

## **If ‘good enough’ is sufficient for primary mathematics teaching, do we need excellence?**

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Teachers face persistent demand to achieve ‘excellence’ in teaching. These same teachers encounter paradoxes as they endeavour to reconcile their personal and professional identity, with the political agenda. For this research, the question was ‘How is excellence in primary mathematics teaching perceived by primary mathematics teachers?’ Four different teacher groups in the south of England were drawn through a purposive, specialist sampling method and interviewed producing narrative and mind-maps. An interpretative, thematic approach to analysis was adopted. One unexpected outcome was that ‘good enough’ teaching would suffice; targets in primary school can be met by less than excellent teaching. It might be questioned whether better than good teaching is essential, necessary or achievable by all teachers. However, the research also revealed reservations in the acceptance of a standard that is sufficient, citing enduring long-term gains and encompassing both aspirational and functional principles, such as societal gains, aesthetic and intrinsic value.

**Key words: excellence; teaching; targets; accountability; mathematics; primary**

### **Introduction: context and research approach**

The impetus for this research arose through increasing irritation at the persistent rhetoric and demand by policy makers for educators to achieve ‘excellence’ in teaching whilst not defining what is meant by this or agreeing on the means by which to achieve it. ‘Excellence’ is an emotive term and is subject to being defined by external criteria and social change; for example a teacher deemed excellent in 1965 may not be assessed as excellent in 2014 and vice versa. The HE green paper (DBIS, 2015, p.21) asked ‘What do we mean by excellence’ concluding that it is difficult to define. In addition, there was an awareness of the paradoxes encountered by teachers at all levels of education who create their identity through a need to reconcile their personality and life stories, their professionalism and the political agenda.

The research used a qualitative, interpretative paradigm in which the nature of the enquiry was explorative, creating access to the respondents’ professional, social and cultural worlds and the knowledge, skills, cognition and emotions that contributed to their identity (Yin, 2009). The analysis adopted a nondualist stance in which agent and object, producers and products and “the known and the knower are interdependent” (Maykut & Morehouse, 1992, p.12). The ethics for this research were in accordance of the guidance given by British Educational Research Association (BERA, 2011).

The respondents were drawn through a purposive, specialist sampling process, and the sample achieved comprised: student teachers (2); experienced teachers embarking on becoming Mathematics Specialist Teachers (MaSTs) (2); MaST graduates (3); primary mathematics university lecturers (3).

Open-ended or unstructured interviews with a single, opening question of ‘what do you believe is excellence in mathematics teaching?’ were used to allow the respondents to take the interview in the direction they chose to provide their own insights (Yin, 2009). The interviews comprised two elements, each of which produced data: the spoken responses and immediately after when the respondents were asked to draw diagrams (mind-maps) summing up what they had said. The outcomes were established using emergent theme analysis.

### **A sample of the literature reviewed**

The literature reviewed was extensive, drawn from a range of factors that contribute to excellence in education to consider some overarching factors influencing decisions made about education within which primary mathematics education is situated. The review then reflected upon the nature of mathematics and why mathematics is part of the primary curriculum, both functional and aesthetic before moving on to include how success is measured and how the teacher might achieve excellence.

Aldrich (2005), amongst others, identified two tenets that pertained to the purpose of education: the development of children to meet their civic responsibilities for the betterment of the lives of the people in their community; to create citizens who will contribute to democracy. This was developed by Ernest (1991) and OECD (2010) who noted the interlinked purposes of being relevant to society, the economy and to the individual’s quality of life, making the connection between education standards and economic prosperity. Education needs to prepare the child for whatever life will ask of it, being capable of independence and self-reliance (Ronnstrom, 2012). Additionally, Ernest asserted that individuals have an entitlement to be educated and society, through its government, has a duty to ensure this occurs. Pragmatically, this means that if education creates good, contented, productive citizens, these will be more use to society (Ernest, 1991).

As Mason (2012) noted, school mathematics has overt relevance and purpose as a human endeavour beyond the classroom and into the future. Ernest (2008) and Restivo and Collins (2010) stated that the current focus in mathematics arises from the contemporary social stance and how mathematics is envisaged in public and political perceptions. Mathematics enables us to communicate thinking and reasoning; it embodies a precise language (Suggate, Davis & Goulding, 1998). Therefore, education should provide degrees of access to and use of mathematics from the basic functional to those for whom mathematics is beautiful and of aesthetic value, with its own intrinsic gratification; the joy of arriving at an elegant solution (Krutetski, 1976; Betts & McNaughton, 2004). Additionally, Boaler (2012, p. 59) believed that children must learn how to “act with agency and responsibility” and be held “accountable for mathematical reasoning and sense making”.

It sometimes seems that Programme for International Students Assessment (PISA) and Trends in International mathematics and Science Study (TIMSS) are the only international evidence that matters and that statistics can be used to prop up any argument or cause (Alexander, 2012). However, measuring performance does not automatically lead to insights as to what policy and practice can do to help students to learn better, nor teachers to teach better (Barber & Mourshed, 2007). Brown (2010) observed that a goal based on performance, such as examinations, will engender a particular set of affective responses and behaviour patterns. As Mason (2012, p. 31) stated, it is commonplace for the “successful completion of routine tasks [to be] taken

as evidence that students know how to do something”. Ofsted (2012) noticed that the ‘best’ teaching tends to occur for those pupils about to undertake external assessments. The aim of learning mathematics must be greater than achieving certain levels at certain times (ACME, 2008).

Pragmatically, Brown (2010, p. 24) remarked that we will always be looking for ways to improve standards. However, the 2015 floor standard for KS2 mathematics SATs was 65%; 87% was achieved (DfE, 2015). Krutetski (1976) and Williams (2008) argued that isolating mathematics (both within the subject and across the curriculum) would limit the potential to achieve optimum success; it is possible to improve attainment but the offset is a reduction in engagement and enjoyment in mathematics. Knowledge through content can be successful in the short-term and this short-term retention does serve the purpose of meeting prescribed targets (Williams, 2012). If the meaning is not evident, not embedded, pupils do not possess the skills and cognition to apply what they have learned (Boaler, 2012).

Teachers establish customs and practices that make life manageable and these routines can inhibit and limit possibilities (Mason, 2004); ‘habit’ can stand in the way of development and advances in new ways of thinking. Hence change will only occur if the teacher subscribes and has personal agency in the process. Suggate, Davis and Goulding (1998, p. x) added, referencing primary teachers, that “mathematics has a troubled place in the emotions of many highly intelligent learners”.

## Findings

The emergence of ‘good enough’ was an unexpected outcome, yet it arose through the words of the respondents. Their views, with illustrative quotations, are collated into the following two main categories: what is necessary and sufficient (Figures 1-4); beyond good-enough (Figures 5-8).

<i>‘I don’t think excellence is necessarily necessary, if that makes sense. Children still achieve and do well.’</i>	<i>‘I certainly have seen lots of good maths lessons where children make good progress.’</i>
<i>‘Subject knowledge may just be adequate but still know the children well and be able to take them on.’</i>	<i>‘I’m not sure that you need excellence every minute of every day ... in a child’s school career ‘good enough’ will do for some of the time’</i>
<i>‘You need consistently a good standard supporting their children’s learning all day every day.’</i>	<i>‘I’m not sure that you need that every minute of every day ... in a child’s school career ‘good enough’ will do for some of the time.’</i>

Fig 1: Good enough

Within the views of excellence put forward by the respondents, there was reflection on the difference between good and excellent. Whilst they all believed that excellence is highly desirable, they debated whether it is essential, necessary or achievable by all teachers. In particular, the respondents commented that for the most part, a good teacher would provide appropriate learning opportunities for children to meet the necessary targets. In addition, it may be that by maintaining a ‘good-enough’ approach to teaching, children are subjected to an even-handed, consistent mathematics education.

<i>‘Part of the deal is that you need good statistics at the end of the year as it is ‘the thing we are most strongly judged on.’</i>	<i>‘We’ve still got to do SATS, I can’t scrap all that type of thing totally and do an entirely creative rich lessons - my hands are tied.’</i>
<i>‘when it comes down to it there needs to be “they can all do this”</i>	<i>‘Getting results measured mostly through pupil attainment and progress.’</i>
<i>‘They just have to churn it out and be good at</i>	<i>‘Learning procedurally can be quick and get</i>

*copying and performing. It can work, it's not that results and can pass SATs papers.'*  
*children aren't learning from doing that.'*

Fig 2: Targets & accountability

If targets in primary school can be met by less than excellent teaching it seems that it is not necessary to teach better. After all, primary schools met the floor standard for KS2 SATs. Perhaps consideration should be given to the appropriateness, relevance and justification of the targets. Nevertheless, the research showed that aspiration to be excellent should not be subsumed within success from a satisfactory performance.

<i>'You do it on the board, they understand it, they do it in their books, but three weeks later they might not understand it.'</i>	<i>'For example, fraction and division links which is a secret that some teachers don't communicate to children.'</i>
<i>'Children will tick the boxes and may just go through learning everything but not be curious, not be interested, not be investigating as they grow up.'</i>	<i>'They may make progress and succeed but there is no joy.'</i>
	<i>'I would argue I don't think they're learning - I don't necessarily think it always goes in and stays in.'</i>

Fig 3: Limitations of good-enough

The respondents appreciated that much could be done to meet short-term targets including teaching on separate aspects of mathematics to raise attainment. This could, the respondents acknowledged, mean that learning could be superficially acquired, but this strategy would result in a reduction in engagement, enjoyment and intrinsic motivation, which will have an impact in the longer term. The teaching by which learning becomes embedded is a continuous, sustained, high-quality process.

<i>'I have worked with very, very capable mathematicians who day-to-day grapple with teaching primary level children because they can't unpick the maths.'</i>	<i>'It doesn't always happen. Like a teacher I worked with who is quite happy to try out new things but always comes back to what she's safe with.'</i>
<i>'Not everybody is prepared or has the time to get the knowledge and understanding that may be necessary. Nobody will change unless they see a purpose of changing.'</i>	<i>'All they're actually doing is imitating what you did. After they've used your ideas, they don't have anything else.'</i>
<i>'I think in some schools it's just a case of damage limitation.'</i>	<i>'If you tell them, it's easier to control their behaviour and you can also assume - I know I've taught them all this.'</i>

Fig 4: Becoming better than good-enough

Some respondents agreed that not all teachers are capable of this while others thought that all teachers have the potential to be excellent. Some are not willing to persist and be flexible to cope with inconsistencies and idiosyncrasies they may encounter from the children. Some things can be learned to move towards excellent teaching: addressing poor or inconsistent mathematics subject knowledge and pedagogical subject knowledge, with a view to enhance teacher confidence and attitude.

<i>'Move with the children, forwards, backwards and sideways. You teach in a different way, and are able to adapt to and not to stick with your one idea.'</i>	<i>'Even more it means that if the teacher does not understand it they have the confidence to work with the children to clarify [...] help them and move them on.'</i>
<i>'Be able to meet those targets in an interesting way.'</i>	<i>'Listen to the child, hear what he is saying and know what to do.'</i>
<i>'To have that flexibility in the way they teach in their classrooms to allow and take risks.'</i>	<i>'You are being that mathematician that you want children to be.'</i>

Fig 5: Beyond good enough – teaching

The respondents also noted the need for a passion for mathematics that enables the teacher to be the mathematician model in the classroom, creating experiences

where children learn and understand. Moreover the teacher needs to be aspirational and inspirational, creating and developing these same traits in the children.

<i>'We all have rubbish lessons at times but that doesn't mean you are not an excellent teacher.'</i>	<i>'I think it's almost impossible to do that all day every day without it finishing you off.'</i>
<i>'I think we should aspire for excellence, but whether or not we always will achieve it is doubtful.'</i>	<i>'I can't believe that a teacher could be on top of their form and be excellent in every single lesson, every day of the week [...], it's not sustainable.'</i>

Fig 6: Beyond good enough – realism

The more experienced respondents (MaST graduates and HEI lecturers) acknowledged that there is not complete freedom to teach in a way they believe to be excellent. They talked of high expectations, meeting the needs of individuals, recognition of potential and mutual respect.

<i>'Learning with understanding takes time - equip children with a repertoire of strategies develops resilience and resourcefulness.'</i>	<i>'Continued determination to achieve rather than just wanting the instant gratification. Life's not like that. They learn that grappling with something is when you learn more.'</i>
<i>'Knowing that sometimes you're playing the long game, knowing the long term benefits will come in the end.'</i>	<i>'A recognition of potential. Not just that "this is the year they've got with me and this is what we are going to do" but what will that child be in the future?'</i>
<i>'It is not just for the moment but it's something that will continue.'</i>	

Fig 7: Beyond good enough – the long view

All the respondents believed the excellent teacher goes beyond that which is required to meet prescribed markers of success; as a result, the child will also do so. He will challenge himself, have improved thinking, derive enjoyment from mathematics generating motivation and possess pride in his achievement. Respondents wished the children to have pleasure and pride in their achievements. By enthusing about and valuing the mathematics and gaining an appreciation of success through persistence and tribulations, these pupils perceive an overt relevance in school mathematics.

<i>'I want to liberate them.'</i>	<i>'Children feel proud of their achievements.'</i>
<i>'Open out maths as something beyond learning a few fractions and a few procedures.'</i>	<i>'Children who get much better at thinking, enjoy being able to be like that, who find challenge to be motivating.'</i>
<i>'I think you would like to hope that in a child's career, they maybe come across somebody who is inspirational in their teaching of mathematics.'</i>	<i>'To appreciate the power that it has, on a day-to-day level, enthusiasm for the subject, appreciation and love of mathematics.'</i>

Fig 8: Beyond good enough – outcomes for the child

The excellent mathematics teacher has a pragmatism that allows him to reconcile the need to meet the demands of two masters that are not necessarily compatible; to satisfy both short-term and long-term views of the purpose of successful mathematics education. Excellence in teaching must be nurtured, becoming developmental and accountable and it is within and enacted by the child who is the outcome of excellent teaching.

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