Maths and physics teacher supply package

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Department for Education | National College for Teaching & Leadership

Maths and physics teacher supply package

Research brief

March 2017

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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.

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.

[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.

Key findings and recommendations by strand

Paid Internships

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 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.

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.

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.

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).

Key programme-wide findings and recommendations

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.

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.

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.

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.

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.

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.

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.

Department for Education | National College for Teaching & Leadership

Reference: DFE-RB683

ISBN: 978-1-78105-746-9

The views expressed in this report are the authors' and do not necessarily reflect those of the Department for Education.

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