BACKGROUND

The study has tracked primary school teachers through their final year of Initial Teacher Training (ITT) and their professional induction as Newly Qualified Teachers (NQTs). Centred in the social practices that surround the teaching of primary mathematics, it has addressed the question of how students’ and NQTs’ conceptions of mathematics and government policy initiatives, as manifest in university and school practices, contribute to their socialisation and evolving professional identity.

An earlier study (ESRC R000222409; reported Brown et al., 1999) depicted students addressing a variety of demands from a number of agencies throughout the different phases of their training. Key findings that informed the interpretation of the present study included notions of how student perceptions were shaped by the varying contextual parameters including: a) being nervous about mathematics as pupils at school; b) being convinced by child centrist orientations of teaching mathematics during early stages of their training; c) adjusting these notions upon being faced with the realities of school experience; d) anchoring conceptions of professionalism in empathetic relations with the children; and, e) being faced with discrepant accounts of what constituted teaching by government, university and placement schools. The training process itself seemed to be predicated on supposing that these seemingly divergent demands could be reconciled. We offered a theoretical framework to accomplish this comprising three dualities: phenomenological v. official accounts of mathematics; discovery v. transmission conceptions of teaching; and perceptual v. structural accounts of the training process. These pairs of potentially dichotomous perspectives might be seen as complementary hermeneutic arcs (Ricoeur, 1981, 209-221). The first of each pair, reveals how student perceptions frame the space they are working in; and the second, shows how contextual parameters shape student perceptions. Analysis, however, pointed to the trainees pursuing partial accounts with little attempt at overall reconciliation.

It is from this foundation that we began to develop an empirically referenced theoretical framework to understand the complex nexus of mechanisms operating in this study, which took place in an increasingly prescribed and politicised climate. Our principal conclusion is that participation in these new institutions of ITT and teaching results in the production of languages that facilitate mathematics teaching but also serve to conceal difficulties encountered in reconciling the multiple demands.

OBJECTIVES

1. To chart the transition of final year primary B.Ed. students through their first year of teaching mathematics in the primary school.

2. To examine how students’ conceptions of school mathematics and its teaching are derived and how they contribute to their evolving perception of their professional self.
3. To devise new understandings of the professional socialisation and education of newly qualified teachers of primary mathematics.

4. To examine the impact government policy initiatives relating to mathematics and Initial Teacher Training (ITT), as manifest in college and school practices, have on the construction of the identities of the student/novice teacher.

METHODS

The study was based upon a cohort of 30 students on the 4th and final year of their BEd course at the Manchester Metropolitan University (MMU). The sample was chosen to be representative of non-mathematics specialist primary BEd students. All 30 students were volunteers: 23 were recruited at the beginning of the 4th year (October 1999), 7 of these had been part of an earlier study (ESRC R000222409) and were keen to continue their involvement into the second study. At the end of this first phase of the project a principal cohort of 10 students was selected to be tracked, as NQTs, through their first teaching appointment. The NQTs in the principal cohort were chosen, firstly to include 5 of the students who had been a part of the earlier study (thus providing a longitudinal data set spanning 5 years for these students), and secondly with a view to their employment status, their representativeness, and, to a degree, their geographical location. Where we refer to an interviewee as Student 15 in the first phase of the project we refer to that same individual as NQT 15 in the second phase. Where data are taken from the wider student population, or the quotations are ‘soundbites’, we do not attribute it.

The data collection process was completed as planned and this centrally included 4 sets of interviews across the two years of the project: two with the initial study cohort of 30 students and two with the principal cohort of 10 NQTs. The interviews were semi-structured and explored how university/school based training and school and government policy shaped students’/NQTs’ understanding of effective practice, their role as professionals and their image of themselves as (mathematics) teachers. The remainder of the original study cohort, not chosen to be part of the principal cohort, were followed up in less depth using telephone interviews to ascertain where their career paths had led after they left university. In addition to the planned data collection the introduction of QTS Numeracy Skills Test, not anticipated at the time of writing the original proposal, presented an opportunity for collecting additional data, including a single focus questionnaire distributed to all BEd students in June 2000 (see nominated publication).

In summary the complete data collection process involved:

- 2 phases of interviews with 4th year students (n=30) (Jan 2000 and April 2000).
- Questionnaire/interview data with specific focus on Numeracy Skills Test (n=250) and follow up telephone interviews with study cohort (June 2000).
- 2 phases of school visits and interviews with the principal cohort of NQTs (n= 10) (Oct 2000 and April 2001).
- Telephone interviews with remaining study cohort (n=20) (Jan/Feb 2001).
- Documentary analysis of government policies and local course documentation.
- Interviews with college tutors.
Methodologically, we adopted a phenomenological perspective on teacher training and induction, reporting it as an interpretative and generative hermeneutic process through which the students and NQTs gradually organised their experiential world. Emphasis was on students'/NQTs’ own accounts at successive stages of their development. The categorisation and analysis of data initially focused upon themes identified in our first study (as outlined in the grant application). The conceptualisation was subsequently impacted upon by data from this study as particular themes from the four sets of interviews were identified. The data sets from the interviews were coded and managed using NVivo, a qualitative data analysis software package. A common core of categories was used and in each phase of analysis and extra dimension(s) were added as and when necessary, depending upon the focus of the interviews and the student/NQT context. Although the analysis was largely developed in a ‘branching tree’ model certain cross cutting themes e.g. ‘notion of play’, ‘rite of passage’ were identified and double coded as ‘free’ categories. The data sets gave a sense of the transitional process undergone by students relating to: their conceptions of mathematics and its teaching, the emergence of their professional identity, and their accounts of the phenomenological and textual environment they operated in and were structured by/structured.

RESULTS

The last few years have brought a considerable change in the positioning of primary NQTs and teacher trainees. In particular, the demands made of them, and the university/school based ITT partnership, by the apparatus of government have become increasingly prescriptive and intrusive. In this study we examined students and NQTs confronting and mediating these newly imposed external demands in the form of government policy instruments, such as, the National Numeracy Strategy (NNS), Ofsted inspections, statutory induction arrangements, the Numeracy Skills Test etc. The principal result of the study is a theoretical model that illustrates how we might conceive of students/NQTs developing their professional identity as they are socialised into teaching against the backdrop of the multiple demands they encounter during the training and induction processes. The four objectives of the study are addressed in turn:

1) Transition from training into the first year of teaching

In applying a contemporary anthropological lens we identified transition, undergone in passage through ITT and into the first teaching appointment, not as a linear progression but as a complex process of extended and ambiguous ‘in-between-ness’ that involved play, performance and ordeal. We depicted student teachers enmeshed in the performance of symbolic acts and the undertaking of ‘ritual ordeals’; and reported how they narrated their passage as a complex ‘game’ of ‘being’ and ‘becoming’ and portrayed the holistic experience metaphorically in terms of ‘play’ (McNamara et al., in press). We considered also how NQTs faced further initiation rites in their first appointment when they were faced with the seemingly overwhelming multiple

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1 E.g. self ➔ as NQT ➔ in relation to others ➔ [colleagues, parents, pupils]; or self ➔ in relation to policy ➔ [National Numeracy Strategy, Ofsted, Induction, Assessment (Skills tests, skills audits, competences, internal assessments)]
demands of a new post and were inducted into school norms and classroom practices. We also monitored transition more temporally through looking at the changing ways in which students and NQTs reported on the frameworks they faced at different stages of the course. This was achieved through examining their perceptual accounts as they attempted a reconciliation of the structural demands they faced.

a) The final year of college
Our data unsurprisingly pointed to students being very anxious about the various requirements, imposed by government, university and placement schools, directly prior to their accreditation. In the final year of training they demonstrated a keen awareness of the regulatory frameworks governing the course. Particular attention, for example, was directed at one newly imposed ‘ritual ordeal’, the Numeracy Skills Test, which was piloted in the final year of this cohort’s course. The test produced a considerable amount of anxiety: “the amount of worry that that has instilled in quite a lot of people is really really worrying”; “Nervous stressed sick”; “I was vomiting before it”. In many cases this concern reactivated anxieties relating to mathematics itself: “Not very confident about [the tests] really because I don’t feel that I am able to manipulate figures in my head” (Student 19). Students reported an overwhelmingly hostile response to its inappropriate timing, lack of notice, lack of relevance to the Key Stage 1 and 2 curriculum etc. The test was generally seen as rewriting the demands students faced prior to entry, and repositioning other previously existing symbols of passage such as Maths GCSEs and /or A level: “It’s another hoop to jump through”. Many students saw it as a wielding of power with respect to themselves, “I think the government like to have a hold over us”; and ITT providers, who were seen to lack any degree of agency in the matter, “it was just a mystery to the tutors as well”. Some students felt, the tests could potentially prove a ‘hostage to fortune’, “the government has a stick to beat HE institutions”, and in this respect students saw it mainly as a popularity gimmick in which the government could depict themselves as gatekeeper of standards (McNamara et al, in press).

Tests were by no means the only rite of passage: “Audits came in in our second year, we only had two years to do them” (Student 11) and “having originally been told the audits were instead of doing a test … then the numeracy tests come along” (Student 18). The audits achieved another level of gravitas when they were policed directly by Ofsted: “they would really say that the audits would have to be up to date for Ofsted and the Ofsteds are going to come in and… might be asking questions” (Student 14). Ofsted inspections in which the university, placement schools and students’ own individual practices as teachers and mathematicians as gauged against the externally defined notions were a matter of great concern to students. Tutors, students and school placement teachers alike were extra vigilant: “It feels as if [tutors] are checking up on you all the time, they’re not leaving it to your own professionalism to be able to cope or not cope … but the university have to cover their own backs don’t they, with Ofsted coming” (Student 15).

Any quest for resolution of the succession of conflicting demands appeared to be thwarted by the partiality of the student’s perspective at any particular point in time. For example, alternative ideological conceptions of teaching mathematics were never fully resolved, enthusiasm activated by ‘front loaded’ university-based sessions (reported in the previous study) was partially sidestepped in this later and more school-based stage of the course. Here again the ‘goal posts’ had been moved and students had to quickly develop and display competence in the delivery of the NNS:
you’ve lost the freedom to be imaginative ... in the first couple of years there seemed to be an emphasis here on the practical side of maths, which I think is important particularly for younger children, but that now I feel seems to be being pushed to one side with the Numeracy Strategy (Student 23)

Nevertheless many of the sample reported feeling “confident [about] being able to teach maths” (Student 6) and, in particular, comfortable with the NNS Framework and its implementation in the classroom.

The Career Entry Profile, another relatively recently imposed regulatory instrument, was at the time of the final interview beginning to be assembled by students preparing for first appointment interviews. There was evidence that they complied resignedly but many expressed a feeling that they as individuals, and to a degree as professionals, were missing from the account: “my professional development it addresses but not really perhaps my personal development, how I’ve developed as a person” (Student 7). The temptation to be slightly less than completely honest was ever present: “it’s hard because you’re like admitting your weaknesses aren’t you to your employers?… A lot of the time I’m thinking ‘well they’re definitely going to hire me are they if they read that so I’ll put this instead, something that’s perhaps loosely related to it’” (Student 15). Strengths were felt by some to be equally problematic: “I hate doing the strengths ‘cause it’s always like, you know, you don’t like to say - Oh! I’m really good at this!” (Student 17) and in any case “some strengths are weaknesses aren’t they?” (Student 19).

b) First year of school
Once in their first appointment the principal cohort of 10 NQTs reported, as would be expected, markedly different experiences. A notable disparity related to NQTs’ experience of the local implementation of the statutory induction arrangements. The NQTs were distributed over 7 LEAs and the extent to which the latter became actively involved in supporting the induction process varied. One LEA was reported to have “an excellent induction programme” (NQT 18), another “very good training” (NQT 2), a third however offered inadequate provision: “they know full well how many NQTs there are so why they don’t allocate enough places is beyond me” (NQT 15). It thus appeared that structural constraints relating to LEA interpretation of government policy varied, and may have had implications at individual school level in relation to availability of provision and attitudes towards NQTs rights and expectations.

Perhaps the most marked shift in self perception reported by NQTs was not in relation to such structural constraints, however, but to a newly found agency: “ownership that’s the word”, “well right from the start it’s all my ideas”; “it’s my own classroom”. Many also remarked upon their sense of ‘autonomy’:

you have more autonomy... you can be more spontaneous, you can react to the needs of the children better because you’re working within your own framework, even though you’ve got to follow the demands of the ... literacy hour and the numeracy hour, you can say - Right that’s not worked, we’ll stop that, we’ll do something else (NQT 2).
Autonomy and ‘ownership’ did not, however, always extend to the curriculum: “the NNS... it shapes your whole teaching of maths ... 100%” (NQT 17). There was evidence that on the whole NQTs began to adopt looser interpretations of the requirements, inflected by a more pragmatic attitude based around personal aspirations: “the actual set up of the lesson is restricted to sort of government requirements and school requirements and LEA requirements and Ofsted requirements and everyone else but you can still fit your own style in that” (NQT 18).

Many NQTs felt their initiation “nerve-wracking” (NQT 21) and agreed with the sentiments expressed by NQT 17 “I still don’t feel 100% a teacher... the actual teaching is not a problem... there’s just so many other things, other responsibilities”. There was evidence that the sheer burden of responsibilities, and the multiplicity of tasks facing the NQTs, led to a short termism - a response to situations in which immediate demands were met by initial coping strategies: “the Headteacher actually said ‘if you need to stop a lesson to practice being quiet for example, then do it now get them sorted out in the first month it doesn’t matter if one or two lessons go astray’” (NQT 6). Even when NQTs were actually teaching other factors still took precedent “the classroom management overrides everything that you’re doing in the day” (NQT 37). Early professional development more broadly was not always seen in terms of better achieving curriculum objectives, such as those framed within the NNS; and the latter, if somewhat prescriptive, was viewed as a comfortable consensual framework that could claim some sort of unifying agenda, at least partly because it had become the new orthodoxy.

2) Students’ and NQTs’ conceptions of school mathematics

Mathematics is a function of social formation and of the discourses that permeate that formation. How might we now pinpoint the specific influences on this formation? We have argued elsewhere (Brown, 2001) that the apparatuses of mathematics teaching are part of the culture of mathematics and thus part of the mathematics itself. In this present study we argue that the instruments of curriculum reform have also become part of mathematics itself. There was evidence that the NNS, as a regulatory regime, reigned supreme and had to a degree rendered the school maths policy obsolete: “everyone’s comfortable with the NNS... I’ve certainly found the file the Government produced very useful but I’ve never really used the school policy”. Albeit the NNS was, in some schools, mediated by particular contextual factors such as the need for a supplementary scheme devised to assist speakers of English as an additional language etc. The new regime had a pronounced effect upon the alignment of mathematics with other National Curriculum subjects: defining a hierarchy that extended from numeracy/literacy in pole position, through other ‘core’ subjects (science and ICT) and finally to foundation subjects (history, geography, art, PE etc.). The statutory orders in respect of the foundation subjects were, over the period of the initial implementation of the strategies, ritually dissapplied to secure and officially sanction this realignment.

Through practices associated with these reforms, specific traits of a particular society, its mode of governance, attitude to schools, teachers, children etc get built into mathematics. Similarly teaching practices, as understood generally in a primary school context, provide the professional frame for mathematics and conceptions of how it is exchanged in social forms. It is thus important to examine how students and NQTs conceptualise and represent mathematics, instrumental as they are in its generation in the classroom.
Students in the study subscribed overwhelmingly to a view of mathematics as a utilitarian body of knowledge, a ‘life skill’ that could be acquired most effectively through ‘hands-on’ practical experience. The students, who could be characterised as ‘technological pragmatists’ (Ernest, 1991), held the belief that mathematics was “the study of numbers … taught in school to give children an insight… we use maths in everyday circumstances, shopping, housework, most jobs use numbers” (Student 11); “making sense of the world around you in a different way that’s pretty concrete that you can measure and apply it to different contexts” (Student 12); “used all the time… well I do ‘cause I work in a pub so I’ve got to add up the numbers and know the answers” (Student 19). The only divergent notion came from one student who perceived “maths to be about logical thinking, making decisions” (Student 18). The students in the study claimed to be more comfortable with mathematics, on the whole, than had the cohort of the first study – in which we reported 80% as having bad experiences with mathematics as a pupil. Roughly equal thirds of the second sample of students claimed to have had negative, ambivalent and positive experiences as a learner of mathematics in school. Students’ perceptions of their own success at mathematics often, but not always, correlated positively with these experiences. Overt measures of esteem did not, however, always translate into self-confidence: “everyone around me was saying I was good at maths but I actually wasn’t and I think I knew that really” (Student 18).

Given the students’ conceptualisation of mathematics it is perhaps not surprising that they reported little dissonance with the ideology of the NNS: considered by some (Brown et al, 1998; Noss, 1997) to present a reductive account of mathematics in its specification of content and pedagogy and a prescriptive framing of the cultural norms within which it is performed and assessed. It was evident, however, that the NNS structures and pedagogy formed a useful vehicle through which students/NQTs conceptualised and discoursed their practices, and were in turn both socialised into primary school mathematics and inducted into the local cultural norms and practices of their schools. Reference to key aspects of mathematics classroom practice was thinly veiled by NNS discursive patterning: “now it’s sort of engrained into my head that I say at the beginning of lesson what my learning objective is and I stress key vocabulary” (NQT 18); “I speak to each child a lot during maths and I’m always assessing as I go around” (NQT 15); “after the mental and oral starter it was whole class teaching - me demonstrating and explaining and then choosing individual children to interact and respond to what I’m saying - and then the actual work was individual work using the resources (NQT 17 – emphasis added).

The NNS functioned then to provide students and NQTs with a pedagogic discourse through which to conceptualise, articulate and share aspects of mathematics teaching and learning. One particularly prominent feature of NQTs’ accounts of classroom practice was the overt reliance on representational media to model and display the notional, and almost completely overlooked, underlying mathematics: “I’ve made everything we’ve got; place value dominoes, number bingo.. number bands, number cards, number bond loops… once you’ve made 25 sets of number fans every child can have a go” (NQT 10); “you can’t have a washing line where I am so I use the children to be number lines... it’s that physical act of involvement in the whole class situation... we have little egg men that are on a little board - in a groove” (NQT 12). Interestingly, vigorous and novel activity such as that reported in the ‘oral and mental starter’ also had a marked effect upon the way mathematics was depicted: as ‘fiery’ and ‘snappy’, against literacy as ‘slower’ and ‘calmer’ (NQT 6).
3) Conceptions of socialisation

Socialisation into teaching was examined in terms of students’/NQTs’ perceptual understanding of the task they faced against a structural account of what they were required to achieve. For the purposes of our analytical frame we considered the process of socialisation into teaching as being closely aligned to the attempted resolution of the alternative ideologies encountered. The supposed achievement of such a final resolution is, Althusser suggests, necessarily an illusion: the “End of Ideology” is an ideology par excellence (see Zizek, 1989, pp. 1-7), a compromise in the name of a supposed social calling. In this analysis however, such an illusion is a crucial component in the student’s/NQTs’ essential belief in themselves as part of a social project - through which their identity and sense of community is in part defined.

The trainee’s/ NQTs’ conception of being a professional was shaped by perceived expectations of their supposed engagement in the social programme and their perception of how they lived up to these expectations through the NNS, Ofsted, Numeracy Skills Test etc.: “you have to do what they tell you to do... you have to be doing this at exactly this time for this amount of minutes but ... I’ve been trained to do it that way, perhaps I would teach it that way anyway” (NQT 15). Sometimes, however, reconciliation slipped into meeting expectations at any price: “I thought OK, just for the sake of argument, and say for the next three weeks, I would do as she asks but I know that that is not right” (Student 6).

There is ample evidence in our data to suggest that the social quest to improve mathematics teaching in schools had become embodied within the NNS. That is, if teachers ‘buy into’ the supposed improvement trajectory it confers purpose to their participation in the social programme. Thus the shaping of mathematics is strongly governed by the Framework specified in the NNS and, a consequence of this shift of policy is a perceived loss of agency on the part of schools and teachers: “I don’t think we’ve got a lot of say now in the maths because of this highly structured numeracy hour” (Student 37); “the numeracy hour, it’s so prescriptive as to what you have to do, when you have to do it and how long you do it for, so it shapes the whole numeracy hour of every day of every week of the school year” (NQT 10). It was common in our study, as elsewhere (McNamara & Corbin, 2001; Millet & Johnson, 2000), however, for the students and NQTs to find the Framework useful and the compliance this activated was generally seen as supporting the common good, namely the basic need for mathematics as a social project to be taught such that all pupils could engage in it as fully as possible: “it’s something we need to participate fully in life from a very early age” (Student 2).

4) Government policy and the construction of identities

A key task of the study entailed understanding how trainee teachers and NQTs constructed themselves as such. This was examined through a framework introduced by Zizek (1989) in which contrasting perspectives are taken on how humans construct themselves as subjects. Zizek rejects the Habermasian notion of the subject seeking to reconcile his/her actions with some supposed consensual ideal but similarly he questions Foucault’s alternative conception of a human subject who seeks to achieve a more personal reconciliation. Zizek suggests the dichotomy between the positions of Habermas and Foucault shields a more profound opposition between the conceptions of identity implicit in the works of Althusser and Lacan. As we have seen, Althusser sees identity construction as the subject misrecognising their calling up to a social project. Lacan, however, suggests more fundamentally that “the ego is ... always an
unauthentic agency, functioning to conceal a disturbing lack of unity” (quoted in Leader & Groves, 1995, p. 24). That is, the human subject is “fragmented” and does not succeed in reconciling all the contradictory discourses (see also Troman, 1996, 1999; Stronach et al, 2002). Identity can never be complete since it is a function of identifications with disparate and often conflicting discourses (Sokefeld, 1999). For a student seeking to reconcile personal aspirations with social demands there is inevitably a gap between how she ‘is’ and how she ‘might be’: “we are not, this, this and this” (Student 30). For Lacan (1977) the gap, a point of negativity, defines identity. Misrecognition inevitably results from attempts to achieve resolution of the disparate concerns; meeting government requirements, enthusing children, being liked, maintaining control, fitting in with school norms and practices etc: “what you teach and how you teach it and the actual set-up of the lesson is restricted to sort of government requirements and school requirements and LEA requirements and Ofsted requirements and everyone else but you can still fit in your own style in that” (NQT 18).

A resolution cannot be achieved without compromise; certain desires will always be sacrificed. The teacher may nevertheless feel obliged to attempt such reconciliation and have some account of her achievement in this regard. For example, for some of the trainees interviewed mathematics was a subject that filled them with horror in their own schooling. Yet such anxieties seemed less pervasive once the trainee had reached Qualified Teacher Status. It would seem that those who were so often intimidated by mathematics do not continue to present themselves as mathematical failures; rather, they manage a complex story by highlighting themes in which their perceived qualities, have a positive role to play e.g. “patience” (Student 4), “sensitive…encouraging and positive” (Student 5).

Such happy resolutions to the skills required to teach mathematics can provide effective masks to the continuing anxieties relating to the students’ own mathematical abilities. The evidence in some of our interviews pointed to such anxieties being sidestepped rather than removed since they were still apparent in relation to more explicitly mathematical aspects of our enquiry. This masking was also evident elsewhere; the NNS seemed to have provided a language that was learnt and spoken by most of the NQTs interviewed.

The thing with government policies is really whether you agree with them or not and you think they’re beneficial or not, you’ve got to adapt and change to go with them, so it’s just a case of experimenting with them, trying them out and then adapting them to suit you… then it’s going to be beneficial (Student 10).

Thus the NNS appeared to succeed in hegemonic control where trainee’s capacity to afford a critical purchase on such policies was limited by their need to comply or their ability to see alternatives: “I find the numeracy and literacy strategies quite useful but I’ve never known any different” (NQT 2). Many trainees, it would seem, saw the Strategy as a pragmatic approach that facilitated their participation in the professional enterprise of teaching a subject where many had some uncertainties: “my own personal experience of maths since I left primary school has not been good, ...it was never my most enjoyed subject so I definitely think it’s the way that (the strategy is) structured” (Student 6). It has thus become a generally popular social programme with which many can identify and which provides a language for expressing and harnessing more personal aspirations.
REFERENCES


ACTIVITIES

Aspects of the project have been presented at the following conferences: BSRLM, BERA, Kings College London Research Day.

OUTPUTS

An article has been accepted for publication in the British Journal of Educational Research. Two published books (Kluwer, OUP) have drawn on the study (see REGARD returns). A book length report resulting from the study is at an advanced stage of production. An invitation to submit this as a JRME Monograph has been received, as has an unsolicited expression of interest from Kluwer Academic Publishers.

IMPACTS

The research will inform college practices at research site.

FUTURE RESEARCH PRIORITIES

Assessment of policy impacts relating to mathematics on more experienced primary and secondary teachers.