from September 2016

Q15 - If you know that you will be teaching maths/physics from September 2016, will this be:	N	%
in your present school?	489	84
in a new school?	89	15
No response	3	1
Total	581	100

Due to rounding, percentages may not sum to 100.
A filter question: all those who said they would be teaching maths/physics from September 2016 in Q14.
Source: NFER TSST survey summer 2016.

Number of hours teaching maths or physics

Table 37a Number of hours spent teaching maths/physics per week

	(A) Number of hours teaching maths/physics before TSST (2015/16 academic year)	(B) Number of hours teaching maths/physics after TSST (2015/16 academic year)
Mean (hours)	6.5	7.9
Minimum	0.0	0.0
Maximum	35.0	35.0
N Gave a response (valid)	863	856
Missing	19	26

This chart is based only on data from respondents with a valid response at both time points.
Variations in the N at different time points are due to fluctuations in non-response.
Source: NFER TSST survey summer 2016.

Table 38b Number of hours spent teaching maths/physics per week

	(A) Number of hours teaching maths/physics before TSST (2015/16 academic year)	(B) Number of hours teaching maths/physics after TSST (2015/16 academic year)	(C) Predicted number of hours teaching maths/physics from September 2016 (2016/17 academic year)
Mean (hours)	7.8	9.5	10.0
Minimum	0.0	0.0	.5
Maximum	35.0	35.0	35.0
N Gave a response (valid)	483	483	489
Missing	399	399	393

This chart is based only on data from respondents with a valid response at all three time points.
Variations in the N at different time points are due to fluctuations in non-response.
Source: NFER TSST survey summer 2016.

Table 39 Estimation of the number of hours teaching maths or physics from September 2016

Q16c - If you aren't sure of the exact number of hours you will be teaching maths/physics from September 2016 yet, please tick the statement below that best reflects what you think will happen:	N	%
I am likely to be teaching more hours of maths/physics from September 2016 than I did in 2015/16	80	45
I am likely to be teaching fewer hours of maths/physics from September 2016 than I did in 2015/16	7	4
The number of hours is likely to stay the same as 2015/16	57	32
I have no indication yet	32	18
Total	176	100

Changes to the key stages taught

Table 40 Highest key stage to which respondents taught maths or physics

Highest key stage taught	Before TSST (2015/16 academic year) (%)	After TSST (2015/16 academic year) (%)	From September 2016 (2016/17 academic year) (%)
I did not teach maths/physics at this time	12	6	-
I don't know which key stages yet	-	-	5
KS2	15	14	15
KS3	22	18	18
KS4	44	55	55
KS5	4	4	6
No response	3	3	2
Total %	100	100	100
N	695	695	581

B1.10 Changes to teaching practice

Table 41 Ratings of the impact of TSST on personal knowledge and confidence when teaching maths/physics

Q26 & Q27 In terms of maths/physics teaching, to what extent has TSST:								
	To a very large extent (%)	To a large extent (%)	To a moderate extent (%)	To a small extent (%)	Not at all (%)	Not applicable (%)	No response (%)	Total (%)
increased your confidence teaching maths/physics?	26	40	22	8	2	1	1	100
increased your subject knowledge?	25	38	26	8	2	0	1	100
increased your pedagogical knowledge?	21	35	29	10	2	1	1	100
met your individual learning needs?	19	42	27	7	3	1	1	100
increased your ability to answer questions from pupils?	16	39	28	9	4	3	1	100
helped you to apply new subject knowledge in your classroom?	19	42	21	9	3	5	1	100
helped you to apply new pedagogical knowledge in your classroom?	17	37	27	9	3	5	1	100
led to improvements in your teaching practice?	19	39	25	8	3	5	1	100
led to improvements in your pupils' understanding and progress?	17	38	25	8	3	8	1	100
N = 882								

A series of single response questions.
Due to rounding percentages may not sum to 100.
A total of 877 respondents gave at least one response to these questions.
Source: NFER TSST survey summer 2016.

Table 42 Ratings of the impact of TSST on confidence carrying out physics practicals (physics TSST only)

In terms of maths/physics teaching, to what extent has TSST: Increased your confidence in undertaking physics practicals?	%
To a very large extent	27
To a large extent	43
To a moderate extent	18
To a small extent	8
Not at all	4
Not applicable	1
No response	1
N=197	100

Due to rounding, percentages may not sum to 100.
A filter question: all those who indicated that their main TSST subject was physics in Q2.
Source: NFER TSST survey summer 2016.

Table 43 Changes made to teaching practice by respondents

Q28 Please tell us about changes you have made to your teaching practice as a result of your participation in TSST	N	%
I have made changes to teaching methods/pedagogy	305	35
I have better subject/terminology knowledge, and confidence in my knowledge	111	13
I use new/more practicals/activities	102	12
I use new resources/websites/equipment	77	9
I am more confident in delivering lessons	64	7
I am better able to explain concepts to students/engage in discussion	55	6
I plan lessons differently	42	5
I have incorporated the learning into teaching other subjects	18	2
I will/have shared learning within my school	11	1
I have not made any changes made to my teaching practice	15	2
I have not made any changes because I am not teaching the subject at this time	50	6
irrelevant/uncodeable/vague	44	5
No response	213	24
Total =	882	100

More than one answer could be put forward so percentages may sum to more than 100.
A total of 669 respondents gave at least one response to this question.
Source: NFER TSST survey summer 2016.

B1.11 Additionality

Table 44 Incidence of other subject-specific training undertaken at the same time as TSST

Q29 - Have you undertaken any other maths/physics subject-specific training at the same time as TSST?	N	%
Yes	72	8
No	805	91
No response	5	1
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.

Table 45 Likelihood of respondents taking subject-specialism training in the absence of TSST

Q30 - If TSST had not been available, would you have taken any subject-specialism training in maths/physics over the last year?	N	%
Yes	139	16
No	417	47
Don't know	321	36
No response	5	1
Total	882	100

Due to rounding, percentages may not sum to 100.
Source: NFER TSST survey summer 2016.