Report of ECC Research Group on Summer Term 2008

Background to the report

The research phase of Every Child Counts, which involved five Local Authorities, was organised into three stages: September – December 2007, January-March 2008 and April to July 2008. The aims of each stage were as follows:

Stage 1 – autumn term 2007: focusing on existing practice

- To gather information from LAs implementing a range of relevant intervention schemes
- To identify a baseline of evidence about the KS1 support practices in place in these LAs as well as detailed information on the focus and content of the intervention
- To identify the nature and extent of the training for teachers and the accompanying support infrastructure within the LA
- To collect evidence of the impact that the intervention has had on targeted children

Stages 2 and 3 – spring and summer terms 2008: implanting models of intervention into five new LAs

- To evaluate the implementation and impact of the implanted models in the 5 LAs

The entire research phase of ECC was informed by and informed the work of the Williams review into the teaching and learning of mathematics in the early years and primary schools. Findings from each phase were reported to the review panel, members of which undertook field visits to the LAs and the schools involved. During stages two and three, 50 schools were involved and approximately 200 children taught during each term. Specific areas of focus were established for each of the two stages and shaped into research questions, with evidence being gathered through two processes:

- Visits by researchers to LAs and schools, incorporating extended interviews with Local Authority Teacher Leaders and senior personnel, interviews with Intervention Teachers, observations of intervention sessions, discussions with a number of head teachers and other members of school senior leadership teams.
- Written reports completed by the LAs themselves and addressing the research questions.

Research pursued in the period January to March 2008 focused on the issues and challenges, actions successes involved in:

- introducing the ECC programme into the local authority;
- getting the ECC programme going in schools;
- maintaining the progress of the ECC programme in the LA and schools;
- identifying essential elements of the ECC programme that make it work.

The research questions pursued in the Summer Term 2008 form the headings in the report that follows. The researchers found that, regardless of which intervention programme was being used, there was a considerable degree of shared agreement across LAs about the issues which schools and authorities felt to be important. The summary of evidence in this report is presented under the headings used for the areas of research focus during the Summer term 2008. Extracts from the detailed reports submitted by the five research LAs are shown in the boxed, italicised text. The researchers have included their recommendations at the end of each section.

Report of ECC Research Group on Summer Term 2008

REPORT FINDINGS AND RECOMMENDATIONS

1. Structure and sequence of the mathematics intervention programme

What has worked well? What would you change to strengthen the intervention? Is there an optimum duration, why?

- There is significant support for 4 or 5 days of one-to-one work each week. Over the period of the programme, the teachers welcomed increased flexibility to introduce some group work and to offer in-class support.
- Such a model also allows intervention teachers time to offer some in-class support for their current group of children and to undertake more effective liaison with class-teachers.
- The length of the programme has varied considerably but the general pattern has been around 10 to 12 weeks for each cohort. The general consensus was that the programme for each cohort should be contained within a term where possible, to allow for a clean transition to the new cohort.
- Twelve week blocks have worked well although flexibility would be useful as some children may need more time. Children, who appeared to need more than 12 weeks, need to be re-assessed to see if there are other barriers to learning and whether they would benefit from continued intervention.
- Schools would welcome additional published information with a detailed schedule for the coming year to facilitate better advanced planning. This could include key dates, deadlines and recommended stages in the programme and would be welcomed in both schools and LAs.
- Reflecting on their current practice, one LA and intervention teachers felt that it could be worth reviewing the present pattern along the following lines:
  - The next autumn term cohort should be selected before the end of the summer term to make for a smoother start.
- To make the greatest impact on the Y2 national assessment, autumn and spring term cohorts would be drawn from Y2 as proposed with the summer term group from the cohort of older Y1 children. This would also avoid the likelihood of intervention being disrupted by the KS1 national assessment process.
-

Recommendations:

The intervention sessions should be one-to-one for the majority of the programme.

Due consideration should be given to feedback from Intervention Teachers on reviewing the intervention selection process, including those outlined above.

A detailed Intervention Schedule should be published, detailing advisory dates for testing, selecting children, start and finish of intervention periods, key dates reporting deadlines.

Report of ECC Research Group on Summer Term 2008

2 Group work

If group work was part of the support offered children, what were the benefits of group work in teaching mathematics e.g. supported development of mathematical language? What were the challenges presented within group work?

- Group / paired working was explicitly part of the programme in only two LAs. In one LA this was more flexible in the way it was organised and was introduced quite late in the programme. Some intervention teachers in other LAs used group or paired working occasionally, usually in addition to the intervention sessions.
- One LA commented that 'the children chosen for the programme were already underachieving in the classroom and, where barriers to learning were behavioural issues and avoidance tactics, these same issues presented themselves during group work. So slowing down the pace of the sessions'.
- Benefits of group / paired work included:
  - Weaker pupils picking up strategies from more confident peers
  - Exposure to a wider range of mathematical activities allowed children to use and apply their mathematical learning.
  - Children developing language and social skills, making them more active learners in the whole class DML.
  - Gives the teacher the opportunity to reflect and see whether the child can demonstrate their learning.
  - Teachers reported very good interaction between children in paired work and an increase in children's mathematical vocabulary and use of language through reporting to peers.
  - Children sometimes feel more at ease in group work, as the focus is not entirely on them.
- Disadvantages of group / paired work included:
  - Group size can lead to behaviour management issues, especially if groups are introduced too early and are too large.
  - Reduced opportunities to identify and support individual barriers to progress.
  - It can be difficult to group or pair children together as their needs are very different.

'During the first phase of the Research group work wasn't very successful. Initially ISTs were teaching 4 children in a group which meant there were more diverse abilities and needs. This proved more challenging to encourage children to develop as independent learners. Although this is a necessary part of the children's learning it wasn't an efficient use of the intervention teacher's time.'

'During the second phase of the research the IST trialled splitting the groups of children into pairs and this was very successful. Teachers reported very good interaction between the children and an increase in children's mathematical vocabulary. The teachers also felt that this was a good time for reflection and assessment. The children felt more at ease during these sessions as the focus wasn't totally on them.'

'.....several teachers taught pupils in pairs or threes at various times for practical reasons such as when a school event meant there was insufficient time for pupils to be taught individually. There seemed to be more challenges than benefits with this. One teacher reported that ***"even with two children, it is harder to target teaching to individual needs"*** *and that there were issues with pupils' concentration and over competitiveness.'*

'Group work allows the opportunity to gain insight into how other pupils tackle the same work, and some pupils understand better when things are explained by another child, and learn from giving explanations' themselves. Teachers would benefit from more training on the positive effects of group work and when it is most appropriate to use it within teaching programme.'

Recommendations:

Clear guidance should be given on when and how to introduce group work, in addition to the one-to-one support, and the likely impact such work provides to the learners.

The training should provide intervention teachers with examples of good practice in delivering effective group and paired working.

3 Exiting from intervention

Do you have a re-entry policy in the LA? What procedures helped children reintegrate into mainstream lessons at the end of the intervention?

- Whole school policies and practices on the exchange and use of information, between intervention teachers and class teachers, are still not fully developed.
- Some schools made careful plans for the exit process, but the pace of the programme meant that the focus shifted too quickly from cohort 1 to cohort 2 for this to be implemented fully.
- Intervention teachers provide a considerable range of information to class teachers, but, as this is often informal and unstructured, the follow up opportunities are not always effectively implemented.
- Some schools have decided to update the progress tracking, of the children involved in intervention, more frequently than previously.
- There are particular concerns where support passes back to TAs who have had little or no guidance about the programme; their lack of mathematical understanding often leads them unintentionally to contradict some of the important messages, especially by denying children access to counting and other resources which children have become confident in using to secure their learning.
- There was concern that, given the age of the children involved in the intervention programme, they did not always understand why their intervention sessions came to an end so abruptly. Some children might have benefited from post-programme in-class support, where the intervention teacher worked with the group of target children for up to three lessons to help reintegrate the children.

'*The re-entry policy is developing in schools as the programme progresses. In one school, the IST worked with children in the classroom during the transition period, looking at resources in the classroom and the use of adults to support the transition'*

'*An LA re-entry policy is being developed, and we would welcome some guidance on this during development phase training sessions. At training sessions we have already discussed a range of things that teachers could do to support reintegration into mainstream lessons, and teachers made further suggestions themselves.*

'All teachers have shared exit assessment information with the class teacher and in some instances this has been used as evidence to support end of KS1 teacher assessment. One class teacher noted: ***"3 of the 4 children are significantly more confident in class, keen to contribute and with a more positive attitude to maths".'***

'Some class teachers have made use of information from the exit assessments to support planning for differentiation in the daily mathematics lesson. We acknowledge that further work needs to be done to enable class teachers to make more effective use of the information provided by intervention teachers.'

' Many teachers adopted the idea of providing an exit pack for pupils, a set of resources that they could use in mathematics lessons in class , and one reported that the contents included place value cards; a 0-100 number line and a marker pen; a Tens and Units board; straw bundles and games played previously at home. Class teachers have seen pupils using their exit pack resources in maths lessons, and commented that all the pupils will now ***"have a go, and ask for help when needed".'***

Recommendation

Throughout the intervention programme, there should be dedicated time for the intervention teacher and the Y2 teacher(s) to discuss pupils' progress, share planning and determine next steps.

4 Whole school approach to intervention

How was the school's SLT involved, what liaison took place, how have the intervention teachers' skills been supported or shared with others?

- There is a mixed picture on the involvement of school Senior Leadership Team (SLT) members in the mathematics intervention programmes. Many head teachers still do not give the same priority to early intervention for mathematics as they give to early reading, allowing intervention sessions to be missed for a wide range of reasons.
- At least one LA has head teachers on their steering group.
- Despite LAs providing clear guidance to schools, stressing the importance and type of SLT support and expected involvement, outlining the programme and its benefits, this had insufficient impact in many schools. There was increased interest and SLT involvement with the programme after the results from the progress tests were shared with head teachers.
- Intervention teachers value support from SLT (such as the head teacher leading a staff meeting to explain the programme, giving appropriate status to the programme, providing an adequate working base).This raises the importance of their work in the eyes of parents, governors and staff.
- Liaison between intervention teachers and class teachers is not always given sufficient priority by the SLT and is often inadequately represented in the school development plan. Frequently, this reflects a limited understanding of early mathematics development by senior staff as well as a limited understanding of the effective management of intervention.
- Some good practice has involved intervention teachers conducting whole school INSET, about the programme; they have gained confidence in leading such professional development. However, Intervention Teachers feel they need training in leading such sessions effectively.
- Where SLT members attend such training sessions, as well as gaining insight into the programme, they clearly demonstrate, to other teachers, that the school considers the programme to be important.

'Head teachers have attended regular meetings with their intensive support teachers, including sharing of video footage and teaching strategies and have been included in school visits made by our ECC Consultants. Additional visits have been made to some head teachers by the LA ECC managers.
All teachers have led staff meetings in their schools.'

'Learning Teams are also being developed in schools. Learning Teams may include the head teacher/member of SLT and the intensive support teacher together with one or two other teachers, one from each key stage perhaps, and a TA. The precise composition is determined by the schools and relates to their planned development within their own context. Plans might include, for example, strengthening class teaching, developing group work, looking at exit strategies for extending into KS2. Members of the teams are beginning by observing/discussing taught sessions and by visiting children in the classroom. Planned developments include planned team meetings and regular networking opportunities to share plans, issues and successes. These learning plans have been cross referenced with the ECC LA/school contract to ensure that all elements are included (using a traffic light system). These plans will form part of the Teacher Leader monitoring role and will continue to be moderated through the traffic light system at network meetings, which will include head teachers.'

'Many teachers extended an open invitation to all staff to observe a teaching session: one teacher has been visited by ten teaching assistants and two Y2 teachers. Head teachers have observed a session in 3 of the schools and maths subject leader in another. In another school, the teacher was observed by the acting HT as part of the performance management process. In another school the inclusion manager carries out performance management for the intervention teacher. One Head teacher has talked to the pupils involved in intervention to see if the pupils are enjoying and achieving. In one school, Governors have visited to see teaching sessions which has strengthened the school's commitment to the programme.'

'Most teachers maintain daily informal contact with the class teacher and HTs, SENCOs and class teachers have made informal visits to observe the learning environment. Five schools reported discussions with HTs; 8 with SENCOs; 5 with maths subject leaders and 4 with other class teachers.'

Recommendations:

The Primary National Strategy and the Every Child a Chance Trust should continue to provide support and guidance to senior LA staff on the importance of early intervention in mathematics and the effective implementation of ECC.

LAs should continue to provide guidance to school SLTs and monitor the implementation effectiveness of the provision.

LAs should monitor closely the number of sessions the children miss during the length of the programme.

LAs should be holding network meetings for the head teachers involved in the ECC programmes.

Teacher Leaders should receive guidance and training on how to support LAs and school SLTs in undertaking provision mapping in mathematics to embed the 3 Waves model.

Briefing needs to be provided for class teachers and TAs on early learning of mathematics, the content and methodology of the programme, and their expected involvement.

5 Additional activities undertaken by the intervention teacher

How effectively did the school deploy the intervention teacher? Did the intervention teachers work in classrooms, did they organise any collaborative activity, undertake action research, keep subject leader and SLT informed of progress? What were the factors that helped the teacher to take this wider role and what were the barriers?

- In many cases, this was the least developed aspect of the programme. Intervention Teachers would have liked more guidance and support from the LA and discussion with the school's SLT on what they might do, especially with regard to the possibility of carrying out some small scale enquiry that would help the school and the LA.
- The range of additional activities for Intervention Teachers to cover was too often unplanned and not properly coordinated. These activities included:
  - Supporting mathematics for similar groups of children in different year groups
  - Supporting teachers to develop working walls for mathematics
  - Supporting reading and other aspects of the curriculum
- Some intervention teachers worked with the children in Y1 who were most likely to be selected for the programme in Y2. Those who have worked in this way expect that their knowledge of the children, and the rapport they have built up with them, will help the selection process and provide a good start to intervention in Y2.
- There was too little reference to the guidance provided to LAs to inform this activity and even Intervention Teachers who were appointed 0.6 FTE were not given appropriate additional activities that would benefit the school in the long term. There were examples of good practice where the school had given careful consideration to the role of the Intervention Teacher and how the skills needed for the role could be extended and drawn on to benefit the Intervention teacher and the school. For example, an Intervention Teacher worked alongside a Y2 teacher to assess and support in-class, those pupils who might have been identified likely to receive support had there been room for more pupils. Together the Intervention Teacher, the class teacher and the teaching assistant devised a programme of support for these children, which would be implemented in Y2 and into Y3.
- There was no evidence that SIPs had been informed about the programme operating in schools. There was too little thought given to the wider whole-school alignment between the ECC intervention programme and the other intervention provision on mathematics that operated in the school and the ways these would be evaluated as part of the school's self-evaluation process and dialogue with the School Improvement Partner.

> '*One teacher has been given a contract to work 0.6 by the school, which has enabled her to develop close links with teaching assistants and to work 1:1 with pupils from the first cohort on a weekly basis in class. Other teachers support in class if one pupil is absent. One teacher has jointly planned oral mental starters with the class teacher and modelled them. Another has observed a teaching assistant working with a pupil experiencing difficulties and advised on activities to support understanding of concepts. Four teachers run lunchtime Maths Clubs for Y2 pupils, whilst several have taken on 'routine' activities such as playground and assembly duties, to facilitate their full integration into the life of the school. '*
>
> *'Schools deployed intervention teachers very well. One teacher is also the mathematics subject leader within the school and has shared strategies with other staff.*
> *Group tutorials provided opportunities for teachers to share practice and discuss areas of concern. These were very useful. Teachers also held meetings with SLT to discuss pupil progress.'*

Recommendations:

Early and clear guidance on additional duties needs to be provided as part of the programme.

Schools need to plan additional activities that deploy Intervention Teachers and draw on their skills in ways that help the school to address key aspects of provision in mathematics beyond the intervention programme.

The engagement of SIPs requires careful preparation and thought so that the intervention programme is part of the whole-school approach to improving standards and QFT for all children and is evaluated properly.

6 Assessment

What tracking of individual children's progress operated during the intervention sessions? How was diagnostic assessment used? What assessment information was shared with the class teacher and how was it used?

- The assessment information provided through the NFER tests undertaken in January was very useful in planning the intervention sessions for the first cohort of children. Since the second cohort had spent a further term in daily mathematics lessons, the diagnostic information was less useful. A number of intervention teachers suggested they were 'surprised' by how much progress the second cohort of children had made before coming to intervention sessions.
- In the best practice, the intervention teachers provide children with regular feedback on their mathematical learning, as well as encouragement and praise. The teacher and child reflect on progress made in the session and the teacher uses this information to inform the next steps, though this is not always formally written down.
- Some teachers use a form of pupil diary to keep class teachers informed; some children are also encouraged to take these records home to provide feedback to parents / carers.
- The programmes provide guidance on the progression in each area of mathematics covered, but teachers still need to interpret the guidance and tailor the activities to support the progress of individuals. Teachers with a good knowledge and understanding of the underlying mathematics find this easier than others.
- Intervention teachers regularly mentioned that the end of programme assessment process was lengthy and repetitive and that it might be shortened by using wider questions, covering a number of topics at once,
- It was difficult to discover how Y2 class teachers make use of the extensive set of data provided for them by the intervention teacher, including topics covered and the progress made. Intervention teachers tend to be sceptical about this and some pointed out that, when they were Y2 teachers provided with Reading Recovery information, they did not have time to make a great deal of use of it.
- The following factors seem to be associated with those children whose progress was judged to be significant or good:
    - Good attendance
    - Children have a positive / mature attitude
    - Parents were actively involved
    - Children who needed their confidence / self-esteem raising
    - Children with EAL / language issues which could be addressed alongside the mathematics. (Where a child had an EAL or other language issue and the teaching addressed this, particularly good progress was made.)

  Less progress was made where:
    - Children had other SEN issues
    - Children with illnesses, especially where it affected attendance
    - The starting point was too low.

  The teachers suggest that, where there is a choice of children with the same mathematical level, preference for the first cohort of intervention might be given to those exhibiting one or more of the first set of factors, leaving the others to the next term.

'Another successful aspect has been the time invested in the diagnostic assessment of pupils at the beginning of the programme which has enabled teachers to identify gaps and misconceptions and therefore tailor the teaching programme to their specific needs. Teachers have also embraced the idea that sessions should be fun, interactive and engaging for pupils and have been creative in their use of resources and the development of games which ensure high levels of motivation and enjoyment.'

'For on-going assessment, most teachers have annotated lesson plans either during or immediately after teaching sessions, noting what pupils do and say (both difficulties and successes) to inform planning for the next lesson. One teacher uses a coding system to indicate the level of confidence shown by the pupil during each activity. All teachers plan session by session to ensure on-going assessment informs future teaching. '

'An individual lesson plan was used for each child every lesson with a section for evaluation and next steps. The children were assessed using the detailed and diagnostic assessments from Maths Recovery mid way through the programme. These assessments were very informative and used to plan the next steps for learning. These were also shared with the classroom teachers where appropriate. All schools have their own tracking system and assessment procedures. Some schools used videos and assessment materials as evidence for KS1 moderation procedures.'

Recommendations:

The training should support teachers in the development of their own mathematical knowledge and skills so that they understand :

- progression in the learning of mathematics, using the Primary Framework as a tool to inform planning, progression and assessment;
- how children learn mathematics;
- how to use assessment information to determine misconceptions and next steps, and
- the effectiveness of different teaching approaches, using models and images, multi-sensory resources, engaging in dialogue with the child, using more open questions and the correct use of mathematical language.

7 Parental engagement

What was done to engage parents at the start of the programme? How committed were the children and parents? What has worked well? How have parents engaged with their child, in school, at home?

- Often the parents and carers of children who are part of the programme are among the least involved in school. It is difficult for intervention teachers to engage with them, if there is insufficient support from senior leadership.
- Most parents / carers have been informed of their child's involvement in the programme by letter, often with a form of contract for parents to sign. Though these were generally signed, there is little evidence this resulted in increased engagement.
- Intervention teachers frequently made informal contact with parents /carers at the beginning and end of the school day.
- Intervention teachers have often made strenuous attempts to contact hard-to-reach parents / carers inviting them to meetings and individual appointments, with considerable success. A particularly successful approach has involved telephoning homes in early evenings.
- In all LAs packs of materials were made available for children to take home to support their learning.
- Some schools have invited parents / carers to observe an intervention session. In LAs, using video, it has also been possible to show these to parents.
- There is evidence that real parental / carer engagement, often involving grandparents or older siblings helping children with homework tasks, made a substantial difference to the progress made by some children, especially those for whom English is an additional language.
- Greater parental / carer involvement through the programme has also brought about improved attendance and punctuality.

'*Parents were invited to attend initial meetings and discussed pupil progress both before and after the programme, sometimes in person, or by phone in one school. Parents were invited to observe sessions and those that came found it helpful and were then far more prepared to play a game observed at home. This helped persuade parents who believed that home activities should be more structured and did not normally perceive games as being mathematically valuable. Parents who visited one teacher were impressed with how practical the sessions were.*
In another school, parents were invited to write messages in a home contact book when returning activities sent home and were also asked for their views on how the programme could be improved at the exit meeting. One parent wrote: ***"Played 'hidden numbers'. G really surprised me how quickly she knew them. G set them out in order independently and counted aloud with confidence".*** *Many parents commented on their child's progress****: "I have seen a great improvement in her maths and her confidence and enjoyment of doing maths is far greater. Thank you".*** *Where parental support was strong, pupils tended to make most progress, in one case 2 sub levels (1c to 1a) despite missing 8 teaching sessions.'*

'Some parents have met with the intervention teacher to discuss simple activities that can be carried out at home and how they can support their child. Some intervention teachers held parents evenings for the 4 children. One teacher sent a video clip of a lesson home for the parents to watch at home. Some parents with limited mathematical skills themselves have been able to support their children with very small steps.'

Recommendation
There should be case studies of successful practice of parental / carer engagement.

8 Teaching approaches

What teaching approaches worked particularly well? What stimulated dialogue, use of mathematics language? What multi-sensory equipment worked well, how was it used and what mathematics did it support?

- In all LAs the teaching approach is well structured and precise, supported by the techniques and strategies provided to teachers through training and guidance documents. As intervention teachers gained knowledge and understanding, they felt confident in adapting their approach and responding to gaps in learning.
- The one-to-one approach helped the teacher to recognise the importance of providing children with time, and permission, to think before answering. This helped children to articulate their thinking, refine their mathematical language and recognise their achievement.
- Intervention teachers made effective use of counting apparatus such as model dinosaurs, bears, cotton reels and small figures of children. These all provide contexts and encourage the children to talk about what they are seeing and manipulating, as they are thinking and reasoning. Teachers are beginning to recognise the need for children to move away from simple manipulation to acquiring a broader understanding across a range of contexts, in order to generalise, but this is too often left until the end of the intervention period.
- The use of arrays, screened and unscreened, provides the children with a good model/image for counting and describing patterns.
- Successful intervention involved the teacher in making a number of decisions in order to identify and diagnose misconceptions and barriers to learning. Where teachers' subject knowledge was weak they were over-reliant on the activity rather than on the analysis of mathematical learning.
- In some cases the teachers' knowledge of the Y2 curriculum had a positive impact on the intervention and, although some of them thought they were secure with mathematics, at the start, many acknowledged that their own understanding of mathematics, and how to teach it, had improved greatly. Many teachers said they would welcome continued professional development to increase their knowledge of mathematics.
- One-to-one sessions are generally a structured dialogue and, as the children grow in confidence, their contribution increases and their language becomes more sophisticated.
- A clear strength of the programme is the development of confidence and increased contribution in lessons. This is mentioned most often by class teachers, describing this as the most noticeable effect of the intervention which often transfers to the wider curriculum, as children are able to support their own learning.

'The diagnostic assessments informed teachers' plans for individual children. Teachers also identified children's learning styles and preferences during this initial assessment period. This led to tailor made plans which worked particularly well. All teachers used a variety of strategies and approaches including regular counting, the use of games and songs/rhymes to stimulate and develop language, a variety of resources to embed concepts, art work to reinforce and stimulate.'

'We analysed the lesson plans for a sample of pupils from the first cohort to get an idea of the proportion of time spent on different aspects of the teaching programme - about 50% of the teaching time was spent on counting and understanding number, especially counting and recognising numbers. 25% of the time focused on deriving and recalling number facts. About 10% of the activities included some elements of problem solving, and the remainder of the time addressed calculation, mostly addition and subtraction. (It must be noted that difficulties with counting and understanding numbers were common issues identified in the initial assessments).'

'3 part, pacy and structured lesson, which inevitably links together through application of knowledge and skills. Focus of lessons practical in nature using range of settings to develop and consolidate from the concrete to the more abstract i.e. supported by visualisation and explicit modelling using appropriate apparatus e.g. tens frames, place value materials and straw bundles. Giving the child time to think!'

'The teaching that was most effective was at the "cutting edge" for the child. Knowing when to scaffold the child and when to allow independence. Allowing the child to discover the method itself had biggest impact so that they fully understood what they were doing and why. Not pseudo teaching – teaching a tip'

Recommendations

The training programme for Teacher Leaders must take into account the importance of developing pedagogy alongside subject knowledge in order that teachers understand how children learn mathematics and are able to plan and adapt their teaching approaches, during intervention sessions.

The training programme for Intervention Teachers must help them to support children to move on from simple manipulation to a broader understanding across a range of contexts, in order to generalise, whilst still providing opportunities for children to have access to, and make decisions about, their use of practical resources.

9 Use of resources

What resources did teachers find particularly appropriate and effective in supporting the intervention programme? What were the essential resources? How has ICT been used to support the mathematics intervention of particular children?

- Teachers have been using a wide range of commercially produced and home-made materials. The extent to which teachers have been supported in reviewing the effectiveness of resources has been limited and this has resulted in some inappropriate use or over-reliance on particular resources.
- The use of technology has been variable. Some good use has been made of videos of sessions to analyse teaching and learning, share at staff meetings and to send home to parents. ICT-based resources have been less successful as Intervention Teachers are less confident about when and why to use available software, or do not have access to appropriate hardware.
- Most intervention teaching bases have now improved with a range of appropriate resources. Mathematics displays support learning and often have interactive elements. Intervention teachers would appreciate specific guidance on the effective use of particular resources, especially with structural apparatus such as Numicon and Cuisenaire.
- Giving children ready access to resources, to support their own learning, is the strength of the intervention programme in many schools. However, this is less well developed in Y2 classrooms.
- Even where the effective use of resources (such as number squares, number lines and counters) has been shared with class teachers, intervention teachers often feel that children are discouraged from accessing similar equipment in daily mathematics lessons.

'Not all teachers have access to ICT and / or the internet in their dedicated teaching spaces and so use has been variable. Teacher Leaders have made use of ITPs during their teaching e.g. Counting, Counting On (showing a bead string) and Place Value ITPs for consolidating place value - Number Facts ITP and Multiplication Facts ITP (showing arrays and number lines) to support calculation. As Primary Strategy maths consultants they are very familiar with these resources. There is an implication for further training with intervention teachers, and potential for using the Models, Images and Resources documents from the Primary Framework.

Discussing the use of resources, teachers described their value as

- *encouraging flexible thinking and allowing pupils to devise their own strategies (Number Crunchers)*
- *engaging pupils (10p and 1p coins for place value) and helping them make connections as they represent an idea which can also be shown with bundles of straws, base 10 apparatus*
- *individual resources which were made by pupils during their sessions ensured ownership and encouraged their use in different contexts (glittery number lines)*
- *linking mathematical operations with a visual image (adding 10 using bundles of straws placed on a 100 grid carpet) - this was a comment from one teacher, and Teacher Leaders consider this is an aspect that needs to be developed further by other intervention teachers.'*

Recommendations:

The training programme needs to contain guidance on the effective use of resources, including structural apparatus and ICT materials, in one-to-one sessions.

The Primary National Strategy should review its suite of interactive teaching programs (ITPs), identify those which would support the ECC programme, provide guidance and develop appropriate additional materials.

Teacher Leaders should encourage schools to make available, to children in Y2 classes, the key resources that children use in intervention sessions and vice versa to ensure compatibility in access across all mathematics learning opportunities.

10 Sustained support and attendance

Were there significant absences, by children, teachers? Did absence result in loss of learning, were there any strategies used to secure attendance?

- Some of the children involved in the intervention have a prior history of erratic attendance. In some cases, parents report that children are keener to come to school because they don't want to miss the intervention sessions.
- Where children have unavoidable absences, the intervention teachers often provide additional sessions to help them catch up. This is impractical in a number of schools.
- There was evidence of schools devoting additional teaching resources to the KS1 national assessments which led to some disruption of the intervention programme through loss of sessions and reflected a misunderstanding of the statutory assessment requirements and procedures.

'In most cases children's attendance at school improved. 1 teacher had significant absence; her children were supported by one of the other ISTs in a close by school so the children's learning was not affected. One of the strengths of the programme has been that the group of ISTs have developed a close working relationship creating a support network for each other. They support colleagues wherever possible.'

'With parents' developing awareness and children's added confidence, attendance at school improved as the programme progressed. This added confidence was shown throughout their school work and not just in maths.'

'There were indeed significant absences, by children (e.g. due to chicken pox epidemic and extended visits abroad) and teachers (e.g. jury service) resulting in significant learning loss. Since, the data has been shared with head teachers and intensive support teachers (including individual school's data), school visits have been carried out by consultants with notes of visit being signed by head teachers. Schools are now more aware of the need to prioritise teaching time and there is a LA expectation that this will be significantly improved for the development phase.'

Recommendations:

LAs should ensure that schools implement early action to follow up absences of children on the programme, to ensure that children maximise the opportunity provided by the programme.

Schools should be encouraged to address erratic or poor attendance before children join the programme.

Schools should safeguard the intervention provision for children who receive support in the summer term and arrange the end-of-key-stage assessments so there is no disruption.

11 Professional learning

What are the essential elements in the training for mathematics intervention teachers?

- Because of the rather hurried start to the programme in most LAs, there has been a constant tension between training, preparation and teaching, from the beginning, exacerbated by time constraints.
- Intervention teachers have become more reflective and self –evaluate their own practice. They are beginning to suggest areas where additional training would be helpful.
- Their most frequent suggestions, at present, appear to be:
  - More training on 'Assessment for learning' and 'Assessment for Intervention' including 'how to intervene'.
  - Training in the effective use of particular resources e.g. Multi-sensory apparatus.
  - Guidance on the effective use of ICT in the one-to-one situation
- Intervention teachers are likely to have a role in training other teachers and TAs in similar work and will need professional development in this area.
- Some intervention teachers are likely to need support to develop their own mathematical knowledge and skills, not only to inform their teaching but also to help their credibility in liaison with more mathematically confident colleagues.

'We have identified some generic elements which we consider are an essential part of the training for mathematics intervention teachers

- *mathematical knowledge*
- *how children learn - pupils' misconceptions and difficulties*
- *progression, including the 'difficult bits'*
- *teaching approaches and pedagogy*
- *effective assessment, including APP*
- *devising a coherent teaching programme*
- *peer visits providing the opportunity to share ideas and reflect on practice*

The use of appropriate mathematical models and images is essential. This includes a range of ICT based resources, such as ITPs (Number Grid, Place Value) and also practical models such as coat hanger and pegs to show complements to 10.'

Recommendations

Training should be provided for Teacher Leaders and Intervention Teachers on the use of the Primary Framework for Mathematics, to ensure that planning and delivery of the intervention sessions supports the progression in the Y2 mathematics curriculum.

Appropriate arrangements need to be made by schools, for intervention teachers to continue to receive CPD on important aspects of the curriculum to maintain their professional knowledge and skills as practising primary school teachers.

August 2008