National Centre for Excellence in the Teaching of Mathematics

Supporting teachers to implement effective mathematics – intervention strategies

Introduction

Teachers implementing any form of mathematical intervention can face many hurdles. A major challenge is often trying to decide on the best strategy for the targeted pupils and the most appropriate resources. Teachers in this situation are aiming to provide a tailored curriculum for their targeted pupils, and for those pupils who work with teaching assistants in small withdrawal groups.

To explore how teachers can implement effective mathematics intervention strategies, eight networks across the country received funding from the NCETM to trial a range of ways to support groups of underperforming pupils. A background information paper was also developed for the networks. This document provides a broad base of background information and related research around mathematics interventions and was used as a ‘starting point’ for network activity.

The eight networks explored a variety of different strategies, from Key Stage 1 to Key Stage 4, to improve the outcomes of intervention in their organisation. These included: supporting teaching assistants with developing pedagogy, mathematical subject knowledge or strengthening assessment practice; creating bespoke intervention programmes aimed at addressing the specific needs of a group of pupils; exploring ways in which to engage parents as a means of support and addressing issues with Using and Applying Mathematics.

Full details of each of the networks’ activities and outcomes can be found in a set of case studies, along with ‘Top Tips’ for any other teachers who wish to engage in similar projects. Links to ‘off the peg’ resources used by the networks can also be found within the case studies.

We hope these resources provide good starting points for enquiry and that they stimulate teachers into investigating intervention strategies in any classroom.

What did the networks do?

The networks received funding to explore their specific intervention strategy over the course of two to three terms. Each network consisted of the staff within a school or department. In some cases, only a small group of staff were involved working on a trial project with the intention to roll out the strategy should it prove to be effective; other networks consisted of a whole school staff developing a new way of working. Details of each network’s approach can be found in the case studies.
What has been learned?

As each network focused on researching a different element of developing effective intervention, there is no overwhelming evidence to suggest one or two 'most effective' ways of organising intervention. Each project leader reports success in their own specific project and the case studies outline the activities they undertook, the impact observed, what they learned from being involved in their project and what they will do next. There were, however, some common strands and key messages reported from the projects which will provide food for thought for other teachers wishing to explore intervention in their own schools/organisations.

Bespoke intervention programmes

One of the key messages that came through from the whole project was that, “Intervention that meets the needs of individual children makes an impact on children’s learning.”

(Fiona Kent, John Blow Primary School)

Those networks that focused on providing an appropriate programme of support for a targeted group of pupils found that, whilst some ‘off the peg’ resources available were easy to use due to their ‘scripted’ nature or resource rich package, the most effective programmes were those specifically written and designed by the teachers of those pupils based on careful and accurate assessments of the pupils’ needs. Elements of the ‘off the peg’ resources were used on some occasions, where appropriate and relevant, but on the whole, success was found in those written specifically to meet the needs of the targeted group.

“…developing bespoke interventions systems tailored to children’s specific needs is more valuable than using ‘off the shelf’ intervention systems.”

(Sara Wilkes, Chapel Fields Junior School)

These bespoke programmes were designed to be practical, fun and purposeful. The teachers involved believed it was this that impacted on pupils’ confidence and ability to approach the mathematics. Careful assessment of pupils’ needs was essential in designing an effective programme of support which would progress learning from where each child was rather than from an assumed expected starting point. Through using practical equipment and a variety of models and images to support teaching and learning, pupils were able to form a deeper understanding of the mathematics required.

“We have learnt as teachers in key stage 2 that for some of our pupils, we should not assume that they have a certain level and understanding of maths, but to explore what the children cannot do at a basic level and build on it in a hands-on way.”

(Lydia Spratt, Pot Kiln Primary School)
Skilled teaching assistants

The teaching assistants receiving CPD through this project felt that, through participation in this project, they had gained confidence and a better understanding of some areas of mathematics, describing training opportunities as ‘invaluable’. Whilst being portrayed as ‘under confident’ at the start of a project, this developed to becoming more confident in their approach and ability to support intervention groups in mathematics. They reported the benefits gained from collaborative discussion with colleagues and the time taken to develop their own knowledge of specific areas of mathematics, questioning and assessment techniques. The teaching assistants claimed that this time was essential to the success of their personal development within their project.

“One of the greatest impacts of the project so far has been the development of the teaching assistants’ knowledge and understanding of the teaching and learning cycle. …. With support staff that are skilled…. it will mean that in the future, class teachers and support assistants can look at individual children and work together to identify their next steps.”

(Fiona Kent, John Blow Primary School)

Linking withdrawal and whole-class work

Most of the intervention activities were delivered as withdrawal group or 1:1 sessions. These sessions were best planned alongside the main class lesson objectives for mathematics and then followed up in another format so that they did not simply sit as ‘stand alone’ sessions.

“It is important to follow up these sessions with further homework and in-class practice.”

(Katie Slusar, Comberton Village College)

This then enabled pupils to use and apply the mathematics gained in their withdrawal session in the main lesson or other activity, highlighting the narrowing or closure of any previous gaps in knowledge. Pupils were also more confident in participating in whole class lessons having gained knowledge in a withdrawal session.

Importance of parental engagement

Two of the networks focused on engaging parents as a strategy to improve intervention. They found that keeping parents informed of their child’s needs, and organising workshops for parents to attend to improve their own understanding of how to support their child at home, had a positive impact on pupil attitude. The staff members involved also felt that their involvement in this project had helped to develop relationships with parents, and that they now felt more skilled in approaching and assisting parents in supporting their children.

“.. we feel that we have all learnt how to support parents and pupils more effectively”

(Marie Louise Walker, Beverley High School)
Activities such as these can strengthen home school partnerships and with an improved attitude and understanding at home, pupils may feel more supported. Another network, not directly focusing on parental engagement, commented that an unexpected benefit from the project had been building relationships with two hard to reach parents who had become involved in their children’s learning and who were interested in the weekly progress report provided by the teaching assistant. Parents from Comberton Village College also commented positively on their involvement in the project.

‘I wish maths was taught like this when I was at school – my numeracy skills might be better.’

‘The project looks to be a useful way of supporting numeracy skills and allows us to help at home as well. V, positive!’

‘Really like the fun approach to this project. [My son] really enjoys these lessons.’

Impact on pupils

Reports from these projects also confirm a positive impact on pupils. Due to the reporting window being earlier than the end of most of the projects, comments regarding impact on pupils have been more about improved confidence and attitude. This improved confidence was observed not only in the intervention sessions but in other mathematics activities too, as the pupils began to believe that they ‘could do mathematics’.

‘[child] has been receiving 1:1 maths support since October. During this time she has developed in confidence, shown in her desire to participate in group/class activities more willingly. There has been a noticeable increase in her attempts to contribute ideas/answers to whole class discussion.

(Teacher at Chapel Fields Junior School)

Through the use of small groups, practical activities and, in some cases peer support, pupils have commented on an enjoyment of maths, the withdrawal sessions and the nature/style of delivery and activities.

From short term assessments, staff members have seen progression towards session objectives and a development of mathematical understanding.

“One year seven, when asked her favourite lesson replied “maths”- the reason being that she had learnt to tell the time and that is something she has always wanted to do.”

(Katie Slusar, Comberton Village College)

However, other schools have been able to quantify pupil success by looking at level data and believe that the developments undertaken have had an impact on pupil levels of attainment. Through the project focusing on developing AT1 skills in pupils, Mark Wiseman at Sandhill Primary School has found that
“Initial data shows an improvement for the children in the intervention groups, as well as a large majority of the class. As a cohort, Year 2 children have moved from an APS of 11.00 in October, to 13.24 in January. This has also resulted in some of the children’s end of year targets being increased.”

The benefits of taking part in classroom based research

The staff involved in these networks reported success in all the projects undertaken. This was mainly attributed to having the time and funding to focus on the development of one specific activity. Most of the networks commented on the usefulness of having time to discuss formally with colleagues the issues of current intervention strategies and how they could be improved. These discussions were then followed up on a regular basis, evaluating impact and outcomes. Having the time to share ideas with colleagues and engage in collaborative dialogue and activity was reported as a particular contributing factor to the success of the projects.

“Sharing knowledge and ideas along with peer mentoring has been beneficial. In particular colleagues in Key Stage Two felt they had gained a wealth of knowledge and new strategies from colleagues in Key Stage One.”

(Karen Coward, Thorne Brook Primary School)

Having ownership of the development also enabled staff to take a flexible approach and, in some cases, changed attitudes towards the intervention process. One of the networks reported, that although staff recognised the need for intervention to support groups of their pupils, some had a negative attitude towards ‘an intervention strategy’. This was mainly due to previous experience of unsuccessful intervention resources and a procedural approach to supporting pupils. Through being involved in this project, teachers were able to explore more positive means of intervention. In some cases, this meant trialling strategies that didn’t work but then having the time and support to reflect and address any issues. Through having ownership of the project and the intervention strategy to be developed, teachers were able to work flexibly to ensure project success.

We have learnt as a result not to prejudge intervention and to see if it works before dismissing the results.

(Lydia Spratt, Pot Kiln Primary School)

Whilst much of the impact and influence on practice has been observed and developed through the period of the project, some longer term changes have also resulted in the schools. Each of the networks intend to continue with the intervention strategies and programmes put into place during this project, but some have also identified the need for planning regular intervention meetings, meetings for teaching assistants and a greater focus on data analysis and the need for tailored programmes of support for all targeted groups of underperforming pupils. Moreover, the participation in classroom research has empowered groups of teachers to continue looking into this area and other areas.

“As a department we now recognise we have the ability to initiate successful change, taking a lead in implementing intervention strategies that are new to
the school. The department has now become more focused on the intervention that we put in place avoiding wasted time for both staff and pupils."

(Marie-Louise Walker, Beverley High School)

“The Mathematics Intervention Network has enabled educators within this setting to develop their knowledge of mathematics; it has also developed their knowledge of a child’s learning about mathematics. The research process has also developed the mathematical understanding of the Teaching Assistants involved in the project.”

(Karen Coward, Thorne Brook Primary School)

Summary

The teachers and teaching assistants in each of these networks travelled on learning journeys specific to their needs and the needs of their pupils. However, common findings and key messages have been identified to support other teachers in exploring intervention strategies in their own schools.

The teachers in the networks discovered that whilst ‘off the peg’ intervention resources were useful starting points, the best intervention programmes were those that were tailored to address the carefully analysed needs of the targeted pupils. By providing opportunities for pupils to ‘catch up’ in smaller withdrawal groups, attitude towards, and confidence in, approaching mathematics was improved. This was noted not only during the withdrawal sessions but during other mathematics lessons and activities. Improvement in attainment was also observed. When teaching assistants were given the opportunity to develop mathematical and pedagogical knowledge, they felt more confident in the mathematics they were teaching and more robust teacher/TA relationships were developed. Intervention was most effective when parents were involved and a good home school partnership approach taken. This was further enhanced when parents were given the opportunity to learn about the mathematics required and how they could support pupils at home. Effective developments and change was best achieved when staff worked collaboratively towards a common goal and when a high priority was given to allocating appropriate time and funds to ensure success.

Through being involved in a small scale project, the teachers in these networks discovered an enjoyment of learning about mathematics and how to support pupils in their classrooms more effectively. Many are now empowered and enthused to further improve their intervention strategies or to use this experience in wider school developments.