EEF publishes new review of evidence on Maths teaching

Using calculators in maths lessons can boost pupils’ calculation and problem-solving skills, but they need to be used in a thoughtful and considered way, according to a review of the evidence published by the Education Endowment Foundation (EEF) today.

The age of pupils matters too, the research finds. Primary school pupils should use calculators regularly but not every day. Secondary school students should have more frequent access to calculators so that they’re able to make decisions about when, and when not, to use them.

The report has clear implications for teachers: they need to teach pupils how to use calculators. For example, pupils might be taught strategies for estimating tricky calculations that they would then use a calculator to work out accurately.

Today’s review – commissioned by the EEF and the Nuffield Foundation – analyses the best available international research on teaching maths to children aged 9-14 (Key Stages 2 and 3) to find out what the evidence says about effective maths teaching. The review was conducted by a team led by Prof Jeremy Hodgen at UCL Institute of Education with Dr Colin Foster of the University of Leicester and Dr Rachel Marks of the University of Brighton.

It was commissioned to support the EEF’s guidance on teaching maths, published at the end of last year and focusing on practical “dos” and “don’ts” of great maths teaching. Improving Maths in Key Stages 2 and 3 has recommendations in eight areas, each designed to support primary and secondary schools to close the attainment gap between disadvantaged pupils and their classmates.

The latest data shows that 59% of pupils who are eligible for free school meals achieved the expected standard in maths by the end of primary school, compared to over three-quarters (78%) of all other pupils.

Today’s report also finds that teachers should help pupils to use a range of mental and other methods and be able to recall number facts efficiently and quickly. The evidence suggests that those who are unable to do this may have difficulty with harder maths later in school. But while fluent recall is important, teachers should also help pupils understand how different calculations work and when they are useful.

Sir Kevan Collins, Chief Executive of the Education Endowment Foundation, said:

“It’s often said that calculators can harm students’ arithmetic skills. What this review finds is that they can actually boost pupils’ fluency and understanding of maths – but that to do so, teachers should ensure they are used in a considered and thoughtful way, particularly with younger students.

“There are thousands of potentially useful studies out there on maths, most of which are presented in academic papers and journals. It can be difficult for teachers to know where to start. This new report looks at the best available evidence to give schools and teachers clear ideas of what works when it comes to maths teaching. The findings will help schools navigate the wealth of information out there and give all their pupils the knowledge and skills they need to succeed.”

Josh Hillman, Director of Education at the Nuffield Foundation said:

“This research is valuable because it synthesises a huge range of international evidence on what works and what doesn’t when it comes to teaching maths. For instance, it tells us that collaborative learning has a positive effect on attainment, but that setting or streaming students by ability generally does not.
“It also provides an invaluable checklist for areas where further research is needed, for example in relation to the reasons behind low attainment in maths and what teaching strategies might be effective in addressing it – something on which the Nuffield Foundation is funding further work.”

Professor Jeremy Hodgen, lead author of the report, said:

“Teachers who want to be well-informed about the best evidence concerning the teaching of mathematics are faced with a mountain of various kinds of educational research. This wide-ranging review of mathematics teaching condenses what is known into an accessible form.

“We hope that this review and the EEF guidance on mathematics teaching will be helpful to everyone who is interested in making mathematics lessons more effective for students.”

NOTES TO EDITORS

1. The Education Endowment Foundation (EEF) is an independent charity set up in 2011 by the Sutton Trust as lead foundation in partnership with Impetus Trust (now part of Impetus-The Private Equity Foundation), with a £125m founding grant from the Department for Education. Since its launch, the EEF has awarded £96.3 million to 160 projects working with over 1,000,000 children and young people in over 10,000 schools, as well as early years and post-16 settings, across England. The EEF and Sutton Trust are, together, the government-designated What Works Centre for Education.

2. The Nuffield Foundation is an independent charitable trust that funds research and student programmes to advance social well-being in the UK. We want to improve people’s lives, and their ability to participate in society, by understanding the social and economic factors that affect their chances in life. The research we fund aims to improve the design and operation of social policy in Education, Welfare, and Justice. Our student programmes provide opportunities for students, particularly those from disadvantaged backgrounds, to develop skills and confidence in quantitative and scientific methods. The Nuffield Foundation has funded this project, but the view expressed are those of the authors and not necessarily those of the Foundation.

3. The evidence review was commissioned by the EEF and Nuffield Foundation and authored by Jeremy Hodgen, Colin Foster, Rachel Marks and Margaret Brown.

4. Improving Maths in Key Stages 2 and 3 and its accompanying resources can be accessed here.

5. The Department for Education’s data on Key Stage 2 attainment in maths can be found here.