

Closing the attainment gap in maths: a study of good practice in early years and primary settings

Introduction and background

Children from disadvantaged backgrounds are more likely to underachieve in maths throughout their school career than their more advantaged peers. In 2016 just over half of all children from disadvantaged families achieved the expected level in maths at age 11 (58%). This compares to a figure of 76 per cent for their more advantaged peers (DfE, 2016). It means that a significant proportion of children from disadvantaged families leave primary school without the basic maths skills to succeed at secondary school; strong maths skills and understanding at age 11 provide a firm base for success during secondary education and beyond.

This report from the Fair Education Alliance shows, however, that the link between underachievement in maths and socio-economic disadvantage can be broken. It presents case studies from 10 primary schools and 10 early years settings in which a high quality education is being delivered, irrespective of children's backgrounds. The schools and early years settings include some which are in the most deprived neighbourhoods in England, as well as some which are in more affluent areas. In all but 3 of the primary schools, there is a higher proportion of children eligible for the Pupil Premium than the national average of 26 per cent. The case studies also include settings and schools which, although not necessarily closing the attainment gap for their disadvantaged children, are successfully turning maths around for all. This summary of the full report outlines the aspects of good practice which were highlighted by the case studies and summarises the resulting recommendations.

Key findings: primary schools

Teacher subject and pedagogical knowledge

- Across all case study primary schools there was a strong focus on the development of teacher subject and pedagogical knowledge. This was supported through clear maths leadership, particularly where leaders support staff in identifying gaps and developing a culture of maths across the school.
- In these schools the maths lead also encouraged the development of maths across subjects and teachers were trained in how to use resources effectively to maximise children's outcomes. Maths co-ordinators/ leads were part of strong maths networks which met regularly to discuss best practice. This was enhanced when schools had a 'teacher research' focus and/or a focus on encouraging staff to obtain further qualifications. For example, one of the schools provided a GCSE maths course for staff and parents, other schools supported and encouraged teachers to participate in the Mathematics Specialist Teacher Programme.

A focus on the essentials

- The new national curriculum for maths (DfE, 2014), with its focus on depth and its emphasis on number and calculation, has enabled the case study schools to focus teaching and learning on the essential foundational blocks for problem solving and reasoning. In many schools at least 70 per cent of lesson time was spent on number and the concept of number, e.g. asking pupils questions such as 'how many ways can you show me three'?

- In many schools, problem solving and reasoning were interwoven into lessons. This was most effective when these areas are purposefully addressed across the school. For example, in one school, number, problem solving and reasoning were addressed in every lesson in every year group.

Knowing the child

Good assessment, linked to planning (frequently daily planning) was evident in the case study schools. Teachers knew where the children were in their learning, where they needed to get to and how to get them there. There was a focus on immediate feedback and correcting misconceptions as they arose.

- Some schools were piloting the split lesson practice of the Singapore mastery approach, where children have half a lesson, have a break and come back for the second half of the lesson; the teacher then teaches to the strengths, weaknesses or challenges of each child. In another school, a key strength of their approach was a pre- and post-maths topic assessment (written); it provided an opportunity to show children how far they had 'travelled' over the two week period of the topic.

Making maths fun and changing mindsets

- In most schools, pupil engagement and motivation was achieved through a shared approach of 'everyone can achieve'. This involved setting the right amount of challenge, with smaller steps for those who needed it. It



also relied on teacher or teaching assistant (TA) support in lessons and instant feedback. The approach was enhanced through maths games, weekly competitions (e.g. times tables) and problem solving set in 'real life' contexts. For example, in one school, menus and brochures were used to calculate the cost of a meal in a restaurant or a holiday.

- Many of the schools had focused on developing positive attitudes to maths across the school, including amongst parents. They ensured that there was a 'can do' attitude and that pupils were aware that it is good to learn from mistakes. In some schools there was a focus on metacognition through, for example, pupils discussing their learning with a peer.

Keeping up

- The increased focus on the essentials of maths, on teacher development, and on assessment meant that teachers were quickly able to identify a child who failed to address a certain concept and deal with it immediately. This was achieved through small group or one-to-one work prior to the following lesson and through planning, with teachers identifying potentially challenging areas in advance.

Parental engagement

- Across schools there was a focus on the engagement of parents through initiatives such as drop in lesson sessions, workshops to show parents how to support their child at home and even opportunities for parents to take qualifications in maths.

Mastery approach

- The mastery approach to teaching maths encompasses 3 core elements: deep understanding whereby learners are given time to fully understand, explore and apply mathematical ideas rather than being rushed through topics; problem solving, whereby pupils are encouraged to understand and apply relevant mathematical principles and make connections between different ideas; and the need to have high expectations for every child, enabling all to have the same curriculum and learning experiences.
- Many case primary schools are now adopting a mastery approach, for example through accessing mastery-based curricula, resources or training via Maths Hubs, or by joining the Mathematics Mastery Partnership.

Key findings: early years

Staff training and qualifications

- In the case study settings, the training of staff was a priority. The maths lead was a teacher or held Early Years Teacher status (EYTS) or Early Years Professional Status (EYPS). The majority of staff had undertaken further training or had taken a further qualification in maths education. In the teaching school, there was a focus on teacher research and staff progressing to Masters Level. Research was integrated into daily practice.

Environment and engagement

- In all case study settings there was a focus on how the environment can encourage maths. Most settings had used an audit as the first step towards initiating changes. In addition to wall displays some settings had arranged equipment and other objects to stimulate mathematical

thinking, such as carpet tiles imprinted with shapes in order to increase children's awareness of shape and number.

- Settings ensured that pupils entered a maths-rich stimulating setting, starting the day with a problem to solve, or enjoying games such as number hunts.
- Further engagement was promoted through regular themed problem solving activities.

Knowing the children well

- Across all case study settings, staff knew the children well and were aware of their strengths, weaknesses, interests and areas for development. This was achieved through effective key working, i.e. a key person working with a number of children or through children belonging to key groups. Children were regularly observed/assessed, with activities put in place to develop individuals. More detailed observations were carried out weekly.

Planning

- In some settings there was a focus on staff planning together, thereby supporting CPD. In the school there was a focussed planning framework. Consideration was given to how the day needs to be structured for children to achieve. In some settings, learning diaries were used to record children's achievement over the key areas of number, shape space and measure; this informed the child's next steps.

Parents

- Parental involvement was considered to be an area for development across many settings, although a number of initiatives had been set up including: an annual session for parents on how to support their child in maths; explanations to parents of how Numicon works; and regular informal chats about the child's work.

Recommendations

The case studies have highlighted areas for the development of maths across educational settings in England as outlined below.

- A national maths professional development programme with subject knowledge and pedagogy which includes better support for practitioners in assessing and supporting children's progress in maths.
- Changes to the current Ofsted inspection framework so that it looks for greater evidence of how well settings are supporting children's early maths development.
- The development of focussed approaches across all settings to develop parental engagement. Such engagement has been shown by research to be central to better outcomes in both short and long term learning and development.
- A focus on effective transition, i.e. continuity in approach and practice from early years to primary school and primary to secondary school and beyond.
- A focus on individual research projects and action research are important and should be further developed. Teacher CPD builds skills and confidence in teaching maths and enables staff to become confident in performance and attitude.

The full document can be downloaded from:

https://afaeducation.org/media/1226/fea-numeracy-report_fv.pdf