Teaching for Mastery: What is the research problem?

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Theme: Number Mastery

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Background information

As an initiative to improve Mathematics education in England and to increase participation post-16, the NCETM (National Centre for the Excellent Teaching of Mathematics) was set up in 2006. It was established initially as an online "virtual centre" (Boylan et al, 2011). Boylan et al describe how the NCETM was a unique approach to CPD and refer to it as a "decentralised change initiative". It is complex and not prescriptive rather it provides professionals with opportunities to engage in many ways. It takes a pedagogical approach to CPD with classroom practice at its heart; it supports teacher enquiry and active research, all with improvements to practice being the ultimate goal (Boylan et al, 2011).

The NCETM is funded by the Department for Education (DfE) and to date over £50 million has been invested into it (NCETM, 2016). The current goal of the programme is to reach 60% of primary schools and 50% of secondary schools by 2023 (Boylan et al, 2017). At the heart of the NCETM principles is "Maths Mastery", the definition of which will be discussed in the next section. It is this pedagogy that it aims to instil into schools to meet the above target of 2023 and go further beyond. The DfE recognised that a small group of East Asian countries consistently dominated the top of the PISA league tables and therefore visited them (Jerrim and Vignoles, 2015a). Teacher methods and curriculum design were of interest to the policy makers and the DfE therefore set up the England/Shanghai exchange whereby specially trained teachers will visit each year to find out more about pedagogies over there. In addition, every year teachers from Shanghai will return to the UK to teach demonstration lessons for UK teachers to observe and discuss. It is some of these pedagogies that have now been branded as Maths Mastery by the NCETM.

In addition to the England/Shanghai exchange, the NCETM have been training four "mastery specialists" per Maths Hub every year since 2014 (there are 37 Maths Hubs across England). It is the responsibility of each of these four specialists to then work with six schools in their region to disseminate and support these schools set up Maths Mastery. It is through this model that the NCETM hopes to achieve their 2023 target.

Defining Maths Mastery

Maths Mastery is very difficult to define not least because it is known as many different things: *Maths Mastery, Teaching for Mastery,* the *Mastery Approach* to name just a few. There is little or no literature that seeks to define it using one definition rather it is a collection of teaching pedagogies which together create Maths Mastery. These consistently appear in the literature and can be summarised as follows (Boylan et al, 2017; FEA, 2017; Jerrim and Vignoles, 2015a; NCETM, 2018; Vignoles, et al, 2015):

- the large majority of children move through the curriculum at the same pace
- high expectations for *all* pupils
- whole class teaching (no setted ability groups)
- slower pace with more time spent on topics
- emphasis on number (less time spent on other areas such as shape and statistics)

- conceptual understanding is essential
- use of a wide variety of models, images and manipulatives
- varied interactive teaching (short periods of questioning and dialogue interspersed with short activities – pupils are not left for long periods of time to work independently). This is known as "ping-pong"
- application to real life context
- deepen understanding, don't accelerate to new content
- pupil talk and language is important
- Same Day Intervention (so pupils "keep up" and don't have to "catch up")

Drury (2015) explores the notion that Maths Mastery is long-term internalisation of knowledge with understanding which enables a pupil to apply this knowledge to a new and unfamiliar situation. From looking at the above it can be seen why some may describe Maths Mastery as "*just good teaching"* which is a potential perception of some teachers but many argue it is more than that and, as one teacher summarises in an article on the NCETM website, it does echo many previous ideas but they are all interlinked and grouped together to create the concept of Maths Mastery (NCETM, 2018). A guidance report was recently published by the EEF (Henderson et al, 2017) which outlined eight recommendations relevant to improving mathematics teaching for all pupils in KS2 and 3. The eight recommendations were all linked to the aforementioned pedagogies that make up Maths Mastery.

Evidence for the Maths Mastery approach

Considering the amount of funding that has gone into developing it, there has been very little research into the effect of the Maths Mastery approach. This is possibly because it is difficult to define (as discussed above) and it could be argued that it is just the re-branding of established teaching theories such as those of Vygotsky (who discusses social interaction) and Kilpatrick et al's five mathematical proficiencies (Kilpatrick et al, 2002) which are themselves heavily based on academic research. There has been a one-year study into Maths Mastery conducted by the EEF (Jerrim and Vingoles, 2015a and b; Vingoles et al, 2015), a study of good practice by the FEA (FEA, 2017), an evaluation of the England/China exchange (Boylan, 2017) and an evaluation of the National Textbook project (NCETM, 2015).

My Research

I intend to study the over-arching question: **What are teachers' perceptions of Maths Mastery?**

Within this I am going to consider the following research questions:

- Is the Maths Mastery approach based on research?
- Do teachers perceive the Maths Mastery approach to be based on research?
- What do teachers perceive as "reliable" research?
- How have schools translated Maths Mastery (and why are there differences)?
- Have all individuals in the school translated Maths Mastery in the same way?
- What accounts for discrepancies between the Senior leaders, middle leaders and class teacher perception?

I have started to read around evidence-informed practice, policy translation and communities of practice – my reading has included the following authors: Ball, S., Borko, H., Brown, C., Coldwell, M., Godfrey, G., Greany, T., Joyce, B., Lave, J. Putnam, R., Showers, B., Sfard, A., Wenger, E., Zhang, D.

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