RECME: Summary of the report's findings on the CM Network group: March, 2009

The **Researching Effective CPD in Mathematics Education (RECME) project** was set up under the umbrella of the National Centre for Excellence in the Teaching of Mathematics (NCETM) in England. This 2-year, nationally funded project is the largest UK research project into CPD in Mathematics Education to date and ran from 2007 – 2009).

Summary from Report

We are delighted that the Researchers identified many positive aspects of the ***Children's Mathematics Network Group* (Bristol)** as a powerful means of CPD. These findings confirm our beliefs in teachers and practitioners; in the need to trust teachers and to give back professionalism to teachers in order to empower them.

The findings also support the success of our initiative in supporting high levels of children's mathematical thinking, reasoning and problem solving and contributing to deepening understanding of the standard abstract symbolism of written mathematics, captured in this comment from the research team: ***'The standard of the mathematical understanding, thinking and reasoning that the displays revealed was far higher than the specified curriculum objectives for children of this age'.***

Note: The teachers involved are 'Sarah' and 'Ann', a nursery and a reception class teacher. Maulfry and Elizabeth are referred to as 'Melanie' and 'Lizzie' in the report.

'For these researchers *(Carruthers & Worthington),* involvement in CPD was driven by a passionate commitment to children's mathematics and to ways of working with other professionals to develop it. This had originated in their own teaching experiences as a result of careful research into teaching and learning mathematics and reflecting on their practice over a number of years.

Sarah was now committed to practice focused on children's mathematics as a result of her extended study of children's graphics and problem solving. This involved a way of teaching that was completely different from a worksheet-and textbook-based approach that used to exist in her school. Evidence of this change was observable in Sarah's classroom. Examples of the children's spontaneous mathematical work were displayed in annotated form on the walls and in their books. Sarah's participation in the group had made a significant contribution to her professional development:

> *I feel more confident in my teaching of mathematics and proud of my school's early years team's development in this area. I find it personally rewarding, professionally exciting and socially enjoyable!'*

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> *The children in our classes have a positive attitude to sharing and representing their*

mathematical thinking. They are developing confidence in their mathematical graphics which are valued, they are developing fluency and a willingness to talk about their thinking. By focusing on problem solving they are identifying meaningful problems, rising to the challenge and developing a sense of achievement and satisfaction in finding a solution. They are sharing ideas and drawing on prior experiences to inform their strategies. Hopefully this positive attitude to mathematics and problem solving will stay with them. The children are able to demonstrate their individual ability and explore concepts beyond the normal curriculum.

The second teacher involved was Anne, who was working with a reception class of children aged four to five years in the same school as Sarah. She was an experienced teacher who had worked in primary education for over 20 years in a number of schools. Much of her teaching prior to her involvement with the group had been traditional and based on working with young children using schemes of work and worksheets drawn from published resources. Her participation in the CPD arose through the leadership and encouragement of Sarah, who felt that they would both benefit from the added support that the group might offer them. Anne suggested that before taking part in the CPD, she had found teaching mathematics less interesting than literacy and some other subject areas. However, having adopted the new approaches suggested by the CPD, she said she had become passionate about teaching mathematics. Anne was initially resistant to the idea of changing her mathematics teaching to focus on the children's mathematical graphics. She said that she was uncertain about how much mathematics the children would engage with if they were not involved in filling in worksheets. As she said at interview:

I didn't feel that comfortable to start with and it wasn't until I realised they (the children) were learning so much more that I was convinced. Pursuing their own maths gives them unlimited potential to develop imaginative games they have come up with that are far beyond the maths in the scheme. I could never go back to that now. The meetings gave me confidence to speak to parents and feel sure that I could justify our decision.

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Another theme was increased teacher confidence. Teachers reported increased confidence to try things out, and it was apparent that the support of the school or department, or even a colleague, was important in building this confidence. Increased confidence seemed to be important for teachers in introducing changes in the classroom, such as using more open and unpredictable tasks, letting go of control and letting students take the lead. Changes in practice related to this included using more open questioning techniques, moving away from relying on textbooks and becoming more relaxed with students

The changes that the teachers made in their practice were fully in line with the aims of the CPD. We would suggest that the success of Anne in overcoming her reluctance to change may have been due to the support that she got from the group and especially from Sarah. This suggests that ways of working with teachers that facilitate their mutual support and offer them ownership of the content, purpose and direction of their CPD may be particularly effective in supporting radical changes in professional practice. Participant ownership of this initiative helps to sustain involvement and that the members support one another in sustaining this passion and enthusiasm. Overall, the initiative supported the participants in their professional change by giving them a space for the detailed and joint consideration of children's mathematical thinking. It supported them in following up research sources that would support their analysis of the children's mathematical graphics and enabled them to encourage children to take charge of their own mathematical activity. It also offered them a supportive and encouraging arena in which their professional concerns and difficulties could be discussed.

One of the Early Years teachers explained how she had become more aware of the mathematics of the children and of how she could help children:

> *I think I am probably more aware of what the children are trying to achieve and what I should be trying to teach them and more aware of the skills they need to get out of the maths lesson; more aware of this now I recognise the maths in the children's play that I used not to see.*

The teacher who set up the network group had begun to read about research related to children's mathematical graphics as a result of her attendance at conferences run by the researchers involved. This teacher then used her knowledge as the basis for the network group meetings, became involved in further research in her own classroom and supported her colleagues in the network to do the same. She reported she is 'becoming more of a researcher in her classroom'. Also, as a group they were developing an 'enquiry approach' in this initiative.'

Another significant feature of this initiative is its focus on careful consideration and analysis of children's mathematics, and the ways in which professionals can support and encourage the children's mathematical thinking and reasoning. We were struck by the emphasis on observing and analysing children's spontaneous mathematical activity. This emphasis seems to shift the teachers' focus from teaching to learning and to give them the opportunity to consider the children's mathematical understanding and thinking. The teachers are then able to use this to support the children in their mathematical development and to plan appropriate adult-led activities that help the children build their mathematical thinking and reasoning, such as the counting.

In Case Study 5, a teacher described herself as having developed a 'passion' for teaching mathematics because she had developed her understandings of children's ways of making informal representations on paper (to support their mathematical thinking).

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Final RECME Report - (2009):
http://www.ncetm.org.uk/files/387088/NCETM+RECME+Final+Report.pdf

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