

WHERE HAVE ALL OF THE MATHS TEACHERS GONE?

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This paper presents findings, and raises questions, from a series of small studies of the socialisation and distribution of new secondary mathematics teachers. These studies have been carried out over the last two years and seek to explore the emerging positions of teachers, both on a pedagogic landscape and socio-geographically to their first teaching appointments. The first of these studies has been reported elsewhere (Noyes, 2004) but here I build on this and try to develop the issues from my teacher-educator perspective in the East Midlands.

INTRODUCTION

My interest in the socialisation of mathematics teachers began from the start of my work as a teacher educator. Working with pre-service teachers raised many questions for me about the impact of university tutors, and school mentors, work with them and the mechanisms by which some were more able to move their thinking and practice on. Other students, by contrast seemed less able to develop practices other than the traditional ones that they themselves had experienced and could still see in many classrooms, and of these some just didn't see such a need. Moreover, it quickly became clear that there was some kind of distribution patterns of our new teachers. So my work in this area aims to explore two distinct but interrelated questions:

1. How do various 'agents' and 'structures' shape new mathematics teachers' emerging pedagogic preferences and practices?
2. What mechanisms function in the distribution of these new mathematics teachers to schools?

In order to understand this process of socialisation into the profession I have made extensive use of Bourdieu's theory of practice. His concepts of field, habitus and capital offer a helpful theoretical perspective on these processes, and also, along with several case study methodologists (Simons, 1996; Walton, 1992), allow for the possibility of generalisation from the particular.

the deepest logic of the social world can be grasped only if one plunges into the particularity of an empirical reality, historically located and dated, but with the object of constructing it as a "special case of what is possible", as Bachelard puts it, that is, as an exemplary case in a finite world of possible configurations. (Bourdieu, 1998, p. 2)

Habitus is central to Bourdieuan sociology and is the mediator of agency and structure. It is the "durably installed, generative principle of regulated improvisations" (Bourdieu, 1977, p. 78) and so is the principle by which new teachers act and also their means of perceiving and ascribing social meanings to the actions of others. Moreover, "it is a general, transposable disposition which carries

out a systematic, universal application - beyond the limits of what it has actually learnt" (Bourdieu, 1984, p. 170). This point is an important one because Bourdieu here describes how the dispositions acquired as part of the life history, now embodied in the teacher's habitus, can generate action in new classroom contexts of which they have no prior experience. This is where the dialectic relationship of field and habitus is realised. The social fields of which Bourdieu writes are homologous structured social spaces that tend to maintain or reproduce their form and keep those within them in distinct positions. These fields do not have self-existence but are constantly restructured by the strategic actions of those in them. So Bourdieu describes habitus as both a 'structured structure' and a 'structuring structure' (Bourdieu, 1984); habitus and field cannot exist in objective isolation. A metaphor that Bourdieu used later in his work is that of habitat and I have found this helpful in my analysis of the imbricated educational fields of school and university:

a habitat can be occupied physically without really being inhabited in the full sense of the term if the occupant does not dispose of the tacitly required means of habitation, starting with a certain habitus. If the habitat shapes the habitus, the habitus also shapes the habitat, through the more or less adequate social usages that it tends to make of it. (Bourdieu, 1999, p. 128)

Bourdieu is here talking about that sense of 'dispositional harmonization' (Bourdieu, 1984) whereby actors tend to position themselves, and are positioned, in places where they fit, socially and culturally. This might seem too determinist, and indeed Bourdieu's critics have constantly bemoaned the apparent egalitarian pessimism in his sociological work (e.g. Giroux, 1983). Roth (2002, p. 50) suggests that "through considerable socio-analysis...through an awakening of certain forms of self-consciousness and self-work that enables practitioners to get a handle on their dispositions", habituses can be transformed, but how this works in practice is unclear – particular during pre-service teacher education courses. It might well be that for most student teachers, the short length of time on a PGCE course is simply too brief to see the benefits of such "self-work".

THREE STUDIES

I will now briefly outline the findings from the three studies, in the order in which they were carried out. These build upon one another but explore the questions in different ways. The first and last of them use case study methodology whereas the middle study was a survey of schools in the partnership region regarding their recruitment of newly qualified teachers of mathematics.

(Re)Producing Mathematics Teachers

This was the first study in this series in which I conducted case studies of four pre-service mathematics teachers on a full-time PGCE course (Noyes, 2004). The data included life-history interviews as well as the usual tutorials, assignments, school visits and lesson observations. When visiting these teachers the post-lesson

discussions included a more detailed unstructured interview process relating to critical moments in the lesson.

What emerged from the data was the way in which during their lengthy main teaching practice the teachers settled into pedagogic patterns that in many ways reflected their own social, educational and mathematical journeys. The students were not selected because they were particularly unusual but each of them had dispositions which strongly shaped their emerging practices. In a sense this was unsurprising but what also emerged from the data was the way in which each of them obtained their first teaching post in schools similar to the ones they had attended, and in two cases it was the same school, although these teachers had not intended to return to their *alma maters*. These findings raised further questions, including:

- If these teachers tend to return to schools in similar socio-economic conditions to those that they themselves attended, who will go and teach mathematics in the schools that produce no future mathematics teachers?
- How can, and should, teacher educators try to disrupt these reproductive tendencies?

At a recent international mathematics education conference I questioned a presenter about her work on beginning maths teachers in urban schools regarding the teachers' social origins. Surprisingly for her (but less so in the context of this research) she then realised that the volunteers for the project had all been similar high needs urban schools.

Recruiting Mathematics Teachers

The University of Nottingham's partnership of schools covers much of Derby and Nottingham shire and city LEAs, as well as parts of other LEAs in the East Midlands. Parts of this region have some of the worst recruitment and retention figures in the country (TTA, 2004) and so it behoves us, as the largest supplier of mathematics teachers to the region to consider how we can contribute to the amelioration of this problem. We have started to talk about these issues more with our student teachers, partly to develop their critical awareness of the structural inequalities within the education system (and mathematics education) and partly to support those who are committed to working in the aforementioned schools.

During the academic year 2003/4 all schools advertising mathematics teacher posts suitable for Newly Qualified Teachers in the partnership region were surveyed concerning their recruitment process. This was in excess of seventy advertised posts. The responses were categorised in relation to the most recent GCSE figures (% of pupils attaining 5 A*-C grades) and although this is a rather crude way to organise the data it helpfully sketches out the extent of the problem. Figure 1 shows some of the findings:

GCSE 5A*-C	No. shortlisted (mean)	No. interviewed (mean)	P (appoint.)	Criteria matched
<35%	1.3	1	0.3	1.5
35-50%	1.9	1.6	0.7	1.4
50-65%	3.8	2.4	0.9	1.3
>65%	3.8	3	1	1.25

Figure 1: Key data from study of maths NQT recruitment (Spring/Summer 2004)

Much of this is self explanatory, the third column being the probability of appointment. The 'criteria matched' column would have been 1 if the school considered their appointee to be a 'very close' match with their requirements and 2 if it was a 'reasonable' match. These figures don't include the schools that were unable to appoint and this clearly has a disproportionate effect on the <35% group. We have used this data in our mentor training so that they can see the recruitment patterns in the partnership region and in discussions about our interview procedure. Some have been unhappy with the quality of the student teachers that they have had to work with, and these mentors tend to not be from the top two categories of schools.

Repositioning Mathematics Teachers

This third study began with the intention of following those who had chosen, or had been chosen, to teach in the group of schools with the lowest attainment (all of which were schools in Nottingham City and the ex-mining communities of north Nottinghamshire). However, at the start of the process one of the four case study teachers began to question the appropriateness of this school for him. Over the next few weeks he managed to reposition himself and obtain an alternative post that was much more his kind of social/teaching *habitat*. At the same time another newly qualified teacher who had previously obtained a post in a suburban area of the city realised that she preferred the children and culture of the school in which she had completed her teaching practice in the city of Nottingham.

In both of these cases (Noyes, 2005) there was evidence of the struggle to harmonise personal, social and educational dispositions with those of the characteristic dispositions of the school. However, this struggle was not just that of the teachers themselves but included the intervention of classroom assistants, heads of department, head teachers, LEA advisors and solicitors. In both cases the student teachers ended up in the schools in which we had placed them for teaching practices. This process of repositioning was far from straightforward, and represented a sociological 'corrective' principle, which lies hidden under the surface of apparently objective individual agency in choosing schools. Both of these teachers were aware that they had misplaced themselves into jobs that were not right for them. Both of

them found ways of correcting their position and relocating themselves in a teaching habitat that was more comfortable or harmonious with their own socially-structured habitus.

I have mentioned that their final teaching destinations were the schools in which they completed their final placement and although this complicates my argument somewhat, it does indicate the contribution that we, the tutors, make to this distribution process. At two points in the year we allocate student teachers to schools, taking into account a range of factors. During recent years we have become more acutely aware of the workings of our own principles of social categorisation as we try to 'fit' students into schools. About 40% of our student teachers get jobs in the schools in which they have been placed for their main practicum. In response to the realisation that we are clearly implicated, along with schools and students in the inequitable distribution of new teachers of mathematics, we are now considering what, if anything we should do about this.

CONCLUSION

This series of studies have been carried out with a relatively small number of teachers and schools and there is a need for a much larger study that takes account not only the staffing in maths departments (as in the recently tendered DfES project), but also the socio-cultural composition of departments, taking into account teachers life histories and professional trajectories. Such a study might also consider the landscape of pedagogy and the factors that constrain and change such pedagogic practices, whether collective or individual.

What these studies have highlighted is the need for more critical contemporary analyses of these aspects of mathematics teacher socialisation and distribution. Liston and Zeichner (1991) argued for criticality in the general training of new teachers. However, their assertion that "teacher educators have at their disposal a wealth of knowledge and theoretical perspectives focused on the social and political context of schooling" (1991, p. 59) is a position from which we are drifting. New patterns of UK teacher education when combined with the abandonment of teacher education by some universities are leading to a reduction in the critical resources of teacher educators.

There has been a well documented reduction in the contributions of the traditional social science disciplines to pre-service teacher education courses. I am arguing here that there is a need to recover, or perhaps simply discover, ways of engaging beginning teachers, tutors and mentors with critical discourses surrounding the role of education in society. This goes beyond the notion of the reflective practitioner (Schön, 1993) to a more reflexive criticality, in which the new teachers and their tutors work to recognize and disrupt, at both the individual and collective level, the mechanisms that on one hand tend to reify certain pedagogic practices and on the other result in the uneven distribution of new teachers.

REFERENCES

- Bourdieu, P. (1977). *Outline of a Theory of Practice*. Cambridge: Cambridge University Press.
- Bourdieu, P. (1984). *Distinction: a social critique of the judgement of taste*. Cambridge, MA: Harvard University Press.
- Bourdieu, P. (1998). *Practical Reason*. Cambridge: Polity Press.
- Bourdieu, P. (1999). Site Effects (P. P. Ferguson, Trans.). In P. Bourdieu & e. al (Eds.), *The Weight of the World* (pp. 123-129). Cambridge: Polity Press.
- Giroux, H. A. (1983). *Theory and Resistance in Education*. London: Heinemann Educational Books.
- Liston, D., & Zeichner, K. (1991). *Teacher Education and the Social Conditions of Schooling*. London: Routledge.
- Noyes, A. (2004). (Re)producing mathematics teachers: a sociological perspective. *Teaching Education*, 15(3), 243-256.
- Noyes, A. (2005). Distributing newly qualified teachers: considering processes of social harmonisation. *submitted for review*.
- Roth, M. W. (2002). *Being and Becoming in the Classroom*. Westport, Connecticut: Ablex.
- Schön, D. (1993). Generative metaphor: A perspective on problem-setting in social policy. In A. Ortony (Ed.), *Metaphor and Thought* (2nd ed., pp. 137-163). Cambridge: Cambridge University Press.
- Simons, H. (1996). The paradox of case study. *Cambridge Journal of Education*, 26(2), 225-240.
- TTA. (2004). *Regional Report on Initial Teacher Training*. London: The Teacher Training Agency.
- Walton, J. (1992). Making the theoretical case. In C. C. Ragin & H. S. Becker (Eds.), *What is a Case? Exploring the Foundations of Social Inquiry* (pp. 121-137). Cambridge: Cambridge University Press.