

# 10

## Identifying with Mathematics in Initial Teacher Training

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### INTRODUCTION

Int: So what do you see the purpose of teaching as being?

Nathan: As being just educate children and make a difference in their lives really—just to make things—it's just a very small part of their lives you know the year in which I teach them, really but hopefully to make a difference really—you know I can see a purpose in it.

Int: What sort of a difference would you want to make?

Nathan: To give them—I don't know—confidence in themselves to enjoy school, enjoy learning, enjoy books and you know just have a real ... just have an enthusiasm for life you know not be resigned to thinking things are not worth doing you know and yeah preparing them for secondary school so they don't go having a negative attitude towards school.

This chapter addresses issues of identity among trainee teachers as they progress through university into their first year of teaching mathematics in primary schools. We examine how we might conceive of the trainees confronting mathematics in the context of government policy instruments. We suggest that teacher identity is produced at the intersection of the trainee's personal aspirations of what it is to be a teacher and the external demands they encounter *en route* to formal accreditation. We also suggest that participation in the institutions of teaching results in the production of discourses that serve to conceal difficulties encountered in reconciling these demands with each other.

We commence with a brief account of an empirical study involving trainee primary school teachers. This is followed by a look at how student teachers experience external demands as constraints to their personal aspirations. We, however, urge caution in inspecting the trainee accounts of this experience, by suggesting that the accounts mask anxieties emerging in a difficult transition. We then offer the theoretical notion of ‘identity’ guiding our work (cf. Brown and Jones, 2001). Readings based on interview transcripts relating to student conceptions of mathematics are then offered. Here our task is to show how ‘identity’ becomes a means for reconciling the past with the present and the future. Our suggestion is that because certain reconciliations have been effected, transitions between the two sites of learner and teacher, are made possible. Finally, we consider how mathematics, shaped as it is between multiple sites, emerges within the teachers’ appropriation of the social discourses surrounding their teaching of the subject. We also consider here how teacher professional development might be better understood.

## THE EMPIRICAL STUDY

We draw on two studies undertaken within the B.Ed. (Primary) programme at the Manchester Metropolitan University in the UK. The empirical material produced provided a cumulative account of student transition from the first year of training to the end of the first year of teaching. The specific interest in the discussion which follows is on how the students’/teachers’ conceptions of school mathematics and its teaching are derived. In particular, we explore the impact that 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 primary student and first year teacher.

## Identifying with Mathematics in Initial Teacher Training

The first study spanned one academic year. We interviewed seven/eight students from each year of a four year initial training course from a total cohort of some 200 students. Each student was interviewed three times at strategic points during the academic year; at the beginning of the year, whilst on school experience, and at the end of the year. The study took the form of a collaborative inquiry between researcher and student/teacher generating narrative accounts within the evolving students'/teachers' understandings of mathematics and pedagogy in the context of their past, present and future lives. The second study, which followed a similar format, spanned two academic years. In the first year of the study a sample ( $n=37$ ) of 4th year students was identified. Each student was interviewed three times during this year. The sample included seven students involved in the earlier project, five of whom were tracked for a total of four years. In the second year of the study a small number of these students ( $n=11$ ) was tracked into their first teaching appointment. Each of these students was interviewed on two further occasions. These interviews monitored how aspects of their induction to the profession through initial training manifested itself in their practice as new teachers.

Specifically, students involved in the research were those who were training to be primary teachers and who, as part of their professional brief, would have to teach mathematics. Significantly, whilst all the students who were interviewed held a GCSE (16+) mathematics qualification as required for entry to college, none had pursued mathematics beyond this. Nor had any of the students elected to study mathematics as either a first or second subject as part of their university course. The research set out to investigate the ways in which such non-specialist students conceptualize mathematics and its teaching and how their views evolve as they progress through an initial course.

## **RECONCILING PERSONAL ASPIRATIONS WITH EXTERNAL DEMANDS**

Nathan, whom we met at the beginning of this chapter, is a primary teacher. How might his personal aspirations be understood? He is talking here about the sorts of motivation that underpin his developing practice as a professional teacher. His comments point to a desire to participate in an educational enterprise aimed at making things better for the learners in his class. He hopes that they will “enjoy school” and as a result build an “enthusiasm for life”. Such sentiments seem unsurprising for someone entering the profession. The motivation of buying into such a strong mission must be very appealing to those mapping out a future career. In this perspective the task of teachers is not just about raising standards according to the latest government directive—the motivation is to improve the quality of educational experience more generally and hence the subsequent lives of the pupils. Teaching is about empowering young learners and as such can be seen as a very worthy profession, around which one can harness more personal aspirations such as feeling one has social worth and a clear identifiable professional purpose.

Nevertheless, Nathan is obliged to work within a professional framework. Within a broader perspective of social improvement, the role of individual teachers often takes second place to the wider social agenda. Such individual teachers become participants in a collective programme where their personal aspirations need to be filtered through a set of socially defined demands. Such demands get to be meshed with the requirements for accreditation as a teacher and the regulations governing everyday practice as a teacher in schools. Trainee teachers, in the study (Brown and McNamara, 2001), seemed less enthusiastic than Nathan, when it came to having their individual practices as teachers and mathematicians gauged against the externally defined definitions of what it is to be a teacher, as for example, in government sponsored inspections carried out by the UK Office for Standards in Education

## Identifying with Mathematics in Initial Teacher Training

(OfSTED). We offer a few brief comments from the study to illustrate how the new teachers perceive the potential conflict between personal aspiration and external demand.

It feels as if they're checking up on you all the time, yeah, they're not leaving it to your own professionalism ...but the university have to cover their own backs don't they, with OfSTED (inspectors) coming.

But I am here for the children, OK I am to meet the criteria, but I am not here to prove to the OfSTED that I can do maths.

The study coincided with the introduction of the National Numeracy Strategy (DfEE, 1999), a high profile government initiative defining the content and conduct of mathematics lessons in great detail. Whilst most students regarded the Strategy and its daily 'numeracy hour' as 'very useful', it resulted in nearly all schools and individual teachers in the sample abandoning their own more personalized schemes of work. Changes to teachers' work impact on learners. Hardy, in this volume, gives a clear expression of how normalizing and surveillance practices associated with the UK reform play out in the classroom. In our study it was not uncommon for some teachers to find the Strategy somewhat over-prescriptive:

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.

We don't always stick to it exactly because I feel it's a little bit too restricted.

But, for many trainees interviewed, the idyll of teaching encapsulated by Nathan was not compromised by recent government requirements alone. The idyll was also somewhat punctured by a sometimes unwelcome, yet long standing component of the overall job description of a primary school teacher, namely, the actual need to teach mathematics in the first place. Many had experienced significant emotional turmoil in their own experience of

mathematics whilst pupils at school, where it seemed that some had received excellent training for becoming compliant individuals:

It was just a case of doing the sums but you didn't realise why you were doing the sums. I think the teacher's role played a big part in it as well because the atmosphere she created, it wasn't a very, it was just a case of if you can't do it, you should be able to do it now. It wasn't very helpful or you didn't feel like, she wasn't very approachable, you didn't feel like you could go to her and say I'm having trouble with this and I need some help, it was just a case of don't even bother going to a teacher, just very much a case of you have to meet the standard and if you don't then you're a failure. So I didn't really enjoy maths at all.

Attitudes such as those expressed here were very common in the study. Those expressions worked against any ease about producing a conceptualization of teaching through which their personal aspirations could be achieved.

## **WHAT DOES THE DATA TELL US AND WHAT MIGHT IT CONCEAL?**

In analyzing such data, however, there seemed to be a need for us as researchers to adopt a certain amount of caution (cf. Convery, 1999). We felt reluctant to accept all of the accounts provided at face value. We wondered what could be concealed in such stories? Story telling can be used as a support device to sustain teacher learning (e.g. O' Connell Rust, 1999). But surely in the last data extract the interviewee did not have just one teacher, introduced here as "she". The trainee appears to be personifying his entire experience of many teachers in just one teacher who is required to carry the weight of this individual's perceived suffering at school. We may wonder which narrative devices individuals employ when they are requested to recount experiences that happened some ten to twenty years earlier. For what reasons do they construct such images of themselves and what present demands are concealed in these images? How do teachers tell the story of their lives to rationalize their current motivations—

their futures? Freud might suggest that a repetition of such a story may be a form of resistance, an insertion of a fixed image, that blocks off the possibility of building memories in a more creative way (cf. Ricoeur, 1981, p. 249). The reworking of memory into a story is not the memory of a linear narrative ‘as it was’ but rather a probing that creates something new; a present day building of the past, shaped by current motives, but perhaps also distorted by things the student would rather not confront. Consequently, our analysis adopts a cautious attitude to the data presented in seeking to build a better picture of how student teachers account for their own transition into professional teaching.

All transitions are potentially problematic. But for students entering initial training as primary teachers, who so often perceive mathematics as a source of anxiety, the movement between the two locations of learner and teacher seemed especially fraught. This chapter marks an attempt at having some appreciation of the various kinds of “selfwork” (Stronach & MacLure, 1997, p. 135) that are undertaken by students when making the move from being a ‘learner of mathematics’ to becoming a ‘teacher of mathematics’. Shortly, we shall suggest that for such students ‘identity’ can be seen as a key feature in easing those tensions that lie between the two sites. Subsequently we try to show how particular constructions of the ‘self’ are used to surmount and negotiate hurdles and boundaries. This includes a perceived lack in mathematical competence. Our main interest then is on perceptions of the ‘self’ and how this, in relation to mathematics, is talked about, described and generally theorized. In part, this involves looking at the kinds of emotional baggage that centre on mathematics and which students have collected over a period of time. We are particularly interested in those ways ‘identity’ seems to assist in both accruing and jettisoning this baggage. We also note and discuss how accounts concerning past mathematical experiences are filtered through current perceptual frameworks. It is this criss-crossing between present perceptions of mathematics and the self, memories of mathematics and the self, and how together these feed into and help

fashion future constructions of the self as ‘teacher of mathematics’, that we attempt to address.

In exploring the uneven territory between being a ‘learner of mathematics’ and a ‘teacher of mathematics’, we offer a series of interpretations based on interview transcripts. These interpretations are personal readings and cannot be considered as ‘hard edged analyses’ or indeed ‘authoritative accounts’. Despite this, however, we believe that these readings make tentative steps in increasing our understandings about ‘transitions’ and ‘identity’. In offering examples of how a teacher makes sense of interactions in her own classroom we hope to illustrate an approach that other teachers might pursue in unfolding the discursive layers present in their own practice. First, however, we shall now say a little more about how we are using the word ‘identity’.

## **IDENTITY**

Identity should not be seen as a stable entity—something that people *have*—but as something that they *use*, to justify, explain and make sense of themselves in relation to other people, and to the contexts in which they operate. In other words, identity is a form of argument. As such it is both practical and theoretical. It is also inescapably moral: identity claims are inevitably bound up with justifications of conduct and belief (MacLure, 1993a, p. 287, author’s own emphasis).

The notion that ‘identity’ is something people *use*, as outlined by MacLure, became a significant research theme. Briefly, perceptions of what constitutes ‘identity’ are seen as “constantly being produced anew within different and competing discourses...more fluid and drifting than had previously been assumed by reproduction theorists” (Haugh, 1987, p. 17; see also Davies, 1989; Lather, 1991; Stronach & MacLure, 1997). For these writers, questions to do with ‘true’ or ‘real identities’ are ‘unaskable’. Rather, the perspective held is that ‘identity’ is a “shifting and erratic performance” (Stronach & MacLure, *ibid*, p. 58).

Our use of the notion was also guided by the work of Zizek (1989) and Laclau and Mouffe (2001) who see ‘identity’ as an always unsuccessful attempt to weave together specific identifications with various social demands. Demands for trainees in the UK working on primary mathematics are complex. They include, for example; meeting school requirements, meeting university requirements, being popular with children, pleasing parents, building an enjoyable conception of mathematics, performing adequately on Numeracy Skills Test for teachers, achieving personal aspirations, following National Numeracy Strategy adequately, getting through OfSTED inspections, minimizing teacher pupil anxieties relating to mathematics, and, not least, teaching up to nine other curriculum subjects. Teacher identity then might be seen as the outcome of trying to reconcile these complex demands. The teacher might *use* a particular account of this reconciliation according to the demands of a specific domain. These might involve, for example, meeting college requirements or defending a lesson to a school inspector. Such an approach is quite different to more traditional conceptions within mathematics education research in which psychologically unitary teachers encounter groups of individual learners. The conception does however echo the work of Walkerdine (e.g., 1988) and some of the more socially oriented work to have appeared since (e.g., Walshaw, 2001).

In our analysis, those ways that the ‘self’ perceived the world, including certain worries concerned with the learning and teaching of mathematics, became, in our view, central to how such concerns were confronted and addressed (Munby, 1986; Schon, 1979). Taking note of the figurative language that was used by students when talking about themselves, particularly in relation to mathematics, allowed us to glimpse some of their beliefs and orientations about learning and teaching. After all, mathematics, as such, does not exist in any tangible sense but nevertheless produces tangible effects as though it does exist. Mathematics does not impact on our lives as mathematics *per se* but rather through the social practices that take up

mathematics into their forms (cf. Brown, 2001). Such social practices cannot be separated from personal engagements in them and the affective products of such engagements. Mathematics itself is thus necessarily shaped through the often emotionally charged activity that gives it a form (Bibby, 2002). As an example, trainee teachers observed often presented a fairly clipped ‘didactic’ version of mathematics, anxious as they often were about opening it up as a field of more creative inquiry. In some respects, this research echoes that of Kagan (1990) who, in seeking to develop alternative ways to evaluate newly qualified teachers’ thinking, focused on their choice of metaphors. These were perceived as reflecting how they characterized “the nature of learning, the teacher’s role in the classroom and the goals of education” (Kagan, 1990, p. 423). In this way, beginning teachers’ metaphors gave some insights into how they had filtered and modified their university training.

The idea of identity as being *used* as a ‘form of argument’ (MacLure, 1993b), we felt, could assist us in negotiating the boundary between student and learner (Jones et al., 2000). As a consequence, particular attention was paid to those parts of the texts in which the students talked about themselves as ‘learners of mathematics’ and where they foresaw themselves being ‘teachers of mathematics’. The methodological strategy used when analyzing the data is loosely derived from both conversational analysis and ethnomethodology. Both these approaches, whilst having certain distinctive characteristics, nevertheless share the view that language, action and knowledge are inseparable (Stubbs, 1983, p.1). Our studies were not undertaken to find the ‘true’ identities of the students, nor were they undertaken to find the ‘truth’ about transition. Rather, our efforts were directed at unearthing those ways notions of self get talked about and how such notions become the means for negotiating and staking out particular claims, and become “theorized in discourse” (MacLure, 1993b, p. 377).

## Identifying with Mathematics in Initial Teacher Training

As we have seen, identity is also necessarily social. The argument of one's identity is entwined with an assertion of how one fits in, or does not, with one's perceived community. As Scheff (1994) contends, human consciousness is social "in that we spend much of our lives living in the mind of others without realizing it ....We always imagine, and in imagining share, the judgments of the other mind" (p. 45). Giddens (1991) draws on Scheff in discussing the notion of shame—the signal of a broken social bond. Shame, he contends, highlights the problems in the story we tell as our identity claim and the attendant feelings of "personal insufficiency" and the experience of loss of "integrity of the self" (p. 65). As Giddens (1991) puts it: "Shame directly corrodes a sense of security in both self and surrounding milieu" (p. 153). This work by Scheff and by Giddens has been discussed in relation to primary teachers of mathematics by Bibby (2002). We may ask, however, how such social bonds are defined? Can we see trainee teachers as taking control of their own personal and professional development and hence of their mode of participation in the community? Maybe to some extent, although, in the UK at least, so much of the teacher's task is externally defined by government policy apparatus. Participating in the maintenance of a social bond can so often become a task of compliance. As such, arguments of identity can become claims that we are meeting the expectations of others. We face shame if we do not.

Two key foci emerged from our readings of the transcripts; firstly, how students used the past, present and future when accounting for themselves, and secondly, how in describing their past mathematical experiences, it seemed that negative perceptions of self were resituated as positive traits. We shall now go on to suggest that by displacing certain negative perceptions and locating them as a positive term, transitions between the two sites of learner and teacher can be made possible.

## TAMING MATHEMATICS

Question: How do you feel about Mathematics?

Answer: Maths is the demon that jumped out of the closet and licked me in the face. (3rd year student)

Demons are abhorrent creatures. They instill fear and are best avoided. Yet mathematics as a demon has managed to ‘lick’ this student. Does this imply that the demon has been tamed and that some kind of affection lies between the student and the subject? Has the student’s own fear of the subject been licked; and, if it has, how were the transitions between fear and friendliness, abhorrence and affection made?

The four transcripts that feature in this section were chosen because the students themselves share certain similarities and the transcripts reflect concerns with learning and teaching mathematics (cf. Jones, Brown, Hanley and McNamara et al, 2000). All four students, one from each year of the course, were women who, when starting the course, were aged between 18 or 19. Three of them had gained a minimum grade pass in mathematics (GCSE) at school whilst the fourth had acquired a slightly higher grade. All four had expressed a dislike for mathematics when they were at school and each of the students maintained that they lacked competence in the subject.

The interviews began with this question: What is the first thing that comes into your mind when you think of maths?

I know I’m not very good at it ... It’s a way of adding and multiplying and taking away certain things ...  
maths relates to numbers ... it’s so big. (Yr. 1)

Maths is scary ... I’ve always not been wonderful at maths. (Yr. 2)

The second year student then expanded on “what maths is”:

## Identifying with Mathematics in Initial Teacher Training

... numbers, problems, day to day activities. I know maths is involved in more or less everything I do in my life. We talked about that in lectures ... there's the very complicated side of maths ... when you're sat down and doing sums intensely, GCSE, algebra, that sort of thing ... but if you're going back to the roots back to the simplest basic points of maths then it's to do with day to day problems and helping you through life ... we talked about that ... it's sorting out of things as well as the complicated side of things... organizational skills...sorting washing, blacks and whites...that's all maths ... common factors or differences ... that's maths...I didn't realize this before I came on the course ... we've unpicked a lot on the course ... and it's made me think maths isn't just scary numbers on a piece of paper which I used to think. (Yr. 2)

This student appears to have developed a means of managing mathematics and, in part, her strategy is as a consequence of college sessions. Mathematics, it would seem, is conceptualised as a series of binary oppositions. On the one hand there is the 'very complicated side of mathematics' whilst on the other, there is the 'simplest basic points'.

Using these two polarizations the students' responses could be presented as follows:

<b>Complicated maths</b>	<b>Simplest basic points</b>
sat down	active
doing sums	going back to roots
algebra	day to day problems
GCSE	helping you through life
pieces of paper	common factors
scary numbers	differences in things
	numbers, money
	shopping lists
	grouping of things
	sorting out of things
	organization

It would seem, that through a process which is captured in the statement, “We’ve unpicked a lot of things on this course” the student makes certain moves. This is a collective move in which she and her year group, together with the college tutor, work together at ‘unpicking’ mathematics so that aspects of it may be valorized. By way of the discursive practices of college mathematics, the student is motivated to leave behind that “scary maths” which is located in and associated with “doing sums intensely”. Rather, she finds herself moving backwards to the “roots” and to the “simplest basic points” in order that she may progress forwards towards teacherhood. And, as she travels, there is, we believe, a sense of her beginning to collect some of the cultural baggage which has come to be associated with primary mathematics—certain terms, for example, “groups”, “common factors”, “organization” signal her entry into the discourse of primary mathematics. In effect, emotional and cognitive shifts are taking place within the self. There are the internal realizations that mathematics both exists—and importantly—can be understood even within mundane activities of everyday life. Simultaneously, external changes also occur; she is now beginning to sound like a primary teacher.

And what of the other students? How did they use notions of ‘identity’? It appeared that the fourth year student also dichotomized mathematics. She polarized the subject as either “do-able” or “not do-able” and where by implication mathematics is subdivided between that which can/cannot be understood. She says:

Simple calculations... adding, subtraction, multiplication and division I can do, no problem. When you get into algebra .. I can’t do it...it’s the more complicated things like statistics that frightens me ... I love addition because it’s simple. I do things like area, capacity and volume because they’re practical. I liked trigonometry ... you were given a question—you had a triangle in front of you and you could see that one of the sides or one of the bases was going to be longer than the other or whatever so you could work out roughly what it was going to be, whether it was going to be a reasonable answer or completely out of this world ... whereas algebra ... it doesn’t really mean anything.

## Identifying with Mathematics in Initial Teacher Training

Her response could be arranged as:

Not do-able maths	Do-able maths
complicated algebra	simple basic calculations
fear	love
completely out of this world	reasonable answer
doesn't mean anything	means something

Meanwhile, the third year student posited the following theory which, so it seemed, helped in explaining her lack of mathematical competence:

Somewhere along the line I just think that I've not understood it properly ... I personally feel that maths—to know how to do things you have to understand it in you as a person ... Sometimes I ponder over it and then I think I should know this anyway.

What is being implied here? Does the student, for instance, conceptualize the learning and understanding of mathematics as occurring along a linear developmental line? So that when she does master a particular problem her success is never read in fulsome terms. Rather, she thinks, “I should know this anyway”. That is, she should have learned “it” at some specific or particular point *en route* to the present. She should already have been the person she now perceives herself to be. By constraining herself within a particular way of perceiving mathematical knowledge and its development, it would seem that a lack or gap will always exist between herself and the idealized mathematics student “who can understand it in you as a person.”

Echoes of this notion of “understanding it in you as a person” could be found in the transcripts of the other students. There were, of course, variations in the ways that this was expressed. For example, the first year student categorized people as either “mathematical sorts

of persons” or “arty sorts”. Furthermore, because she defined herself as an “arty sort” she considered that this curtailed her chances of fully understanding mathematics. To quote:

I think if you sat there and learnt and learnt and learnt I still don’t think you could change the way you were. I don’t think you can suddenly become a mathematical sort of person. I mean, I had tutoring for my GCSE and I had a lot of help from my teacher and no matter how much they explain things it still took me a long time ... other people got it just like that.

Similarly, the second year student talks about her brother as being able to do mathematics “just like that”. He, it seems, “doesn’t spend hours doing maths, but when he has to do it, it comes, just like that”.

What are some of the consequences of these perceptions? What, for example, are the effects of placing oneself in the ‘not-capable’ category? One reverberation, which is highlighted in the third year transcript, is that mathematical achievement is perceived as paradoxical; success is always shadowed by failure: “she should have known it anyway”. Similarly, the fourth year student found the learning of mathematics “very, very hard. For some people it just *naturally* clicks but I have to work and work and work at it” (our emphasis).

What are the implications for being a ‘teacher of mathematics’ when the student has located herself within the ‘not-capable of mathematics’ category? It would seem that, rather than being perceived as a hindrance, this particular construction appears to become a strong motivating force. Thus, the first year student, who it should be remembered has had no college input, foresees that because she has “struggled so much, I think it would benefit me.”

She then goes on to map out certain ideas for the teaching of mathematics:

I’d want to give them as much of the basics as I could because I think that would prepare them more ...  
I’d do it very practically. I’d say count these and count these ... what happens when you put them

## Identifying with Mathematics in Initial Teacher Training

together? I wouldn't say 'now add them up'. I'd say: 'what happens when we move this pile of bricks to this pile?' How many are there altogether?

The third year student, on the other hand, would "Try to understand where the children were coming from and where they got their ideas from to start with...and I would ... break things down step by step rather than everything just seem like taught as a whole". The fourth year student credits the university course with helping her make the transition from 'learner' to 'teacher':

And it was kind of ... we are going to teach you how to learn this the same way that children will and that gives you a very good understanding of how the children learn maths as well ... you've been through that same process as you are going to teach the children and you know what to expect and you know broad outcomes of what might happen.

From this, we offer the following speculative thoughts: it would appear that for the fourth year student, shifts in locations including that between being 'learner of mathematics' and being 'teacher of mathematics' are not linear processes. In order to take on the future role as a teacher, the student feels that within the context of college mathematics sessions, she is repositioned as 'the child'. As 'the child' she can then attend to the 'basic' and the 'simplest points of maths' and in so doing she can leave behind all those negative aspects of mathematics. Upon entering school as a teacher she will be able to demonstrate that she is indeed a teacher. She will, for example, be able to control, organise and structure the primary classroom (see Brown et al., 1999, p. 313). But when it comes to the teaching of mathematics, internally she will be in many ways 'the child' and it is this imaging of herself that will provide her with the confidence to teach.

It seemed to us, when rereading the scripts, that because of their own struggle with mathematics, the students were therefore determined to deliver the subject in terms other than

their own experiences. As teachers, they will learn from their own gaps, omissions and lack in the subject. In effect, they will take all those things that in the past they have perceived as preventing them from developing mathematical competence and they will assert the authority of the ‘opposition’. So the students did not, it seemed, want to become ‘mathematical’ types. Rather, they appeared to draw strength from being the Other to this construct (Walkerdine, 1990, p. 62). And it would appear college helps to strengthen this persona:

I didn't enjoy it because it was ... complicated ... intense, difficult, hard, didn't like it, boring ... so I thought from that well ... the children I was going to be teaching, I don't want them to be taught like that so I've been thinking about different ways of teaching which has come from University, they've helped in say in practical sessions, relating it to the home ... you use maths every day in everything that I never thought of ... washing, sorting out, organizational skills, variation in things, differences in things, common factors in things like three people have got brown hair, that's maths, it's relating it to just people. It doesn't have to be difficult like I did at GCSE to be able to understand maths, so I thought I like this approach, I enjoy it, it's easy to relate to, it's not tedious, it's interesting ... went on my school experience ... did a practical approach and it worked so therefore I've got confidence, I know what works, I know I have to go into everything thoroughly before I teach but as long as I make it interesting, don't let the children lose it, get bored, then it should be O.K. (Yr. 2)

Our readings in this section, we believe, can work at focusing attention on the significance of identity and its relationship to transitional journeys. For the students we have met, in order to succeed, mathematics must feature ‘in the ‘genes’ (be part of your identity, make-up). It either just ‘clicks’ or it doesn’t. If you are an ‘arty person’, any current success in mathematics tends to be shadowed by the failures of the past and in this way, future experiences with mathematics are always prescribed. The non-specialist trainee teacher, destined to include mathematics in her professional repertoire, appears to be wedded to the failed pupil, but seeks to revoke those characteristics of mathematics classrooms that are associated with failure. In some measure, this means declining to assume the identity of ‘a

mathematical sort of person' frequently pathologized in the figures of the mathematics teachers assembled from the past. First, mathematics as a demon is powerful and through various ways it subjugates the student and fills that student with fear and loathing. But, in jumping out of the closet, mathematics is 'outed'. It is removed from the dark and abstract underworld and in the light it is possible to see the softer side of mathematics. This aspect of mathematics, besides being fun, is also basic and practical. In fact, mathematics is so friendly, besides letting it loose with children, you can, if you are so inclined, let it lick you.

## **MOVING TO A SOCIALIZED MATHEMATICAL IDENTITY**

More broadly, within the UK, mathematics curriculum materials have become high profile and rigorously enforced. There are many accounts of mathematics, ranging from those built within the discourse of such government-sponsored materials to others generated more by the trainees themselves. Meanwhile, training institutions, schools, mathematicians, employers and parents all have some say in what constitutes school mathematics. For the trainee teachers interviewed, it seems impossible to appreciate fully and then reconcile all of the alternative discourses acting through them. In confronting the disparity between these alternatives, we have argued elsewhere (Brown & McNamara, 2001) that the trainees produce an image of themselves as functioning professionals, in which the failure to reconcile perspectives is swept under the carpet. The individual trainee may, for example, buy into official story lines and see their 'own' actions in those terms. This does not have to be seen as a problem. But it may mean that the trainees subscribe to intellectual package deals laid on for them rather than see the development of their own professional practice in terms of further intellectual and emotional work to do with resolving the contradictory messages encountered. As one teacher

commented in carrying out research for a higher degree: “Why do we need to do research to find out what good teaching is when the government is telling us what it is?”

Any supposed resolution then of the conflicting demands it seems cannot be achieved without some compromises. Certain desires will always be left out. The teacher, however, may nevertheless feel obliged to attempt such a reconciliation and to have some account of her success or otherwise. As an example: for so many 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’. How has this been achieved? It would seem, as in the last section, that those who so often had ambivalence towards the subject of mathematics do not continue to present themselves as mathematical failures. Rather, they tell a story in which their perceived qualities have a positive role to play. For example: “I like to give as much support as possible in maths because I found it hard, I try to give the tasks and we have different groups and I try to make sure each group has activities which are at their level. Because of my own experience” (Yr. 4). Another student comments: “The first one that springs to mind which I believe that I’ve got and which I think is very important particularly in maths as well, would be patience” (Yr. 4). A new teacher is more expansive:

Well I’m sensitive towards children who might have difficulty with maths because I know how it might feel and I don’t want children to not feel confident with maths ... I use an encouraging and positive approach with them and ... because I think if you’re struggling in maths the last thing you want is your confidence being knocked in it, you want someone to use different strategies in trying to explain something to you and use a very positive, encouraging approach and not make the child feel quite—Oh they can’t do maths never ... you know, so, yeah, I think my own experience in maths has allowed me to use a certain approach with children.

## Identifying with Mathematics in Initial Teacher Training

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 our interviews pointed to such anxieties being side-stepped rather than removed since they were still apparent in relation to more explicitly mathematical aspects of our enquiry.

How then might we better understand the teachers' task of their own professional development? Professional development has it seems now come to be seen in terms of better achieving curriculum objectives as framed within the National Numeracy Strategy (DfEE, 1999). The new teachers seemed very comfortable with this Strategy as an approach to organizing practice, even if many did find it very prescriptive. The Strategy does seem to have provided a language that can be learnt and spoken by most new teachers interviewed. In this sense, the official language spanning the National Numeracy Strategy and the inspectorial regulation of this seemed to be a huge success. This does, however, point to a need to find ways of adopting a critical attitude in relation to the parameters of this discourse in that certain difficult issues are being suppressed rather than removed. For example, when confronted with mathematics from the school curriculum of a more sophisticated nature, the new teachers remained anxious. The National Numeracy Strategy and college training however had between them provided an effective language for administering mathematics in the classroom in which confrontation with more challenging aspects of mathematics could be avoided. If true, this points to certain limits in the teachers' capacity to engage creatively with the children's own mathematical constructions. Perhaps further professional development in mathematics education for such teachers might be conceptualized in terms of renegotiating these limits.

Policy initiatives are surely designed to promote improved practice. Actual improvements however may transcend the conceptualizations embedded within the initiatives. It is important

to keep alive the debates that negotiate the boundaries of mathematical activity in the classroom and how those boundaries might reshape in response to broader social demands. It would be unfortunate if the prevailing conception of teacher development reached further towards the preference of providing a new set of rules, and of the teachers understanding their own professional development in terms of following those rules more effectively.

Trainees and teachers seem to be increasingly interpellated by multiple discourses and risk ending up speaking as if they were a ventriloquist's dummy. Immersed, as they appear to be, in socially acceptable ways of describing their own practice, the obligation to identify with these can generate resistance to the desire (rather than ability) to produce an identity of their own. Mathematics, as it is presently conceived, seems to have a habit of deflecting people from creative engagement into more rule governed behavior. Such moves into more structured territory could perhaps be seen as an attempt to dampen the emotional difficulties activated by attempts at more autonomous activity. It seems important, however, that further professional development be seen in terms of teachers seeking to recover and then develop some sense of their own voice towards participating more fully in their own professional rationalizations. Effective implementation of the National Numeracy Strategy is one thing. But we do need to guard against this restricting the teachers' need and desire to reconceptualize and develop their practice in an increasingly sophisticated language. Very often, research focused on mathematics education is seen from the external perspective of mathematics experts detecting the formation of mathematics in classrooms or from the perspective of government officials concerned with administering schools and the standards they achieve. In a professional environment increasingly governed through ever more visible surveillance instruments, such as high profile school inspections, there is a sense of needing to be what one imagines the Other wants you to be, in an environment of supposed or intended control technology. But does it have to be an environment such as this? If there is a shift of focus, where more

attention is given to the perspective of the emotionally charged and vocal individual teacher at the center of the classroom, development within classroom practices can perhaps be conceptualized more by those within the classrooms. Such a shift would, in our view, be a positive.

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Tony Brown, Liz Jones, & Tamara Bibby

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## Identifying with Mathematics in Initial Teacher Training

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