Observing teaching

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The 2014 primary mathematics National Curriculum for England refers to mastery; a nebulous concept. This paper reports on pilot lesson observations to explore whether the Knowledge Quartet is a useful tool for both observing classroom teaching for evidence of mastery and also for understanding the Discourses drawn on by teachers in their interpretations of mastery. It concludes that the KQ is a useful heuristic but that a grounded approach will be more appropriate for this study.

Keywords: English primary National Curriculum; mastery; lesson observation; Knowledge Quartet; discourse analysis; interpretive; insider research; pilot study

Policy background to the research

In September 2014, a new primary National Curriculum became statutory for eligible English schools[7] (DfE, 2013). Michael Gove MP (the Secretary of State for Education at the time of the curriculum reforms) instigated the curriculum change because England had "sunk in international league tables[8]" (DfE, 2011a) despite doubts about the reliability of the test data for England (Pope, 2014).

The way in which England's political leaders responded to this situation was typical of those experiencing a "PISA shock" (Wiseman, 2013, p304); they looked to improve subsequent league table performances by adopting policies from high performing jurisdictions (HPJs) irrespective of cultural and systemic differences (Askew, Hodgen, Hossain, & Bretscher, 2010, p13). Broadly speaking, this involved changes to both *what* is to be taught and *how* teachers should teach in English schools.

In seeking to improve mathematics standards in England, ministers firstly reviewed *what* is taught in the equivalent mathematics curricula of five HPJs and found a greater emphasis on and higher pupil skill levels with number (DfE, 2012); subsequently moving number content to earlier year groups within the English curriculum to match the earliest age at which it is introduced elsewhere. This shift is most apparent under the banner of 'fractions'; with pupils now expected to perform calculations such as $\frac{1}{3}+\frac{1}{4}$ and $2\frac{1}{4}-\frac{1}{10}$ and $8\frac{2}{3}\times\frac{1}{4}$ and $\frac{7}{2}\div 2$ by age 11. This was previously an expectation for the first years of secondary education (KS3, ages 11-14) and therefore few (if any) primary teachers will have prior experience of teaching these objectives.

In addition to changing the content of the National Curriculum, Government ministers also responded to their 'PISA shock' by looking at *how* mathematics is taught in HPJs and consequently made a mastery approach central to this curriculum (DfE, 2013, p99). It has been described by the National Centre for Excellence in the Teaching of Mathematics (NCETM, 2014) as: an expectation that all will achieve; differentiation by depth not acceleration; lessons foster deep conceptual understanding; practice of procedures is intelligent and builds fluency; and teacher

[7] For years 2 and 6, the curriculum will be statutory from September 2015.
[8] The international league tables referred to are PISA and TIMSS.

questioning informs prompt interventions. A mastery pedagogy is a new way of working for the majority of English primary schools but, despite its evident appeal, it is not without its challenges. These include: how teachers will manage to adopt this slow approach to deep learning alongside pressure to achieve high grades quickly (see for example: Lamon, 2007); and confusion over the meaning and use of the term as 'mastery' has also been used as a synonym for 'gifted and talented' describing the highest level of attainment in the new 2016 National Curriculum tests (DfE, 2014).

The two policies adopted from HPJs as a result of 'PISA shock' are the focus of my research; the teaching of the new and more cognitively challenging fractions content in Y6 as the context within which to explore how teachers are engaging with a mastery approach to teaching.

Methodology

In this research, I will use discourse analysis as a means to examine the Discourses[9] drawn on by teachers in their use of the term 'mastery' in the teaching of fractions.

> A discourse is a way of thinking, perhaps culturally or institutionally conditioned, which, like a paradigm, is legitimated by communities, often those with power. Discourses shape, and are shaped by, different meanings and people are members of different discourse communities – those communities which hold similar views, values, ideas and ways of looking at the world. (Cohen et al., 2011, p574)

I am anticipating some interesting, and potentially contradictory, Discourses. Among others, these may include a Discourse that 'fractions' is too challenging a topic for all pupils to understand. Such an attitude would be both at odds with what Anthony and Walshaw (2007) found to be best pedagogical practice – that teachers should believe that "all students, irrespective of age, have the capacity to become powerful learners of mathematics" (2007, p200) – and with a mastery approach (NCETM, 2014).

The need for interpretive research stems from the fact that 'mastery' is a nebulous concept and therefore is not consistently understood and applied in schools. In this interpretive study, I am interested to learn which Discourses teachers draw on in constructing mastery, and I am curious to examine the evolution of coherent and shared Discourses of mastery. I will be examining how Discourses of mastery are evidenced both through teacher talk about their practices and also through observations of the practices themselves (with any contradictions between talk and actions of particular note). This study is therefore interpretive in the sense that I want to understand teachers' interpretations of mastery not only as they describe it verbally but as implied in their actions.

My professional background has a significant bearing on this research; I have worked as a primary school teacher, a Local Authority adviser, a freelance primary mathematics consultant and an Initial Teacher Education (ITE) lecturer. Embarking on a doctoral study which has schools and teachers from within my existing professional networks as the objects of the research therefore presents significant challenges for my identity, as I move from a role of 'expert' to one of 'researcher' and potentially also for the validity of this research.

In carrying out interpretive insider research (Noffke & Somekh, 2011), I am acutely aware that I "cannot escape [my] past" (Mercer, 2007, p8) and am therefore endeavouring to capture these personal challenges in a reflexive research diary kept during the period of data collection. Because what I will be observing will be familiar

[9] Following Gee (2005), I will use both **discourse** and **Discourse**. This distinguishes between **discourse** to mean talk and **Discourse** (capital D) as defined by Cohen, Morrison, and Manion (2011).

to me, the reflexive research diary forces me to turn what I witness into the unfamiliar by making me view classrooms as sites of research.

An in depth study of Y6 teachers in their classrooms

There are three distinct phases to this aspect of my doctoral research, each of which contributes to a rich interpretation of classroom practice. The first of these is the focus of the rest of this paper; my physical presence in classrooms, observing the teaching of fractions. The second phase is the use of video to identify critical moments from the lessons observed, and the final phase is in the form of half-termly review meetings with the teacher to make sense of critical moments from their teaching.

Justification for using the Knowledge Quartet

In my role as an ITE lecturer and tutor, I am familiar with carrying out overt evaluative observations of trainee teachers against the broad range of Teachers' Standards (DfE, 2011b). In an attempt to move away from being evaluative and towards being descriptive, I am adopting a different framework for those observations that I carry out for research purposes.

I have chosen the Knowledge Quartet framework (Rowland, Huckstep, & Thwaites, 2005) for four reasons. Firstly, as a tool grounded in practice from English primary school classrooms, it understands the setting of my research. Secondly, as a framework, it focuses an observer on noticing the elements of lessons relating to mathematics (as opposed to behaviour management, for example). Thirdly, it is comprehensive and builds on earlier models (for example: Shulman, 1986). And finally, although predominantly used in ITE, the framework can be used to support teachers at all stages of their careers to reflect on practice (Rowland, 2009, xv).

I also have two 'hopes' for using the Knowledge Quartet. The first of these is a hope that by using a relatively unfamiliar framework, I make descriptive as opposed to evaluative observations. And the second hope is that the Knowledge Quartet proves to be a useful tool for both observing the teaching of fractions and also for identifying the presence of a mastery pedagogy.

Findings from pilot observations

As this is a new framework for me, I have carried out some pilot lesson observations of trainee teachers from within my existing networks using the Knowledge Quartet observation guidelines recommended by Rowland (2009, p225). These observations were not video recorded and therefore the process of selecting extracts and discussing these with the teacher (as will happen in my main study) was not possible.

These pilot observations raised a number of issues for me and my identity as a researcher, especially in terms of achieving description as opposed to evaluation. I set these out in my research journal:

> After each observation, I had a go at using the KQ to consider how a trainee's teaching might be described using different criteria. I completed one form for describing the mathematics content and a second for describing evidence of mastery and found that:
>
> - Because of my growing familiarity with both the KQ and ideas of mastery, in many cases I had already made comments relating to these two in my feedback against the Teachers' Standards.
> - I am applying my own understanding of mastery in my observations.

- In the act of noticing practice, and of claiming it as an example against a particular KQ criterion, I am making a judgement about what I have seen.
- Because I have an understanding of what I believe to be good practice against each criterion (i.e. what I would aim to do myself were it me teaching), I am noticing both what is present and what is missing from a lesson.
- It was extremely hard to focus only on what I did see.

So while the KQ criteria focused my observations on either the teaching of the mathematics content or the presence of a mastery approach, using the criteria did not in itself support me in being descriptive as opposed to evaluative. (Research Journal entry 25.05.15)

In order to illustrate these points, extracts from my field notes can be seen in Figures 1 and 2 and are followed by a commentary about their significance.

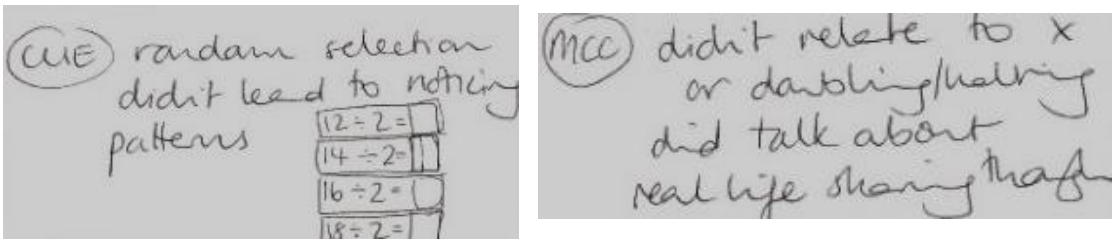

Figure 1: Extracts from an observation of a lesson on division in Y1. Observing for mastery.

The observation of mastery shown in Figure 1 is typical of those completed in that it demonstrates how difficult I found it to purely write about what I had seen. For example, under the transformation code CUE (choice of examples), I noted how the task *did not* lend itself to pupils noticing patterns, and under connection code MCC (making connections between concepts), I noted *missing opportunities* to link to prior learning.

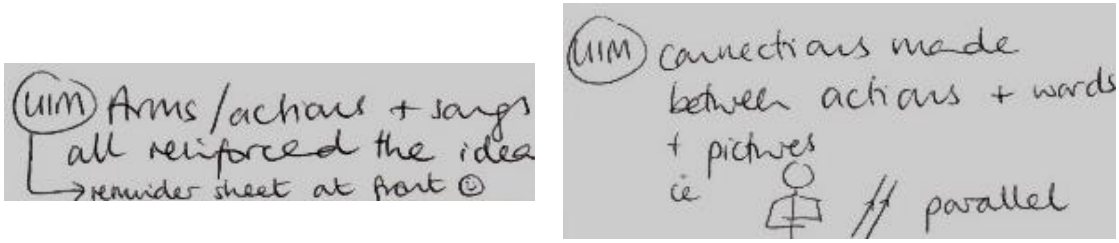

Figure 2: Extracts from an observation of a lesson on parallel and perpendicular lines in Y3. Observing for the mathematics (left) and mastery (right).

In Figure 2, seeing my field notes for mathematics side by side with those for mastery led me to notice the repetition across the transformation dimension (notably UIM, use of instructional materials). This has made me appreciate how difficult it is to separate observations of mathematics from observations of pedagogy and therefore in future observations, I will just use one sheet to capture my field notes.

Reflections on pilot observations

As a tool for observing mastery, the Knowledge Quartet appears to be useful. I made observations of mastery in each of the four quarters (foundation, transformation, connection and contingency) and against more than half of the sub-categories. This exercise has led me to speculate that the subcategories may in fact help in the development of a coherent Discourse of this nebulous concept. I am tempted to

speculate about which aspects of the Knowledge Quartet best relate to mastery however at this early stage, there are two reasons why I am resisting: firstly, where no observations were made (e.g. ATB, adherence to textbook), it may be that I was simply not attuned to this aspect of the Knowledge Quartet as I made no observations of mathematics against this code either; and secondly, those which featured in all/most observations (e.g. CUR, choice of representations) are aspects of teaching which I have personally thought a lot about. My underlying concern about continuing with the Knowledge Quartet as an observation framework is that it may restrict what I notice in lessons; that I may miss opportunities to experiment with new 'codes' which may be better aligned to observing for mastery.

Given that, in this pilot study, the Knowledge Quartet has not helped me to achieve description, what remains to commend it as a tool for carrying out observations of mastery? Remembering that I want to elicit ideas from teachers about what mastery means to them and how they enact it, it seems sensible to not impose an existing set of ideas on the observer; by doing so I might limit what I actually see. Instead, I will be taking a more 'grounded' approach to my observations, albeit informed by what I now know about describing teacher practices using the Knowledge Quartet codes. The Knowledge Quartet has therefore been demoted to the role of heuristic; of something that will usefully support my inductive analysis of data.

As each teacher's understanding of mastery is likely to be under development during 2015-16, I will attempt to select extracts from their lessons which I believe will initiate rich conversations about their practices and thinking. My 'expert' knowledge will inform my selections of, for example: teacher modelling; tasks set and support provided; the pedagogical approaches adopted for different groups within the class; and responses by the teacher to unexpected answers or questions. Rather than trying to flee from being an 'expert', I will use the knowledge I have to my advantage. Then, as teachers tell me about mastery and describe how it is present into their practice, a new set of observation codes may be generated by me the 'researcher' which others could use for observations of mastery in the future.

Concluding remarks

From September 2015, when carrying out the main research for my doctoral studies, some of the issues that I have described here will be mitigated by the later stages of my data collection; especially the opportunity to review extracts of lessons with the teacher in order to understand how they (not I) believe that they have incorporated mastery approaches into their teaching of fractions. The success of my interpretive approach rests on my ability to utilise my 'expert' knowledge to select interesting video extracts and then, as a 'researcher', to ask searching questions that stimulate teacher talk about how lesson(s) exemplify a mastery pedagogy. Mercer (2007) was right, I cannot escape my past, so I might as well embrace it.

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