

MATHEMATICAL IDENTITY IN INITIAL TEACHER TRAINING

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This paper addresses issues of identity among trainee teachers as they progress through college in to 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 be 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.

RECONCILING PERSONAL ASPIRATIONS WITH EXTERNAL DEMANDS

Teaching is about empowering young learners and as such can be seen as a very worthy profession, around which a new teacher can harness more personal aspirations, such as feeling that one has social worth and a clear identifiable professional purpose. However, in adopting a broader perspective on how social improvement might be achieved, the role of individual teachers often takes second place to the wider social agenda. 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 a UK study to be discussed here, were, for example not keen on 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 Office for Standards in Education (OfSTED).

“It feels as if they’re checking up on you all the time, ... 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.”

The study coincided with the introduction of the National Numeracy Strategy, 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 personalised schemes of work. And it was not uncommon for some teachers to find the Strategy a little 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.”

But, for many trainees interviewed their personal aspirations were disrupted more by an unwelcome component of the overall job description of a primary school teacher, namely,

the actual need to teach mathematics in the first place. Most students in our sample (60% plus) had experienced significant emotional turmoil in their own experience of mathematics whilst pupils at school:

“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 and worked against a clear passage to feeling comfortable about producing a conceptualisation of teaching through which their personal aspirations could be achieved.

But in analysing such data there seemed to be a need to adopt a certain amount of caution (cf. Convery, 1999). What is concealed in such a story? Surely this 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 as to 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 rationalise their current motivations? 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 “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. Hence we examine what we might learn from such teacher accounts with particular reference to their current practice.

THE EMPIRICAL STUDY

This paper draws on two studies funded by the UK Economic and Social Research Council. The first study focused on the four years of B.Ed. training (Brown, McNamara, Hanley and Jones, 1999). The second study focused on the transition from the fourth year of training to the first year of teaching. The cumulative report has recently been completed (Brown and McNamara, under review). The particular aims of the second study upon which we focus in this chapter are:

- 1) To examine how the students’/teachers’ conceptions of school mathematics and its teaching are derived.
- 2) To examine the impact government policy initiatives relating to mathematics and ITT, as manifest in college and school practices, have on the construction of the identities of the primary student and first year teachers.

The studies were situated in 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 first study spanned one academic year and 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' understanding 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) were tracked into their first teaching appointment. Each of these students was interviewed on a further two occasions. These interviews monitored how aspects of their induction to the profession through initial training manifested itself in their practice as new teachers. A particular focus was on how aspects of the college training continue to influence the new teacher's practice in school, with an emphasis on mathematics teaching practice.

Specifically, the body of students that the research focused on 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 that 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 conceptualise mathematics and its teaching and how their views evolve as they progress through an initial course.

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. (MacLure, 1993, p. 287, author's own emphasis).

The notion that "identity" is something people *use* became a significant research theme. So, 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 mathematics was constituted. Taking note of the figurative language that was used by students when talking about themselves, particularly in relation to mathematics, provided glimpses into some of their beliefs and orientations about learning and teaching (Munby, 1986; Schon, 1979). 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 (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. As an example, trainee teachers observed often presented a fairly clipped “didactic” version of mathematics, nervous as they were about opening it up as a field of more creative enquiry. A key focus which emerged from our readings of the transcripts was how in describing their past mathematical experiences, it seemed that negative perceptions of self were resituated as positive traits in accounts of their present teaching.

NEGOTIATING A SOCIALISED MATHEMATICAL IDENTITY

More broadly within the UK, mathematics curriculum materials have become high profile and rigorously enforced. Nevertheless, 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 and McNamara, under review) 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 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 had this been achieved? It would seem that those who so often had ambivalence towards the subject of mathematics did not continue to present themselves as mathematical failures. Rather, they told a story in which their perceived qualities had 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’s 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. ... Because I think if you're struggling in maths the last thing you want is your confidence being knocked in". 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 sidestepped rather than removed since they were still apparent in relation to more explicitly mathematical aspects of our enquiry.

CONCLUDING THOUGHTS

How then might we better understand the teachers' task of their own professional development? Professional development in the UK has it seems come to be seen in terms better achieving curriculum objectives as framed within the National Numeracy Strategy. The new teachers seemed very comfortable with this Strategy as an approach to organising 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. And perhaps further professional development in mathematics education for such teachers might be conceptualised in terms of renegotiating these limits.

Surely policy initiatives must promote improved practice that transcends the conceptualisations embedded within specific initiatives. It seems essential to keep alive debates that negotiate the boundaries of mathematical activity in the classroom and how those boundaries might reshape in response to broader evolving social demands. It would be unfortunate if the prevailing conception of teacher development reached further towards the preference of providing sets of rules with the teacher seeing 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 are 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 seems to have a habit of deflecting people from creative engagement into rule governed behaviour as a way of dampening the emotional difficulties engagements with it can provoke. It seems important that further professional development is 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

rationalisations. 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 reconceptualise and develop their practice in their own terms. 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. Freud's concept of the super ego seems to be ever more reified in an environment of supposed or intended control technology. By focusing more on the perspective of the emotionally charged individual teacher at the centre of the classroom and what they have to say, development within classroom practices can perhaps be conceptualised more by those within the classrooms. Surely this is a worthy aspiration.

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References

- Brown, T. (2001) *Mathematics Education and Language: Interpreting Hermeneutics and Poststructuralism*, (Revised Second Edition). Dordrecht: Kluwer.
- Brown, T., McNamara, O., Hanley, U. and Jones, L. (1999) Primary Student Teachers' Understanding of Mathematics and its Teaching, *British Educational Research Journal*, 25 (3), 299-322.
- Brown, T., and McNamara, O. (under review) *The Discursive Formation of Mathematics in Elementary Teacher Education*, JRME Monograph.
- Convery, A. (1999) Listening to teacher' stories: are we sitting too comfortably? *International Journal of Qualitative Studies in Education*, 12 (2), 131-146.
- MacLure, M. (1993) Arguing for yourself: Identity as an organising principle in teachers' jobs and lives, *British Educational Research Journal* 19, 311-22.
- Munby, H. (1986) Metaphor in the thinking of teachers: An exploratory study. *Journal of Curriculum Studies* 18, 197-209.
- Ricoeur, P. (1981) *Hermeneutics and the Human Sciences*. Cambridge: CUP.
- Schon, D. (1979) Generative metaphor: A perspective on problem setting in social policy. In A. Ortony (ed.), *Metaphor and Thought*. Cambridge: CUP.