

**Neither a Lender nor a Borrower be? Exploring Mathematics ‘Mastery’ Policy
Borrowing.**

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Neither a lender nor a borrower be? Exploring Mathematics ‘Mastery’ Policy Borrowing.

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This paper examines an instance of policy borrowing, specifically, the borrowing of ‘mathematics mastery’. In doing so, it considers some of the implications of parachuting policy from one setting into another. The process of borrowing mastery is examined not only as a policy technology, but also as a culturally located artefact embedded in the ‘high performing’ education systems of Shanghai and Singapore. Drawing on empirical evidence, the paper maps how teachers working in the East Midlands region of England borrowed, and enacted, mastery. Data suggests that the cultural ‘baggage’ implicit in mastery rendered it, at times, in conflict with structures inherent the English education system. The paper concludes by suggesting that the teachers’ attempts to enact mastery reported here, reveal some of the fundamental consequences inherent in policy borrowing. Consequences with, in this case at least, significant implications for the English education system at both the micro and macro levels.

Keywords: Mastery; policy; performativity; enactment; culture.

Introduction

This paper reports on the *East meets West* project which investigated an instance of ‘policy borrowing’. *East meets West* examined how the implications, and ‘enactment’, of the borrowed policy played out for primary school teachers working in the East Midlands of England. The paper places the discussion firmly within, what Ochs and Phillips (2002b) describe as, a transnational context to examine the instance of policy borrowing under investigation here, that is, ‘mathematics mastery’.

Mobilising empirical evidence generated from the participating teachers, the paper examines how these teachers attempted to make mastery work for them and their students. To explore mastery policy borrowing in the ‘real world’ context of these teachers’ work, the ‘strategic mathematics hubs’ role in hosting and leading the mastery policy, and the two mastery policy initiatives listed below, are considered here:

- Singapore textbook and professional development
- Shanghai teacher exchange

Through listening to the voices of teachers tasked with making mastery work, the paper argues that the complexities, and limitations, of borrowing policy from one cultural context to another appeared not to have been fully understood - or even considered - in this case by policy makers and government alike.

Contextualising culture

To examine policy borrowing, it is crucial to have some contextual understanding of cultural aspects of both lender and borrower (Olmedo, 2017). Later in the paper, we examine some such aspects of the Shanghai model of maths mastery. At this point however, we consider one of the overarching cultural considerations regarding mathematics education in England, - that is, the high-profile and high-stakes nature of mathematics teaching, learning and attainment both politically and educationally in the country.

The marketized, neo-liberal and performative (Lyotard, 1979) structures of the English education system are described by authors such as Stephen Ball (2003). These structures, allied to high-stakes panoptic inspection regimes (Foucault, 1977; Perryman, 2006), firmly position performance, and mathematics performance particularly, as indicators of the ‘standard’ of education on offer. As such, one of the key drivers for mathematics education policy in England has been its ranking in the *Organisation for*

*Economic Co-operation and Development (OECD) Programme for International Student Assessment (PISA)*¹ tables.

In 2016, PISA ranked English students' mathematics performance as 26th in the world - a ranking which the then government felt was unacceptable. Speaking shortly after the PISA rankings were released Nicky Morgan, the then Secretary of State for Education, was unequivocal;

...England's schools will be the best in Europe for English and mathematics by 2020, and among the top five countries in the world (Shipman and Griffiths, 2015, no page)².

Central to borrowing mastery policy therefore - as well as a focus of successive neoliberal, performative education policy discourses (see Angus, 2015) - was the continuing concern over the mathematics ability of students in England. Mobilising policy enactment³ (Ball *et al*, 2012) and policy borrowing (Ochs and Philips, 2002a; 2002b; Philips and Ochs, 2003; 2004), the paper considers the implications of this instance of policy borrowing for teachers who were tasked with enacting it in their classrooms.

Borrowing policy, enacting policy

Policy borrowing is not neutral as it is a highly political, and politicised, process (Hodgson and Spours, 2016). Central to policy borrowing are key relational considerations such as

¹ See also the *Trends in International Mathematics and Science Survey (TIMSS)*

² This target required a 59 point improvement from 495 to 554 with the highest PISA score for maths in Europe being Liechtenstein 535, and globally South Korea 554.

³ Rather than being 'implemented' by policy makers, policy is read and enacted by actors in relation to context (see Ball *et al*, 2012).

(i) does country *A* do *X* better than us? (ii) Can we use how country *A* does with *X* here? How does country *A* implement policy regarding *X*? (iv) Can we implement country *A*'s policy regarding *X* the same way here? (see, Olmedo, 2017).

A with policy borrowing not being neutral, nor does not happen by accident – policy borrowing is both a conscious and focused act (Philips and Ochs, 2004). Policy borrowing is specifically concerned with one outcome, that is, taking what is the ‘best’ from one setting and implementing it into one’s own context for improvement (Hodgson and Spours, 2016). The crucial point here is the notion of ‘best’. What is highly effective pedagogy for teacher *A* with class *A* might be highly ineffective pedagogy for teacher *B* with class *B*. Similarly, what is best practice in country *A* might be anything but best practice in country *B*⁴.

The notion of ‘best fit’ is important. For example, there is little or no indication as to what evidence informed the decision that mastery policy should be borrowed (see Jermin *et al*, 2015). It seems therefore that in the case of mastery at least, the decision to borrow policy, with multi-million-pound funding implications, was based upon what can only be called a ‘hunch’. As such, which policy is identified as being worthy of borrowing although a focussed act, is not necessarily a rational act. Indeed, policy borrowing is inextricably linked to the triumvirate of political, social, and economic considerations (Steiner-Khamsi, 2014). As a result, policy borrowing must be a philosophical and ideological fit with these domestic agendas. As Steiner-Khamsi, (2014) suggests, for policy to be deemed worthy of borrowing it must first, and foremost, align with the dominant political zeitgeist.

⁴ See the ‘four stages’ of policy borrowing (Philips and Ochs, 2003)

As indicated earlier, there is a further crucial issue raised here - culture. Although, of importance those instigating policy borrowing too often ignore crucial cultural, social and political considerations (Steiner-Khamsi 2014). Moreover, not only is this cultural context often ignored it is done so because of the deeply rooted political drivers at play. For example, the very act of borrowing policy from the 'best' can be part of a larger plan of action - action where the borrowing of policy is part of changing, influencing and manipulating conditions in the borrower country (see Halpin and Troyna, 1995). Ironically perhaps, especially regarding the case examined here, conditions most conducive for successful policy borrowing are those where there is a close 'fit' between the educational, political and ideological conditions of lender and borrower (Lingard, 2010).

It is just this ignoring of the cultural context of policy which can result in the borrower rejecting the lent policy. Auld and Morris (2014) lament, that ignoring cultural context leads to 'cherry picking'. This is again a crucial point. The 'tipping point' where the adaption of borrowed policy - through cherry picking what appears to be the most effective parts - leads to the policy eventual enacted having little, or no, resemblance to the policy that was originally lent.

It must be stressed that there are no guarantees with policy borrowing. Lingard (2010), highlights that enacting borrowed policy might lead to policy change that is unexcepted, or impacts on areas which were not the focus of the policy, or - in the worst case scenario - is actually detrimental to the borrower. No matter what the outcome therefore, it is imperative that borrowed policy is evaluated to understand how it was enacted (Lingard. 2010).

Finally, examining policy borrowing requires an understanding of policy and what happens when policy is borrowed. Ball *et al* (2012) talk of policy in terms of enactment.

In other words, active enactment as opposed to passive implementation. For Ball *et al*, enactment counters policy being ‘done’ to those in education settings, with actors merely ‘ciphers who implement’ (2). Policy is a complex set of texts which are encoded and decoded in equally complex manners. As such, policy cannot be merely implemented by those outside of the complex, relational, setting into which it is introduced. Policy needs to be ‘translated from text to action’ (3), through collective and collaborative processes. Policy enactment therefore acknowledges the interconnectivity between a wide range of policy actors. It also highlights the temporal nature of policy, in that policy rarely arrives ‘fully formed’ (Ball, *et al*, 2012, 8) and goes through an ad-hoc process of interpretation, miss-interpretation, invention and re-invention.

Attempting to define mastery

Mastery is an approach to teaching mathematics which, for some, is capable of improving children’ mathematics ability (see Jerrim *et al*, 2015). Mastery drew headlines in the English press with *the Guardian* suggesting that ‘English pupils’ mathematics scores improve under East Asian approach’ (Weale, 2015).

The task of supporting the mastery agenda across England was given to the *National Centre for Excellence in the Teaching of Mathematics* (NCETM). In 2016 (no page) NCETM outlined how ‘mastery of the subject’ was the central to mastery which, in turn, led to ‘deep, long-term, secure and adaptable understanding’. For NCETM (2014, 1) mastery had five key features:

- Teachers reinforce an expectation that all pupils are capable of achieving high standards in mathematics.
- The large majority of pupils’ progress through the curriculum content at the same pace. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.

- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts in tandem.
- Teachers use precise questioning in class to test conceptual and procedural knowledge, and assess pupils regularly to identify those requiring intervention so that all pupils keep up.

Despite such an articulation of these key features, Askew *et al* (2015) concluded that mastery has been used in four different ways:

- A mastery approach
- A mastery Curriculum
- Teaching for mastery
- Achieving mastery - age group specific knowledge

Indeed, it was just this diversity of mastery definitions which led Townsend (2015) to describe it as a ‘nebulous concept’.

In February 2015, The *Education Endowment Fund* commissioned the *Mathematics Mastery. Primary Evaluation Report* (Jermin, *et al*, 2015). The report explored research which included eighty-three primary schools in the South East of England with a total sample of 4,176 pupils. The report concluded that mastery aimed to:

...raise attainment for all pupils and close the attainment gap between pupils from low income families and their peers. The programme aims to deepen pupils’ understanding of key mathematical concepts. Compared to traditional curricula, fewer topics are covered in more depth and greater emphasis is placed on problem solving and on encouraging mathematical thinking. (4)

However, the report painted a picture of mastery impact which did not necessarily chime well with the high level policy narrative championing the approach:

On average, Year 1 pupils in schools adopting mathematics mastery made a small amount more progress than pupils in schools that did not. However, the effect detected was not statistically significant... There is little evidence that the effect of Mathematics Mastery differs between children with different levels of prior achievement (Amended from Jermin *et al*, 2015, 4).

At the time of writing, other than the 2015 report, there has been no further published evidence examining the effectiveness of maths mastery in English schools.

Maths Hubs

Although NCETM was tasked with leading the mastery policy nationally, the enactment of mastery at local level was via ‘Mathematics hubs’. First announced in December 2013, thirty *Mathematics Education Strategic Hubs* were formed with the aim:

...to enable every school and college in England, from early years to the post-16 sector, to access locally-tailored and quality support in all areas of maths teaching and learning... They will also be responsible for the coordinated implementation of national projects to stimulate improvement and innovation in maths education. (DfE, 2014a, no page)

The hubs were officially launched 2014 by the Department for Education (DfE, 2014a), with the Under Secretary of State for Education Elizabeth Truss exhorting the potentially transformative effects of both the hubs and mastery. Truss outlined how 32 schools and academy trusts were identified as ‘pace-setters’ for implementing mastery in England. The hubs received £11 million funding from the DfE (see DfE, 2013; 2014b).

Each hub was led by an ‘outstanding’ school or college - as ranked by *Office for Standards in Education, Children's Services and Skills* (OfSTED) - in each of the areas. Charlie Stripp, NCETM’s director, was adamant that both the hub initiative and mastery

would have a significant impact on students' mathematics capabilities. Blogging in early 2015 (no page) however, Stripp highlighted that to achieve the benefits of mastery, there was a need for 'structural and systemic changes' and called for:

...expert specialist teacher in every maths classroom, together with significant shifts in the way we develop textbooks and other teaching and learning materials, and in the way maths teachers work together and support each other. (Stripp, 2015 no page).

In July 2016, the Schools Minister Nick Gibb pledged a further £41 million of funding to support mastery in English schools.

Textbooks, professional development and teacher exchange

The textbook and professional development project was announced in November 2015 by Nick Gibb, the then School Reform Minister. As a result, two mastery textbooks series were offered to primary schools:

- *Maths no problem*
- *Inspire Maths*

In the summer of 2015, NCETM published an *End of Year Report* relating to the primary text book project which suggested that:

There are significant indications that the textbook project has had a positive impact on the teaching and learning of mathematics in Year 1 classes. The majority of the schools involved (92%) indicate that the project has achieved overall success. Positive outcomes include increased teacher subject knowledge (93%) and confidence (91%) in teaching mathematics. There has also been a positive impact on children's attitude to learning mathematics (91%) and on their attainment (90%). (NCETM, 2015, 1).

A critique of NCETM's data in this report is outside the scope of this paper. However, other than this report - and some brief commentary in the July 2015 edition of

the NCETM's *Bespoke* magazine⁵ - at present there is very little coverage of text book project available.

The Shanghai-England teacher exchange was announced in 2014 by the DfE. In the announcement, the DfE outlined how 50 teachers from Shanghai would be 'embedded' in the hubs to teach pupils and run mastery professional development. A group of 71 primary teachers visited Shanghai in September 2014. Return visits from 59 Shanghai teachers took place in two waves, in November 2014, and February-March 2015.

The teacher exchange had four different routes. 4 primary teachers visited Shanghai, 60 practitioners' schools were visited by teachers from Shanghai and 120 teachers observed teachers modeling the Shanghai mastery approach. A mid-exchange report was published in November 2014 and a February 2015 press release, reported on the second wave of exchanges. In the April 2015 edition, *Bespoke* described the exchanges as:

...the start of a long-term research project...to investigate ways in which Mastery approaches can be introduced to maths lessons, to the way teachers design lessons, and to how schools organise time-tables, and the deployment of teachers and teaching assistants. (Bespoke, 2015, no page)

Other than these artifacts, at the time of writing, there is very little information regarding any evaluation of the teacher exchange project.

⁵ The hubs, in conjunction with NCETM, publish a newsletter - *Bespoke*.

Methodology - The East meets West project

*East meets West*⁶ was set in 4 schools in the East Midlands of England (Table. 1) over an 18 month period and worked with 14 key informants (Table 2).

Table 1 Here

Table 1. School profiles

Table 2 Here

Table 2. Participant biographies.

Data was generated through semi-structured interviews with teachers and observations of mastery lessons which used either the textbooks, or were being taught by a teacher who had visited Shanghai on the teacher exchange (Table. 3).

Table 3 here

Table 3. Interviews and observations

The primary research question asked:

- What were the UK teachers' views on the efficacy of borrowing mastery?

With subsidiary questions being:

⁶ The project adopted the *British Educational Research Associations* (BERA, 2011) ethical guidelines and all names of participants and organisations are pseudonyms to protect anonymity.

- How did the UK teachers use the mastery text books and professional development?
- What did the UK teachers learn from the teacher exchanges?

Grounded theory analysis (Glaser and Strauss 1967) identified concepts and categories in the data - see Table. 4.- two of which are focussed upon here:

- mastery and policy
- mastery and culture

TABLE 4 HERE

Table 4 Concepts and categories

Mastery policy

Participants described mastery as both a borrowed, and as one told us, “parachuted” policy. Teachers also reported that mastery was a potentially useful pedagogical tool with which to support their mathematics teaching. From the outset however, informants repeatedly told us that there was a major implication of borrowing mastery. Informants were clear that for mastery to be successful - at least mastery that was a close facsimile of the Shanghai model - required large scale reorientation for their working practices. Borrowing and enacting mastery was not a simple case of just ‘copying’ what went on in Shanghai. Mastery required a fundamental reorientation of teachers’ work at macro and micro policy levels:

...when we’ve seen the models from Singapore, we can’t replicate what they have in their country here. (Christina)

A key concern, was that Shanghai mastery employed mathematics specialist teachers. The informants were clear about this. Such a specialist orientated approach had fundamental implications for teacher recruitment, teacher education and teacher retention at both national and school levels:

I think the professional development of the teachers is very interesting in China... They have a five year NQT⁷, where we have a one year NQT. It's a five-year project, where you have a very reduced timetable and the teachers are given a mentor who is a more experienced teacher. (Judy)

Similarly, the use of specialist mathematics teachers would have fundamental policy implications for teachers' workload in relation to both subject teaching and pastoral duties:

We had the exchange teachers come over...those teachers only teach maths, and then in the afternoon they have time to pick up...nurture groups to go over things. (Andrea)

Like the role of specialist teachers, the advantages of the Shanghai mastery teaching day were also powerfully rehearsed by the informants. Indeed, this was in many ways the nub of the policy debate. Teachers told us that they would "be happy to do mastery". There was a proviso however. Mastery policy could not just be borrowed and then rolled out to across the country with the consequence that, as Andrea told us, "teachers just left to get on with it". For mastery to work, it could not just be borrowed with all the existing structures remaining unchanged. Policy had to support wholesale changes for mastery to work.

⁷ NQT is the term to delineate Newly Qualified Teachers and the support structures put in place for them.

As one head teacher, Christina, told us, the mastery policy agenda faced resistance from some teachers in her school. Not because of any deep seated concerns with the pedagogical approach or mathematical content, but because her teachers simply could not see how teaching mastery was possible:

The first thing they [Christina's staff] will say is...but I can't do that, I don't just teach maths, I teach maths and English and history and geography and RE and science and phonics and whatever else have I missed? Design technology... and I'm not being flippant, that's what my teachers teach. (Christina)

Allied to concerns regarding the 'how' of mastery, there were those directed toward the 'what' of mastery. Informants were anxious that there seemed to be 'mixed messages' as to what mastery called for them to do. Teachers told us that in the 'real world' of their schools', mastery was a hybrid of the Shanghai, Singapore and English approaches. Lillian, was clear that mastery had become a policy and political buzzword, with teachers left to "figure it out for themselves":

It's [mastery] very much a buzz word, and I think because it's a buzz word it's used in a lot of different contexts and slightly different ways... (Lillian)

To negotiate mastery's 'fuzzy boundaries, teachers made their own decisions as to what mastery meant for them and their students. Much of what teachers thought defined mastery was a depth and interconnectedness of understanding:

So, to me, mastery is that real deep understanding, and making connections to learning. (Andrea)

However, for many of the informants, it was almost an impossible challenge to enact the depth of knowledge inherent in mastery due to the performative context in which they worked:

...you've got to change your whole ethos as a school, your philosophy on teaching maths...teachers have been trained to move children through material as fast as they possibly could...Whereas now, you get the children to understand very deeply, and that's a shift on teacher knowledge, teacher expectations, a huge difference in the way the whole staff would feel about teaching maths. (Phyllis)

Phyllis's comment highlighted the contrast between what she, and other informants, understood to underpin mastery in Shanghai and the systems in English schools. Teachers were starkly aware that a redefinition of existing systems and structures would have implications for both mathematics policy, as well as, how they thought about and understood mathematics themselves.

There was final element of the mastery policy debate, and that concerned the textbooks. Overwhelmingly, the textbooks divided opinion. For some, the textbooks were an excellent pedagogical tool that led to a clear increase in pupils' progress and attainment. For others, the textbooks 'muddied the water' of their practice. All the teachers we spoke to, identified clear advantages to using the textbooks. However, there was also universal scepticism directed toward the mastery narrative rehearsed by the UK government with regard to the transformative qualities of using mathematics textbooks in primary schools. For these teachers, this narrative seemed to suggest that simply borrowing mastery, and in this case mastery textbooks, would be the panacea which would solve all the 'ills' incumbent in England's PISA ranking.

The textbook policy was described by some informants in terms of 'better than nothing'. Hardly a ringing endorsement, but an indication of what many informants maintained was a lack of investment in primary mathematics. Teachers who had previously had little or no structured resources were grateful for what the textbooks offered:

...if you're a teacher who isn't perhaps very mathematically confident...you could use these textbooks as a script...(Steven)

There was also an acknowledgment of a novelty factor related to the textbooks. For the teachers, it was novel that policy appeared to directly address the challenges they faced from a lack of resources. For their pupils, it was the novelty of using textbooks like the 'big kids' did:

...but they [the pupils] have never had a textbook before...they were like ooh, and it's something very special and precious... we've built it up [the textbooks] ... because they're so expensive, no one can afford new ones, you mustn't write in them and all the rest of it. (Steven)

Teachers did indicate that with the textbooks came a new range of pedagogical and classroom management considerations. These considerations required some new approaches:

There are a lot of them [books], because there are the practice books, the assessment books the textbooks, what else is there...there's a lot of physical stuff and it is about managing how you do that. (Loiuse)

There were also concerns regarding (a) the cost of the books for schools (b) the level of language employed (c) the assumptions underpinning the levels of the tasks and (d) the impact of the book upon classes consisting of a mixture of year groups:

You need to get some funding,...I'm not being flippant, I know what budgets are like. I'm not sure yet, we don't know enough about it [the textbook policy] for me to say it's worth spending thousands on. And that is what you're talking...thousands. (Sally)

Initially we were shocked at the language in them, the high level of language. (Lillian)

...it's easy to say "now everybody you're working for numbers to 20, so turn to page 58 of your textbook" ...but just a minute you're working with numbers to 20!
(Ashley)

...textbooks don't allow for mixed year classes. And there are a huge number of primary schools which aren't able to run single year classes, and so that needs addressing (Diane)

These is one final, and yet crucial, point to be made regarding policy. There was disquiet amongst informants that their existing practice was somehow tarnished. The discourse rehearsed by senior government ministers, appeared to infer that existing mathematics practice in England was somehow sub-standard. This inference was contested by the informants, many of whom could provide attainment and progress data which confirmed their claims regarding the efficacy of their existing practice.

Mastery culture

Participants told us that wrapped up with, but separate to, mastery policy was a lack of acknowledgement by policy makers and politicians alike of the crucial cultural differences between Shanghai, Singapore and England. Participants described what they felt to be as two particularly significant 'clashes' between the English and Shanghai cultures;

- respect for learning and teachers
- human rights

Regarding respect, or lack of it, for learning and teachers the informants were clear. Without a reorientation of the learning culture displayed by some of the pupils they taught - and their parents - informants felt that mastery would be compromised:

The culture of teaching is very different in China; I think on a society level the respect that teachers have. The word for sir is *laoshi*, which means teacher...The high esteem that they hold education and learning and knowledge... the children and

their parents, and the grandparents realise that this is an investment in the future, both educationally and financially. And we [the family] are going to do everything we can so our children are going to be the best that they can be, and make us proud as a family. (Judy)

Informants told us of their attempts to match the mastery culture in Shanghai with their own in England - with varying degrees of success:

They stand up when they answer the questions in China. We did do that for a while... we dropped it because culturally that's not us...And one of the big things that we've not been able to adopt, which would be beneficial to adopt...is homework. There's an expectation in Shanghai that you get homework every day and that you'll make sure that your child does that homework. (Jeffrey)

Informants also highlighted a key difference between the Shanghai and English learning cultures, being the degree to which home tutoring was 'part-and-parcel' of the Shanghai learning experience. Although it was acknowledged that some English pupils participated in home tutoring, it was felt that was not to the same degree as in Shanghai.

Indeed, teachers felt that home tutoring was fundamental to the Shanghai mastery model. The notion of 'being left behind' was a concern for the teachers in the study. This concern was particularly directed toward home tutoring being left to 'pick up the pieces' for those pupils who struggled during school time in Shanghai. Once more, informants told us that mastery required a fundamental restructuring of education systems in England:

Knowing what I know about Singaporean culture, I had a concern about the lower level children just being left...We can't replicate what they do in Singapore. I can't have my teachers teaching mathematics in the morning and then going off and doing catch up, there simply aren't the resources. (Sally)

As well as concerns regarding the structures need to support mastery, participants also rehearsed apprehensions regarding the social structures in Shanghai:

I've huge concerns about us taking the lead from countries with poor human rights record...and I've publicly voiced it...I've said why haven't we looked at Norway, Sweden, Denmark...countries who have equally high mathematics results and yet have far better human rights records. And I've huge concerns about that, and cynically I think the answer is trade...I also have huge concerns that when we've met teachers from Shanghai, when we've seen the models from Singapore we cannot replicate what they have in their country here. (Sally)

The discussions regarding culture highlighted a deep sense of moral purpose in relation to education held by the informants. It also highlighted how these teachers felt that mathematics education had a vital part to play in wider issues of social justice:

We did have a lot of discussions about "is this a culture we should be following", we're a creative country, independent thinkers and minds we want to maintain that. We're a creative school with very confident articulate children and we want them to be that. There's a lot of kind of moral discussion about this, you know, not everything from abroad is good... (Theresa)

Teachers felt that, like elements of their mathematics practice such as group work and investigations, there were fundamental elements of British culture which they valued and which were reflected in the education system. Once more, teachers rehearsed the practicality, and indeed efficacy, of borrowing an educational approach so deeply ingrained in one culture and dropping it 'lock, stock and barrel' into another:

There are some things I wouldn't want [from Shanghai]...you know, the pressure on young children to succeed...there're parts I don't particularly want to adopt. (Judy)

The apparent lack of thought, at a policy level at least, of cultural differences was a recurring concern:

You can't take a Singapore school model and just pick it up and expect it to work fully in an English classroom. (Diane)

You can't take a model out of Singapore and drop it in the UK, that just does not happen... (Louise)

As illustrated by Diane and Louise's comments, informants felt - that at times - mastery policy was no more than a political soundbite ready to be rolled out news conferences. Informants felt that such soundbites ignore the fundamental cultural differences between the lending and borrowing countries. Indeed, the lack of acknowledgment of these cultural differences by government and policy makers alike was, as Louise continued, "bewildering".

Discussion

What needs to be made clear is that for many of the teachers in this study mastery - as a borrowed policy - was welcomed. Informants maintained that they were open towards change, and valued policy, which they saw as being directed toward supporting their practice. There is, of course, a 'but'. Informants also strongly rehearsed concerns that the implications of borrowing mastery had not been fully considered by policy makers and government. There was concern that mastery was being positioned as a 'golden bullet', that would cure all ills. There was concern that cultural and policy implications implicit when borrowing mastery had seemingly not been considered. And perhaps of greatest concern, was that there was widespread confusion as to what mastery was.

The positives...

Within the schools visited, informants claimed that mastery approaches were being used. Before entering the field, we wondered whether text books would be found in un-opened boxes in store cupboards and mastery pedagogy evident in no more than the odd, fleeting, cherry-picked occasion. This was not - at least not always - the case. Textbooks were

being widely used (in some way or another), mastery pedagogy employed (in some way or another) and mastery language apparent (in some way or another).

Teachers could verbally articulate what mastery meant to them, even if they could not verbally articulate what mastery policy appeared to be nationally for government and policy makers (other than as a tool for increasing PISA ranking). However, this articulation came with the caveat that even though teachers had constructed their own working definitions as to what was, and was not, mastery, this did not mean success in achieving their mastery goals followed.

Teachers were positive about NCETM, and the maths hubs in supporting them. The hubs were praised in their role in forging links between schools and teachers and developing networks. The work of the hubs led to schools amalgamating approaches from a variety of sources. As such, informants developed their mastery through local channels where practice was shared within, and between, schools.

Regarding the textbooks, some informants were positive about what they offered. Others, felt that the layout of the textbooks was unhelpful⁸. Teachers rehearsed how professional development was essential, so they could observe classroom practice using the textbooks as modelled by experienced practitioners. Some teachers also valued the structure that the textbooks offered. Having a ‘lesson plan’ outlined in the textbooks was appreciated.

Of course, that the text books offered a pseudo ‘scheme of learning’ reflects how many informants were using the National Curriculum to plan their mathematics curriculum. As such, the Singapore textbook teacher’s guide offered a far more detailed

⁸ Analysis of the textbook content is outside the scope of this paper.

learning scheme and was regarded by many as very useful. Indeed, some schools chose to only purchase the guide.

Unlike the textbooks, informants reported that the teacher exchange had an impact not solely mathematics teaching. Meeting teachers from a very different cultural, and professional, setting - and having the opportunity to speak with them and develop an understanding of their practice - was highly valued by teachers. Of course, meeting the Shanghai teachers, and hearing how their work was structured and valued, resulted in our informants reflecting upon their own context. The role of specialist teachers, and the structure of the school day in Shanghai, seemed to be highly desirable educational model, albeit one which was far removed from their own.

The process of reflection also led to a powerful reinforcement of the English teachers' own practice. Feedback from the Shanghai teachers made it clear, how much they admired and valued the way mathematics was taught in England. This feeling of justification, and pride, in their work however led to frustration. The East Midlands teachers, felt their practice was only acknowledged - at Governmental level - in terms of deficit discourses surrounding PISA underperformance.

Despite these frustrations, informants continued to outline the positives of the teacher exchange. Teachers charted how they adapted their practice, based upon what had been learnt from the Shanghai teachers. For example, some of the schools had implemented a shorter mathematics session in the morning and a follow up session in the afternoon. Similarly, some had implemented professional development sessions specifically directed toward developing teachers' confidence in their mathematics pedagogy.

The challenges...

Despite these positives, informants rehearsed significant concerns regarding borrowing mastery:

- (i) There were fundamental philosophical, cultural, pedagogical and systemic challenges which prevented the English schools from being able to borrow and adopt mastery in a way close to the Shanghai model.
- (ii) Because of these challenges, rather than adopting mastery the school and teachers in this study had to adapt it - adaptations which in some cases were so great that, it could be argued, the result ceased to be mastery at all.

In most cases, the teachers had to adapt mastery to suit their circumstances. However as one teacher told us, if mastery was adapted too much, and key mastery principles not adopted, then what remains ceased to be mastery. For this informant, the result of this adaptation was clear, instead of the borrowing of mastery policy leading to systemic change, it became merely a case of “rearranging the deckchairs”. Other concerns related to 5 key areas:

- Classroom management. Mastery required teachers to present topics to the whole class using the whiteboard which required pedagogies which were new for both teachers and pupils.
- In some cases, very young pupils found it difficult to manage the textbooks - for example, getting all the students on the correct page.
- Mixed year groups, as the textbooks were year specific, this raised problems for smaller schools which had mixed reception and year one classes.
- The level of English required to access the tasks was of a high level - pupils had to be good readers to follow the questions.

- Students who were not keeping up with the rest of the class - additional assistance and support structures were not in place.

This final point, outlining informants' concerns regarding the lack of additional assistance and support structures for pupils, reflected some of the macro-scale challenges facing both borrowing and enacting mastery. Informants were clear, that the Shanghai model of mastery was predisposed to a range of assumptions which were lacking in the English education system.

In Shanghai, the person teaching mastery was a mathematics specialist whose sole role in the school was to teach mathematics. The difficulties in recruiting, training and retaining mathematics specialist teachers in England have been well documented. In February 2016 for example, the UK's *National Audit Office* (NAO) highlighted that the DfE 'has a weak understanding of the extent of local teacher supply shortages and whether they are being resolved' (NAO, 2016, no page). Moreover, the NAO highlighted that despite the government spending £700 million per year on recruitment and training of new teachers, targets have been increasingly missed year on year since 2012. Mathematics is one of the key teacher shortage areas,

A second assumption in the Shanghai mastery model was that teachers would have a significant part of their school day directed solely toward mathematics. This was a fundamentally different model from that of the generalist primary teacher in England. In late 2014, the DfE ran an online workload consultation (DfE, 2015). This was in response to, amongst other reports, the *Teachers' Workload Diary Survey* (DfE) published in February (DfE, 2014b). In March 2016, the DfE published a policy paper *Reducing Teachers' Workload* which included a statement from the then education secretary, Nicky Morgan, pledging 'more support to reduce teacher workload' (2016, no page).

In these documents, it was acknowledged that the workload of teachers in England was too high. Teachers were being asked to do too much during the school day and were taking too much work home with them after school. If, therefore, teachers' workload was already too great, implementing the Shanghai mastery model - which required teachers to focus singularly on their mathematics teaching - would require a fundamental reappraisal of teachers' duties and workload.

From these two considerations - specialisms and workload - a much wider set of policy implications emerge. For mastery to be mastery, at least in a Shanghai model, then mathematics education policy would need a root-and-branch reorientation. Teachers in this study just did not see that happening. Indeed, during the research the incumbent Secretary of State for Education Justine Greening, began the largest policy shift in English education for 50 years when announcing new Grammar schools⁹. This was a course of action not lost to our informants, who lamented that primary mathematics education needed a similar amount of political hubris.

When informants spoke about the grammar school policy, it reinforced both their scepticism and cynicism regarding the government's commitment to mastery. In the informants' view, government expected a reorientation of mathematics teaching to occur without a commensurate reorientation of teachers' workload, contractual hours, curriculum, recruitment, retention, teacher education, the list could go on.

Added to the policy debate were the cultural implications of mastery. If in some way English education policy was reoriented to support a Shanghai mastery model, a similar reorientation would need to take place in some aspects of English culture. Shanghai mastery relied upon parents and pupils having a deep respect for education,

⁹ This policy was itself later reviewed.

school and teachers. It relied upon pupils and parents making significant financial and time commitments to develop the home-school partnership which enabled mastery to work. Shanghai mastery also relied upon the high cultural capital associated with educational success in general, and mathematics specifically.

Wrapped up in the concerns regarding Shanghai mastery, was a disconnect between values. Informants rehearsed how creativity was integral in their practice, as was a deep sense of fairness to all. As such, parts of the mastery narrative did not play out well. Added to this, was disquiet felt about heralding an educational approach so strongly associated to what many informants felt was a deeply flawed political system¹⁰.

Mastering policy borrowing?

Whilst the extra funding announced in 2016 for extending mastery was welcomed, it was done so with both scepticism and cynicism. Informants were sceptical as to how realistic the transfer of mastery from Shanghai, and all the associated policy and cultural implications, to England could be. Informants were cynical that, in the ‘grand scheme’, the £40 million allocated to mastery and the hubs could have been sent more wisely elsewhere.

The teachers in this study were adamant however, that mastery had a lot to offer. A shift in the policy narrative mobilised by mastery to one where primary mathematics was worthy of investment and discussion at governmental level was warmly welcomed. Despite this positivity, there remained a set of fundamental concerns regarding mastery. The first, and perhaps most fundamental, was that the lack of consensus as to what mastery was remained highly problematic.

¹⁰ Participants were equally critical of aspects of UK culture.

In some cases, schools attempted to adopt mastery as closely as possible to the Shanghai model. In doing so, they followed (as closely as possible) the pedagogies, day structures, pupil-teacher hours of Shanghai and the topic order, content and tasks of the text books. Others however, saw mastery as an adaptable ‘movable feast’ where elements were applied differently to different contexts. The different levels of mastery adoption and adaption raised significant questions as to what was being enacted in schools. Indeed, it could be argued in many of the cases reported here what was taking place was not mastery at all.

The question as to what mastery was in practice was wrapped up in several factors. The macro-level policy landscape was clearly one of these. So too, were the high stakes performative pressures the schools and teachers in this study reported directed much of what they did. Mastery was very much part of the performative narrative rehearsed by government, policy makers, schools and teachers alike (see Clapham, 2013; Clapham *et al*, 2016).

For these teachers, mastery, performativity and inspection were interlinked. The policy narrative which signalled the borrowing of mastery as a potential cure for England’s PISA underperformance was delivered with crystal clarity. Teachers felt that mastery was solely concerned with raising PISA attainment. This singularity of purpose was problematic. Teachers valued what mastery could offer just because it was not solely focussed towards raising attainment. Informants wanted to borrow mastery to support their pupils in developing confidence in using mathematics - not solely in relation to tests and examinations - but as mathematically literate citizens. At its best, these teaches felt that mastery led to their pupils developing a deep and interconnected understanding not only of how mathematics worked, but of how the world worked.

These are, of course, bold claims and ones which are clearly open for debate. However, the informants in this study were not part of a mastery 'cult'. They were critical, and sceptical, in equal measures as to the government's motives for promoting mastery. Nonetheless, they adopted and adapted mastery to work as best as possible for them and their context.

There are two final points. Firstly, and especially considering the concerns raised regarding the mismatch between English, Singapore and Shanghai cultures, it seems odd as to why policy makers chose to policy borrow from East Asia rather than from similarly high achieving Northern European countries such as Norway, Sweden, and Denmark.

Secondly, and more substantively, mastery requires significant investment of resources, energy and emotion. The implications of this investment are fundamental. Schools need to be reorganised, teachers' contracts redrafted, society's respect for and investment in education repositioned, and that is just to start with. Consequently, if borrowing policy is to be more than a political soundbite, the fundamental implications for existing systems need to be considered deeply. Certainly, as deeply as merely attempting to satisfy performative indicators of educational success.

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