

Training, Translation and Trust: A multiple-case study evaluation of maths hub impact in two primary schools

This report is based upon evidence gathered from two in-depth case studies conducted by a collaboration of colleagues working internally for the Cheshire and Wirral Maths Hub alongside an external consultant. This final report identifies the key findings both case studies that were conducted across the academic year 2021/22.

The report is split up into the following sections:

1. Executive Summary
2. Introduction
3. Method
4. Findings
5. Discussion and Recommendations

Executive Summary

This study found evidence that the maths hubs programme is enabling deep and sustainable change across the school system. Teachers and leaders believe that what they are doing through the maths hubs will positively impact pupils' lives. Consistent and reliable investment over many years (with the promise of more to come) has enabled teachers and leaders to reflect on their practice and reference credible and curated research evidence to support decision making. A consistent core message has been reinforced with an evolving strategic direction. This has led to levels of clarity rarely experienced by practitioners.

We found that the way in which some teachers and leaders view professional development is changing, and practitioners are seeing the value in models set up by the hubs. Whilst buy-in has been patchy (and exacerbated by COVID), there is growing recognition that this is a long-term endeavour. In a school system where short-termism and changes in direction are endemic, shifts in mindset and culture are taking root because of the sustained nature of maths hub programmes.

Implementation is a key issue in moving both the hub and schools forward in their practice. Schools have yet to see how pupils' data outcomes can and should be tracked and measured - by training teachers and leaders in effective use of the Education Endowment Foundations' (EEF) implementation processes, the link between what the maths hub programmes offer and what can be expected in terms of impact will be better understood by schools.

The key messages being delivered through the maths hub naturally go through a series of *translations* for them to reach teachers. In some cases this translation isn't a problem but in some, it can pose challenges such as core messages becoming over-simplified. The DfE has invested in system leadership for many years and has a number of school and improvement structures operating concurrently (curriculum hubs, teaching school hubs, multi-school groups...). Where there is congruence, school improvement is supported at scale. Where there isn't, opportunities are missed, and teachers do not have clarity.

Introduction

The overarching aim of the maths hubs is to *'...help schools and colleges lead improvement in mathematics education in England. They seek to harness all the maths leadership and expertise within an area, to develop and spread excellent practice, for the benefit of all pupils and students. They are part of the wider development of school-led system leadership in England.'* (NCETM, 2022)

At primary school level, the aim is specifically that *'Maths Hubs support teachers and leaders in primary schools to establish teaching for mastery approaches so that all pupils develop deep knowledge, understanding and confidence, and are well prepared for the secondary mathematics curriculum.'* (NCETM, 2022). Specifically, this involves supporting schools to develop sustainable models of professional development for teachers so that the development of teaching for mastery is a long-term endeavour.

Given the high status and expectations of the hubs, this study aims to:

- Explain the type of impact that sustained engagement with the Cheshire and Wirral Maths Hub has on primary schools and better understand what works and what doesn't
- Strengthen existing evaluation processes by exploring the direct experience of school practitioners through the use of a case study method
- Evaluate how the maths hubs programmes are being perceived within the educational community
- Provide recommendations for the strategic board and the wider Maths Hub network

Method

A multiple case study method was adopted. This involved choosing two schools – one with higher-than-average levels of disadvantaged pupils (School A) and one with lower levels (School B). According to official records, both schools had engaged in core maths hub programmes since the inception of the Cheshire and Wirral Maths Hub in 2019. For each school, the following data gathering methods were used:

- Document analysis of school policies and prior attainment data
- Collaborative lesson planning with two teachers followed by observation of lessons alongside the maths lead and headteacher
- Interviews with maths lead, headteacher and observed teachers
- A survey to all teachers in each school

A hybrid approach to data analysis was taken. This involved first looking through both datasets and asking the question, ‘what themes is the data telling us?’. This was done by three people separately who then met to cross-check interpretations. Following this, Guskey’s five levels of professional development (figure 1) were used to analyse the data through the lens typically used by Maths Hub evaluators.

Figure 1 – Guskey’s five levels of professional development



Findings

This section is written up in five sections, reflecting Guskey's five levels of professional development. Within each section, direct quotes are used from participants as examples of wider themes that were identified in the dataset. Although the findings from both schools are presented together, where there were important differences between the schools, these are made clear. As a reminder to the reader School A had higher levels of disadvantaged pupils and School B had lower levels.

Participants' Reactions: How satisfied are you with the continuing professional development provided by Cheshire Wirral Maths Hub?

Unequivocally, professional development provided by the maths hub is seen as positive in both schools. Overall, good levels of satisfaction were expressed by those who've taken part in the programmes directly. Nevertheless, within this, there is variance: some teachers are effusive in their appreciation, using words like, '...amazing, fabulous, game changer...' whilst others describe their experiences as '...enjoyable, consistent...'. This suggests that, although the reaction to involvement with Maths Hub programmes is favourable, the way in which teachers were

motivated by it to enact change was varied. These differences correlated to the different schools – in School A, teachers were highly motivated and excited by the changes being made whereas in School B teachers were positive but seemed less motivated.

Teachers see the design of the programmes as ‘...strategic, structured and having rhythm...’ and recognise that the model includes both training and follow-up activity. The CPD is seen as ‘quite a different approach’. There was recognition that learning from the maths hub needs to be disseminated and this has brought into sharp focus the way teachers are actually engaging with the hub at a granular level. For some, involvement is direct (messages are received first hand from the hub) and there was a sense of autonomy in being able to acquire new learning and then decide what to pass on to colleagues. These teachers used the word ‘trust’ to describe their experiences, applying it to both the credibility of the programmes and how school leaders have responded to the hub’s offer. They stated that programmes tended to be research informed and congruent with the central foundations of teaching for mastery. For others, particularly in School B, the interface between school and the maths hub appears to be more carefully managed at a senior level. This has resulted in some teachers reporting that they ‘know little about the maths hubs’ work and that barriers to engagement emerge (...time pressures, ...conflicting priorities...). This means that, in some cases, there is an issue with the fidelity of maths hub messages being maintained.

Participants’ Learning: How useful has the content been?

Unequivocally the CPD and NCETM resources are seen as useful. This is supported within the data where teachers stated how they are noticing the benefits to both the pupils and themselves. Most significantly, it was noted that the teaching and learning culture in the schools is changing and teachers talked about a variety of ways in which this is happening:

→ Increased awareness of teaching for mastery pedagogy, for example, is

leading to changes in the decisions teachers are making. For example, teachers talked knowledgeably about the importance of connecting new learning with prior knowledge and teachers' confidence in addressing pupils' needs in the most appropriate way

- Where high quality DfE approved resources are used, such as in School A, teachers expressed their usefulness in supporting both subject knowledge enhancement and pedagogical development
- Some teachers clearly expressed how their subject knowledge has developed and become much stronger

Observing where teachers place importance when talking about the maths hubs offer is interesting and raises many questions. Is this driven by what school leaders perceive the maths hubs message to be? Is this decided at trust level? When programmes are being launched, is it being made clear where schools should be focussing their efforts when taking part? The answers to these questions were different in each school that took part in the study. In School B, the focus has clearly been on the improvement in teachers' subject knowledge and their involvement with the maths hubs has been skewed towards this. For School A, the focus has been on the study of pedagogy with subject knowledge enhancement being enabled through the promotion of a DfE approved textbook scheme. The result? The teachers' perception of the usefulness of the maths hubs' offer is different. We believe that the impact in School A, where there was more of a broad focus on teaching for mastery pedagogy, that change was happening more swiftly than in School B and that there was more considerable impact because of this. Of note, in School A, three teachers talked about the impact their work has had on other areas of the curriculum. This is predominantly about teaching for mastery pedagogical approaches learned about through maths, now being applied to other subjects.

Organisation Support and Change: How well is the work of the maths hub being adopted by the school?

The work of the maths hub is best received where there is a direct interface between the provider and recipient. Within School A, this has led to high levels of trust in both the programmes and people delivering them. In turn, this has resulted in senior school leaders' investment in the programmes and providing time and opportunities for teachers to explore the new learning. This has led to a shift in teachers' mindsets and cultural change has resulted. A specific example - in School A they have adopted the Maths Hub professional development model as a within-school model. This has strengthened the development teaching for mastery across the school. The quality of teaching is seen to be improving by those 'on the ground' because they can see the effects for themselves. Different to this, where school structures preclude the direct interface from being optimised, the teachers describe their experiences as being remote and separate. Relationships with the maths hub haven't been forged as well and of course, COVID has exacerbated this.

At best, teachers believe that they are making deep seated changes in teaching approaches and that the structures that their school put in place, supported by maths hub programmes, help them do this. This has led to their tackling big issues (like inclusion). They are undaunted. There is general appreciation of the benefit from maths hub programmes and the quality of the materials being offered. Nevertheless, there is still work to do on how the programmes are being translated to school leaders and teachers and the natural bias that is being applied.

Participants' Use of New Learning: How well are you able to apply new learning?

The optimisation of impact of the maths hub programmes and materials, and their potential benefit come from where the school (or trust) has placed value. Where value has been placed on the enhancement of subject knowledge, like in School B, the teachers report that they spend too much time looking at resources and planning

(designing) lessons. This was a recurring theme and has clearly led to some frustration. Where pedagogical exploration has been the focus, like in School A, teachers enthusiastically claim that they are seeing school-wide changes, led by maths improvements. They see a broadening of the whole school curriculum where cultural capital is being developed in a very natural way. They have noticed that in applying this new learning, they are becoming more reflective and confident. Where 'live' coaching is used to support teachers' development, it was noted that teachers feel more connected to the improvement process.

Pupil Learning Outcomes: What Impact is the maths hub having on your pupils?

Interestingly, teachers and leaders talked very naturally about the impact that the maths hub is having on them and their pupils. The development of teachers was recognised by all and the word 'enjoyment' was used to describe both the process of engaging with the programmes, and their teaching (as it improves).

Regarding pupils, there is clear recognition of a data lag - the impact of the maths hubs programmes is primarily seen as improving confidence, beliefs, reasoning, vocabulary, enjoyment, independence and thinking skills. Whilst teachers believe that these are improving systematically and well, there is a need for more precision in both the measuring, evaluation and reporting of these. Data-wise, COVID must be taken into account. Having said this, whilst it is hard to attribute improvement in headline data to any single cause, one could argue that where there is sustained engagement with the maths hub programmes and key messages are received with minimal translation, data improves. For example, in School A, despite having a higher-than-average proportion of disadvantaged pupils, mathematics performance in year 6 was higher than both local and national averages.

Discussion and Recommendations

What we already know...

We know that reliable feedback is an essential component in securing sustained improvement at individual or organisation level. The maths hub programmes generate a lot of feedback at different levels - from high level reach and engagement data to teachers' feedback (chiefly through work group reports). This multifaceted data is enabling us to form an increasingly clear picture of the impact the maths hubs are having on pupils' outcomes. This evaluation study has enabled us to garner feedback at a more granular level - directly from school practitioners who are engaged in programmes. We were able to talk to teachers, leaders and pupils and engage in real-time lessons as part of the data gathering process.

In terms of our findings, we already know that the maths hubs are having an impact on the school system, as documented in the data gathering structures already in place. We also know that there is a growing appetite for more precise feedback, particularly related to test outcomes in all key stages. This is not new, but there is a growing sense of urgency. In part, the revised work group plans are addressing this by focussing more pointedly on pupils' outcomes.

In terms of change and improvement within the education system, one could argue that the maths hubs programme is reaching maturity. It is well known by teachers and leaders and is seen as a part of the school system:

- Its programmes are well regarded and trusted because they are rooted in evidence and delivered by knowledgeable teachers
- The design of the programmes is seen as credible, and teachers see the value in follow-up activity (for example collaborative planning and lesson study)
- Both the NCETM and the DfE approved resources are highly regarded and widely utilised

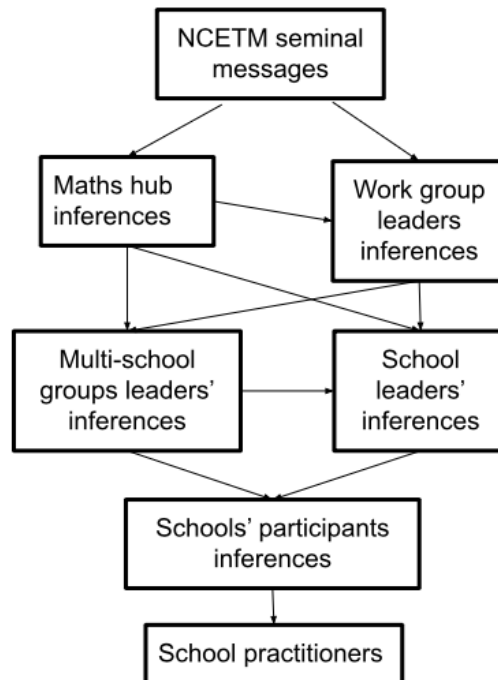
- Teachers are noticing that pupils have an increasingly deep understanding and enjoyment of maths - very much in alignment with the National Curriculum objectives for mathematics
- Teachers' instincts tell them that pupils are being positively impacted but are unsure about how to measure this more precisely

What we have found out...

Our work in this evaluation study has identified some important points for consideration by stakeholders. This section will outline these before providing some recommendations for future work.

First, at a granular level we found there to be variance in how teachers have responded to the programmes. Primarily, what's emerged from our multiple-case study is the issue of translation. In essence, core messages from the NCETM are being translated multiple times before reaching school practitioners (see figure 2). In some cases, messages are translated up to six times before reaching classroom practitioners. This isn't a problem per se and only becomes one if the translation is inaccurate or biased. Mistranslation was more likely to happen if messages were being translated multiple times or if they were being translated by those not working directly in schools (for example, leaders of multiple-school groups). Where teachers could clearly articulate the messages emanating from the maths hub, they were more effusive in their language and were observed to be closer to the information source. In other words, there were fewer inferences in the mix. Conversely, where there was less clarity, teachers were more remote and felt less connected to the maths hub and less effusive in the language they used. This suggests that maths hubs need to consider carefully how to ensure that core messages about teaching for mastery and sustainable professional development are communicated to schools. As it currently stands, there is too much variation in the system, and this is leading to there being mixed experiences and impact within primary schools.

Figure 2 – An example of the different translations of maths hub messages within the network



Second (and unsurprisingly), the influence of leadership was found to have a significant impact. Three key themes emerged: trust, investment, and bias. Where leaders demonstrated trust in the programmes and their delivery, teachers were able to explore and grapple with their learning in an ‘open’ environment. Investment was a key ingredient: if time and coaching structures were offered to enable teachers to reflect on their learning, impact was felt to be greater. The ‘open’ environment is interesting. Where leaders placed trust in the programmes, teachers could receive and respond to the new learning as intended by the maths hubs. Consequently, they were free to place value as they saw fit and develop school structures accordingly. Where leaders carried out this process without their teachers’ input, certain aspects of teaching for mastery have been developed at the expense of others. For example, where leaders have perceived that the focus must be on the design of lessons/content, pedagogical development has not developed in tandem.

Third, teachers have welcomed the clarity (they specifically use this word) that maths hubs have brought to the education system. Whilst we know that the programmes are evolving whilst being rolled out, they understand the constructs and have faith in

their evidence base. Teachers can confidently explore a range of ideas and concepts alongside fellow professionals who are in some cases only a few steps ahead of them. Teachers talked enthusiastically about cultural change and how the maths hub programme is driving this:

- They talked about how their maths teaching has improved and how they are applying the same pedagogical tools to other curriculum areas. They are increasingly able to distinguish between general pedagogical ideas and those that are subject specific
- They also talked about professional development in general, particularly the idea that effective CPD is a process where training is followed by collaborative work group activity. They could see that this is not exclusive to maths and could inform the development of whole-school CPD models

The effectiveness of implementation was found to be pivotal. Maths hub programmes were being delivered both prior to, and during the promotion of the EEF implementation model. That isn't to say that good implementation was absent prior to current activity: rather, professionals are being challenged to review and evaluate past and current practice. We noted that auditing (using credible materials), for instance, is not routinely done in schools and this raises questions about accurate diagnoses and the identification of appropriate solutions.

Last, workload was viewed differently across the two schools. In School A teachers felt strongly that workload was reduced in the medium to long term because of improved pedagogical understanding and intelligent use of curated resources. In School B, teachers felt that the study of content and designing of lessons is an ongoing endeavour which 'isn't getting any easier or quicker'.

Recommendations:

- Review core messages from the NCETM and check alignment with Cheshire and Wirral Maths Hub Work Group Leads.
 - Where possible, distil key messages into easily understood and portable models
 - Invest in reflection and study time for Work Group leads to explore models, particularly how to balance activity in work groups so bias is avoided
 - Liaise with other maths hubs at a similar point in their journey, perhaps through collaborative Local Leaders of Maths Education events
 - Consider providing Work Group leads with professional development that supports them in understanding EEF implementation guidance

- Review communication channels with school leaders and trust leaders
 - Evaluate the effectiveness of how the Cheshire and Wirral Maths Hub communicate with senior leaders
 - Explore strategies to provide equality of access (to core maths hub content) for all teachers

- Explore how the development of teaching for mastery can influence whole-school improvement, including general pedagogy in other subjects