'You weren't expected to be creative': policy-practice tensions in GCSE Mathematics

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This paper reports on an on-going study to illuminate the relationship between policy and implementation of GCSE 2010 by (initially) exploring the beliefs and departmental-level context of two teachers in one department. The analysis draws on both Spillane's (1999) and Ball et al's (2011) approach to policy implementation. Both the department and the two teachers are well-placed to implement the reform, and believed they were doing so, yet after a year significant deviations from intended enaction were sometimes observed. I will reflect on the constraints and affordances of large-scale policy imposition.

Keywords*: policy implementation; teacher development; secondary mathematics

Introduction

A new curriculum for 11-16 year olds in England and Wales was phased in from September 2007, with renewed emphasis on mathematical processes and applications, and 'functional skills' incorporated, as a response to the failure to fully implement the 'process' aspects of the 1999 curriculum (Smith 2004). The new curriculum is the basis for GCSE 2010, the formal assessment at the end of compulsory mathematics, with first large-scale certification Summer 2012. Valid assessments will include more multi-step, unstructured questions and more genuine problems.

The new GCSE implies deep principled change in practice for many teachers (Ofsted 2008). Efforts to reform practice are widespread in the western world (for example NCTM 2000, AAMT 2002) yet these efforts have had limited success (Millett et al 2007, Spillane 2004, Eurydice 2012): it appears that changes such as those implicit in the new curriculum offer enormous challenges to teachers' knowledge and skill, at least if they are to be implemented at scale. Spillane (1999), among others, suggests successful implementation of new policy at classroom level needs a social rather than individualistic enactment zone, rich deliberation with experts and grounded in classroom experience, and quality materials to support that, as well as both motivation and quality time. Some of Spillane's factors are missing at a national scale, although government-sponsored agencies such as QCDA and NCETM have made significant contributions to support. How the new curriculum is enacted is important for both individuals and the national mathematics capacity since it is the conclusion of a common core mathematics education.

Method

This study focuses on two teachers in a secondary department (the researcher's own) that might be construed as a 'telling' case (Mitchell 1984), since it comprises entirely specialist mathematics teachers adopting 'critical professionalism' in Watson and de

Geest's (2010) terms. They engage with a range of current research, often choose to use outside experts to challenge and develop their community practice, and maintain quality dialogue within the department focused on teaching and learning: Ofsted (2008) show they are unusual, but they might be expected to be well-placed for a valid enaction of the new GCSE, especially situated as they are in a well-achieving comprehensive school in a rural area.

The study adopts an ethnographic lens to provide a richly descriptive case study of how the beliefs and knowledge of these teachers impact this enactment. The study was approached with the benefits and risks of insider knowledge, and to date is based on scrutiny of the range of policy 'texts' and department-level evidence, interviews with the two teachers and the Head of Department as a key policy 'player' (Braun et al 2010), triangulated by classroom observations. Adopting a 'grounded theory' approach (Glaser and Strauss 1967), the 'interplay between the researcher and the data' allowed findings to emerge inductively (Strauss and Corbin 1998, 13).

The Teachers

Nigel, as Head of Department, Dan and Carol (all pseudonyms) all have good subject-related knowledge, and espouse a conceptualisation of (school) mathematics as a creative, problem-solving activity in which their role is that of a facilitator; they claim to value link-making both within and beyond mathematics, and for each of them, the vision described for their classroom is quite different from their own experience at school. Interestingly, only Carol claims a significant individual influence in the development of her beliefs and practice, in contrast to much of the literature (Thompson 1992, Walshaw 2010, Williams 2011). Nigel says ideas he encountered during his preparation for teaching chimed with his 'natural inclinations and wider beliefs', and that the prevailing ethos in the department when he arrived as a Newly Qualified Teacher supported the development of that. Dan, the most experienced of the three, says his approach has changed over the years as he has absorbed changing expectations of teaching both from society as a whole and within the department. In fact, all three suggest the department is a source of support and challenge to their practice. However, beyond that there are significant differences.

Nigel has been teaching for five years, three of them in this role. He describes himself as "dynamic, whizzy… I think the students enjoy doing maths with me." In terms of Ball et al's (2011) policy actors he is primarily a *narrator* (although he also has a role as a *transactor*). He leads from the front, 'joining up disparate policies into an institutional narrative.' He is politically aware, conscious of the advantages of promoting both himself and the department, and as a transactor within the institution does that very successfully. He has led the introduction of the new GCSE 'from the front', and his classroom practice is now largely aligned with the department's interpretation of its intentions.

In terms of Ball et al's (2011) 'policy actors', **Carol** can be conceptualised as an *enthusiast/translator*, whose practice embodies (her understanding of) the policy. Although she acknowledges constraints of a performativity culture, she works around them, for example in driving a review of the Scheme of Work to ensure it fully incorporates the breadth and depth of algebraic tools her students might need to build on. She 'speaks policy into practice' (Ball et al 2011), thus driving others to make enactment a collective process. She finds it frustrating that she is constrained to work within someone else's interpretation ("their version of real life" when talking about simplistic pseudo-models in exam questions) but works to expose her students to it

rather than letting it dictate the totality of their experience, where she feels her interpretations are more valid. In common with both her colleagues, she cites time pressures as militating against full enactment as she might choose (though she works very hard to overcome those). She is accepted within the department as a *translator* whose interpretations are influential in whole department enactment: her own has changed to be well-aligned with the intentions agreed in the department.

In contrast, **Dan** is highly experienced and yet shows characteristics of a *'Receiver'* in Ball et al's (2011) terms, exhibiting high levels of compliance and tending to experience policy as reified and oppressive: "when I started teaching…..you weren't expected to be creative", "I think people's expectations of styles of teaching, of what teaching is, have changed, and you have to change with it", "it's just another change….it's frustrating…. It makes a heck of a lot of hard work, because we're teaching in the dark sometimes". He is reluctant to analyse his process of change over the years, ascribing it entirely to outside expectations and his necessary response to those.

Despite being present at many of the (formal and informal) discussions that Nigel and Carol feel have empowered them to risk new practice, Dan seems to feel limited identification with what is happening: "Nearer the time… we need outside resources – exemplar papers and so on"; "I think we could have done with a bit more background, more off-the-shelf resources" (though the department has worked with a variety of exemplar materials when discussing what should change). Like Carol, he has been involved in extended professional trio work purportedly aimed at extending the risk-taking in teacher practice (the group's choice), yet his contribution was nominal.

 Dan's *espoused beliefs*, though, are consistent with the new GCSE: 'the broadening out is a deeper education….', 'I think one of the greatest changes is the realization that you can do things different ways', 'now there's much more opportunity for the students to give opinions, to think for themselves…..', 'so yes, I think…. The connections make for better learning'. The depth of rhetoric here was surprising: his observed engagement with changes appeared often to be passive rather than active, and his 'connections' in the classroom were teacher-provided and solely with the observed world, rather than within mathematics. In the examples seen, they were 'upfront' exemplars rather than bi-directional links: again, showing characteristics of a 'receiver'. He espouses student autonomy, for example delivering student self-assessment exercises as agreed in the department, and using them to inform his report-writing. In the classroom, though, he says in response to probes that he is very aware of students losing confidence if they're given too much freedom to make their own decisions, and that is mirrored in the directiveness observed.

Similarly, Dan is expansive in his ideas about the *nature of mathematics*: "I think maths is really a creative subject … and the way that you get the creation and the enthusiasm is by having a broader knowledge, way outside of education, in its application". In interview, he refers to occurrences of mathematics in the world outside the classroom; however, his classroom did not obviously use that creatively: students were given closed, teacher-led tasks. When probed, he describes the class as "preferring to be told how to do it – they don't really want to think for themselves", so he seems to distinguish between 'mathematics' and the mathematical experience he provides in the classroom. He refers to architectural problems that need trigonometry, technical names for crystalline structures – lots of manifestations of mathematics that he wants to share with students – but they were for students to appreciate from outside, rather than engage with and develop themselves.

Dan refers to his use of slides as 'motivating: if they can see where it's used they can see some reason for working on it'; and the use of surprise in exposition as 'engaging': but both appeared restricted to teacher-led activity. For Dan, the answer is straightforward: "these students don't do risks" –despite his recent involvement in a CUREE project exploring challenge in the classroom. Potentially rich structures seen used with his class, such as using a homework to independently revisit previous work, and matching linked representations in pairs, were not fully capitalized on (for example, talk was tolerated but not encouraged or probed; queries were not engaged with), and questioning was largely closed, suggesting that learning as a *social* activity is not at the core of his beliefs, although he says 'he should' use more open questions. He explained that this class "are not used to terribly much independent thinking", and again that "they'd rather you told them what to do".

Dan is clear his subject and teaching knowledge is always sufficient and his narrative is consistently in terms of a 'teacher expert' (though his teaching style does not facilitate situations which would challenge that knowledge). "My role in the classroom is to try and bring out the best in the students, to try and inspire them to take things further, … to try and make them want to……(their role is) to give everything they can to … show a commitment to not only what I'm doing but what they're learning".

Discussion

Within the department, then, there exist largely consistent espoused beliefs but a range of enactments. All three appear to have a good range of knowledge components, both subject and pedagogical. What is it then that drives distinctive responses on the ground?

This department offers many opportunities for rich professional talk within a social setting, albeit with less quality time available than some would choose. There are sufficient resources, including capacity to develop materials and to support deep change, and for some there is the motivation to do so: in Spillane's (1999) terms a 'rich zone of enactment'. Further, it is unusual in being highly reflective as a body, and in exercising live mathematical 'modes of enquiry'. Ofsted (2008) suggests the department is thus unusually privileged in terms of shared knowledge of mathematics and of mathematics pedagogy.

Shared language, though, is interpreted differentially: for example, Dan uses the shared vocabulary of problem-solving, challenge, engagement, but either means something different, as in Spillane (2004) or has a ***hierarchy of beliefs*** which render those subservient to security and familiarity. Shared conversations and support in the form of detailed development of resources and schemes of work, as well as exposure to externally-provided materials, are capitalized on to different extents. The most striking difference would seem to be the depth of ***reflection*** exercised in relation to the new GCSE, which may be differentiated by either will or capacity. Carol appears an exceptionally reflective teacher, manifesting this in a number of ways which relate closely to Winch's (2011) 'practical knowledge': as well as the component skills, exhibited also by Dan, her responses suggest well-developed 'transversal abilities' (ibid) of evaluating, planning and communicating in depth, and hence of 'project management', conceptualized here as the development and implementation of a new way of working at Key Stage 4. Interviews also suggest a likely ***'occupational capacity'*** (in Winch's terms) to grasp the full scope of her occupation, understand and engage with evolution within it, assess and evaluate the broader impact of her

teaching on students and beyond, and engage with ethical issues. Dan either possesses those to a lesser extent, or chooses not to display them. They are higher-level forms of knowledge for teaching, and tools for probing this need to be developed; as do teacher responses to emerging student longer-term student (or wider community) response, particularly in terms of measurable outcomes: Hunter (2010) suggests these will significantly influence emerging enaction.

What are the implications for bigger-scale enactment? It is difficult to see how a deep commitment to a principled enactment of the new GCSE could be generated with a smaller store of professional knowledge or less commitment to rich professional discourse, especially when economic pressures are leading to shrinking local authority support and greater teaching loads. This well-placed department shows many of the characteristics Watson and de Geest (2010) suggest underpin successful autonomous change, including an ability to tolerate a small number of marginalized teachers, and it would appear that for them the lack of central support might have resulted in them adopting characteristics of autonomous and self-generative (Franke et al 1998) change which they 'own', but even so, differential interpretation of shared discourse, perhaps allied with different belief hierarchies, has resulted in varied enactment at classroom level. This can happen at any interface along the extended chain of 'players' of national policy, so valid *communication of intended policy* change at all levels is critical. Provision of materials and a 'rich zone of professional enactment', itself unusual in this country (Ofsted 2008), may be necessary but are certainly not sufficient. Valid enactment (and interpretation) of such challenging change, at least in the short-term, may also require an (*individual and department-level*) capacity for deep reflection which is harnessed to medium-term 'project management' abilities and a potential to engage with and synthesise broader occupational issues.

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