

Family learning in mathematics

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In his recently published book about multilingual mathematics classrooms, Barwell (2009) has identified the disjuncture between the language of home and the language of schooling as one of the three tensions in the teaching and learning of mathematics in another language. Mathematics is also neither context free nor culture free; mathematics learning in the UK may be very different for pupils who have moved from other education systems. Not only is the subject specific register different, but the symbols used, the methods of calculation, and tools for learning, such as number lines and multiplication tables may also be quite different. Some areas of the curriculum, such as data handling and probability may be quite new to EAL learners.

Studies have shown that parental involvement in a child's learning is more powerful than family background, size of family or level of parental education and, in the primary years, has more impact on attainment than the school itself. Thus one of the key principles of raising ethnic minority achievement has been to involve parents in the life of the school. In the past, this has tended to focus on pastoral areas: attendance, punctuality, bullying, holidays or offering parents an opportunity to improve their own English language skills. But increasingly, schools have realised that if parents also understand the culture of the classroom and more of the content of their children's learning, they not only become involved at school, but can continue to support that learning at home.

In the last few years the government has funded several family learning initiatives. Ofsted (2009) has found them to be largely successful, particularly in working with vulnerable groups of parents and carers. The stated aims of these programmes are to raise the literacy, language and numeracy skills of parents; to improve parents' ability to help their children; and to improve children's acquisition of literacy, language and numeracy. Some areas of the UK have been running an additional pilot specifically for bilingual families but this has only focussed on language and literacy rather than numeracy.

Islington Local Authority in London established a family numeracy project four years ago, before the government family learning initiatives took hold. This project was not related to the national programme, but was set up by the local authority because the attainment data for mathematics at key stage 2 showed there was still a considerable gap between pupils of Bangladeshi and Turkish heritage and local and national averages for all pupils. In the year before the project started (2005), the

performance of Bangladeshi and Turkish boys in KS2 mathematics had actually dropped by 13% and 15% respectively.

The aims of the Islington project were to improve the performance of Turkish and Bangladeshi pupils mathematics through:

- a focus on family numeracy for parents of Year 5 & 6 pupils – an initiative designed to help parents support their children's development in mathematics;
- targeted in-class support for pupils in Years 5 & 6 from Bengali/Turkish speaking teaching assistants.

It was felt that by supporting the parents to understand the ways in which their children were learning mathematics, the methods by which they calculated, and the language that the teachers used to explain, there would be a positive effect on attainment.

During the summer term of 2006 a Bengali teacher, two Turkish speaking and two Bengali speaking teaching assistants were appointed to work on the project in part-time posts. In addition, a Turkish speaking EMA consultant and a Turkish speaking teacher was seconded to work on the project to deliver the parent mathematics courses.

The parents' course was designed to focus on some of the mathematics subject content areas and introduce parents to all the skills and techniques their children were learning in class:

- place value and partitioning
- addition and subtraction
- multiplication and division
- fraction and decimals

Parents were also taught how to use calculators, tackle SATS questions and most importantly, play games with their children. In the later years of the project, the parent course was extended to also cover shape, space and measurement and to introduce probability as these were areas of the mathematics curriculum where more advanced language skills were needed to enable to high achievement. All the parent workshops have been conducted bilingually, usually with a teacher and teaching assistant working together so that they could differentiate the work for parents when necessary. In some of the project schools the teaching assistant would bring the children out of class for a while to work alongside their parents solving maths problems. This was very popular with both parties.

At the outset, project staff had three days of training from the LA mathematics consultants in mathematical methods and strategies for teaching and learning. This professional development has continued on a termly

basis with additional training sessions to support the production of collaborative resources, to introduce a clear focus on developing the language of mathematics, and to introduce specific talking maths activities.

As well as exposing parents to the methods of how mathematics is taught in primary school classrooms today, some of the workshops took a creative twist and also highlighted how mathematics is used in every day life. Through practical activities, the workshops demonstrated the importance of mathematics in cooking, sewing and gardening. In cooking parents doubled and halved ingredients to make a fruit salad; for sewing parents scaled up and down a pattern to make a handbag of their desired size; and in gardening parents worked the area and perimeter of the amount of land they would need to sow their seeds and bulbs.

The project has had very positive reactions from both schools and the parents themselves. Parents' confidence and knowledge about their children's learning has been improved through attending the workshops.

"Word problems are difficult, but when I use something my child can relate to he finds it easier to understand"

Comments like this are very common, but once parents see how some of the "new methods" break down and explain what is happening to the number in a clearer way so they have a better understanding, parents can see why they are used.

"It was really interesting to see how the use of 0 has had such an impact on maths and made calculations easier!"

They have clearly enjoyed these courses and have found them extremely valuable. They stated that they thought it was important that they knew how to help their children at home, because the way they had learnt mathematics was very different to the way their children were taught. They were surprised at the techniques that were used to teach mathematics now and found the resources such as number lines and number squares fascinating.

All the parents said that they had gained more confidence in helping their children with their homework and that they had not realised the educational value of playing games.

"I can help my children more. I learn lots of subjects that I did not know in the past. We learn lots of maths games and we play them together at home. Now my children learn addition, subtraction and times much better."

Many of the parents stressed that they did not like mathematics when they were at school, but the course

had changed their opinion and one parent even commented that attending the courses was like therapy!

Parents who observed lessons in their children's classes mentioned how useful they found this; they made positive comments about the teaching and how interesting it was to see teachers using the Interactive White Boards. In some schools the teachers felt that the children were trying harder so that they remained better than their parents at mathematics.

"I did not expect my son to be able to do fractions but when I saw him he can do them perfectly"

There have been some unexpected benefits in that several parents have decided to go on to take up further studies themselves:

"Before I started this course I didn't know much about maths. My daughter and I play lots of maths games at home. I am going to English courses as well but I don't enjoy as much as the maths course."

The end of the first year of the project, 2007, saw significantly raised levels of attainment for Turkish and Bangladeshi pupils across the borough. The project schools outperformed non-project schools by 16 percentage points for Turkish/Kurdish speaking pupils and by 13 percentage points for Bangladeshi pupils. In 2008, results also showed that project schools outperformed non project schools by 9 percentage points for Turkish/Kurdish speaking pupils and by 9 percentage points for Bangladeshi pupils.

The project will be continuing for another year with a stronger focus on the features of mathematical discourse. In some of the project schools, the class teachers have already been offered training session to introduce them to the specialised ways of talking in mathematics, including spoken forms for mathematical explanation, as well as text types like word problems. They are also provided with ideas for structured pair or group work and problem solving activities that create opportunities for students to explain their thinking.

References

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