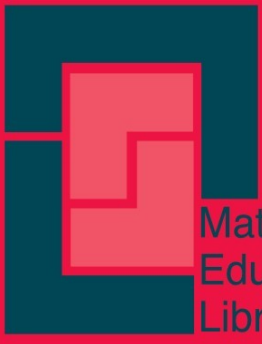
Tony Brown
Olwen McNamara

Becoming a Mathematics Teacher

Identity and Identifications



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Tony Brown is Professor of Mathematics Education at Manchester Metropolitan University. Originally from London, Tony trained in Canterbury and Exeter, before returning to London where he taught mathematics for 3 years at Holland Park School. This was followed by 3 years as a mathematics teacher educator for Volunteer Service Overseas in Dominica in the Caribbean. In 1987 he completed his PhD at Southampton University. His doctoral research focused on language usage in mathematics classrooms, especially where the fluent use of English could not be assumed. After a spell as a mathematics coordinator in a middle school in the Isle of Wight, Tony moved to Manchester Metropolitan University. Tony has headed the doctoral programme in education as well as participating in a range of other courses and became a professor in 2000. Projects have included Economic and Social Research Council funded studies examining teacher education; piloting a distance-teaching programme enabling British volunteers based in Africa to research their own teaching practice within a programme of professional development; a General Medical Council funded project on how senior doctors learn; and leading a team of emergency medicine doctors carrying out professionally focused research. Tony also spent 2 years on leave from Manchester at the University of Waikato where he became the first Professor of Mathematics Education in New Zealand. There he led a project funded by the New Zealand Council for Educational Research on Pasifika teachers working in New Zealand Schools.

Tony has published two other books in Springer's Mathematics Education Library series. *Mathematics Education and Language*, first published in 1997, outlines his interest in mathematics in schools. A revised second edition appeared in 2001. *Mathematics Education and Subjectivity* (forthcoming) explores mathematical learning from the perspective of contemporary social theory. Meanwhile, Tony has also authored *Action Research and Postmodernism* (with Liz Jones), which explores how teachers might carry out practitioner research within higher degrees. *Regulative Discourses in Education: A Lacanian Perspective* (with Dennis Atkinson and Janice England) offered an analysis of teacher practices through psychoanalytic theory. *The Psychology of Mathematics Education*, edited by Tony, introduced

psychoanalytic theory as an alternative to more cognitive understandings of psychology. Tony has also written extensively in journals such as *Educational Studies in Mathematics, For the Learning of Mathematics*, and the *British Educational Research Journal*.

Olwen McNamara is Professor of Teacher Education and Development at the University of Manchester and has lived and worked in and around Manchester most of her life. Her first degree was in mathematics, which she subsequently taught for over 20 years; latterly combining teaching with bringing up a family and studying for a PhD at Manchester Metropolitan University. After completing her thesis in 1996, she worked at Manchester Metropolitan University as an educational researcher, and also managed a research-based partnership of local schools, local authorities and universities. She moved to the University of Manchester in 2002 where her main management role was initially in teacher education. She is currently Director of Initial Teacher Education and Director of Post Graduate Research at the University.

Olwen's research interests are in the area of teacher professional learning, and she has a special interest in mathematics education, social justice and practitioner research. She has undertaken research projects for funders including the Economic and Social Research Council, the Nuffield Foundation, the Training and Development Agency, The Department for Education, the National College and NASUWT – the teachers' union. She has authored a number of reports for these funders and published widely in international journals. Her previous books include *Becoming An Evidence-Based Practitioner* and *Practitioner Research and Professional Development in Education* (which she wrote with Anne Campbell and Peter Gilroy). She has served on a number of national committees including the British Educational Research Association Council, where she was chair of the conference committee for a number of years, and the Research and Development Committee of the Universities' Council for the Education of Teachers, where she is Vice Chair.

Chapter 1
Introduction

Clare is in her final year of training as a teacher. She is aware of the many demands that she will face upon entering her chosen profession. Apart from meeting the academic and professional requirements of her university, she is keen to succeed at the school where she is to be placed in her final teaching practice. Clare enjoys working with young children. She takes pleasure from being popular with them and obtaining the approval of their parents. On her final school placement she will be teaching a broad range of curriculum subjects including mathematics, our particular concern in this book. She has needed to develop a way of teaching this subject that is enjoyable to her pupils whilst adhering adequately to the curriculum. She will need to be sensitive to noticing and minimising pupils' anxieties with mathematics, and perhaps, as we shall show, attend to some of her own. But above all she will need to hold on to some of her own personal aspirations that have brought her this far.

Yet, in reflecting on such demands, Clare is aware that in so many ways she is acting on behalf of others and their own particular priorities. Her discussions with colleagues in schools, tutors at university, and children have become a pastiche of things that she feels other people would want her to say. Clare has become quite alarmed by the absence of her "own voice". But then again, she conjectures, maybe this is now her "own voice", steeped as she now is in the professional way of talking about the job of being a teacher in a school. Her sense of self is fashioned by the expectations of others. Her personal aspirations of what it is to be a teacher have become aligned with the language she feels compelled to speak in order to secure accreditation and then employment, where she will undoubtedly encounter ongoing scrutiny from government inspectors. But then again, even if it were possible to find the real Clare, who would this be? The Clare she thinks she is? The Clare she wants to be? The Clare she was before her training? The Clare who is seen by others? Or the one "others" want her to be? But which others?

How might Clare make sense of all this? Suppose that we imagine Clare lying back on a psychoanalyst's couch where she talks of her life, her motivations, fears and aspirations. And in pinpointing these in words spoken to the analyst, they somehow become more real and tangible for her. As such they emerge as guiding principles for how Clare lives her life thereafter. The words and the way they are put together become part of her. The story that Clare tells of her life shapes her

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actual experience by providing a framework against which she understands what she is doing. Nevertheless, these ways of making sense can deceive as well as enlighten. It's a complex world and there is no unique story of how things make sense. Some versions of self may feel more comfortable than others. Clare may choose a version that she feels she can work with or simply stick with the one she knows as familiar. Yet each story of what she has done or of what she is doing provides alternative trajectories into the future.

More generally we build images of how we collectively conduct ourselves and develop particular understandings of normality, and especially of how teachers like Clare should behave. These images provide a backdrop to individuals making sense of their own lives within this wider frame. For Clare, the final stage of her training seemed to go hand in hand with meeting all the obligations entailed in being fully inducted into the profession. She felt she had been speaking with all manner of unfamiliar voices, much as a surrogate ventriloquist's dummy. But, despite this, her personal aspirations still surfaced.

This book is centred on people preparing to teach mathematics to children in the first half of their schooling. But how do we understand mathematics? We do not start out by supposing that there is a "correct" version of what mathematics is or should be. We centre our attention more on the ways in which beginning teachers talk about teaching mathematics to children aged 4–11 in schools currently. That is, we do not commence with our own advance understanding of mathematics and see what people are saying about it. Rather, we start from what people are saying about learning in schools and see how this points to particular ways of understanding what mathematics is in contemporary school practices and more widely. For whatever reason, most countries have decided to teach mathematics in schools and this decision has shaped the activities that we call "mathematics". Ultimately in schools, understandings of mathematics emerge in the interplay between pupils, teachers and the societal structures they inhabit. These understandings derive from a variety of culturally based assumptions as to the nature of mathematics and the associated forms of accountability they produce. And this situated meaning impacts on the evolving practices of trainee and new teachers. For these individuals mathematical understanding is shaped between the new teacher's grasp of the subject and the institutional definitions of it. Trainees and new teachers reconcile their own sense of what mathematics is with how it might be taught, against the demands they face from a variety of sources. Difficulties arise, however, from inconsistencies between alternative understandings of mathematics, the teaching of it, the perspective we assume in describing this teaching, and the issues underpinning the teacher training process. Moreover, teachers of young children generally need to teach a broad range of subjects with teaching mathematics just one of the many duties. Mathematics as a subject in its own right has had a tendency to be drowned out in the bustle of different agencies selling their wares to trainee teachers as they pass through their training.

How do these people begin to think of themselves as teachers? How do would-be teachers experience their own professional learning? How do they change how they are, or even who they are, as they proceed through a teacher education programme

into their first teaching post? With many years of experience as pupils in school behind them, student teachers are required to re-orient themselves towards the demands of teaching and they eventually progress into salaried classroom practitioners with a particular brief of teaching children in the primary[1] (or elementary) classroom. The professional landscape guides the aspiring teacher's individual practice against a backdrop of diverse and complex social demands that cannot necessarily be reconciled. The work of schools is targeted at enabling pupils to participate in a rapidly changing world where consensus on educational objectives seems difficult to achieve. Once again the diverse criteria that apply in setting educational priorities can result in teachers being pulled in many directions. Yet the demands of employment often play the trump card. Specifically, teacher identity is set against the regulative policies and highly structured frameworks that have come to define teaching in many countries. In this scenario, teachers have needed to craft their understanding according to the legislative framework in which their practices have become ever more strictly articulated. These in turn structure the learning environment and curriculum encountered by children and the style and content of mathematics.

Those charged with providing training for such individuals need to understand the processes and the impact of this training. An appropriate balance needs to be achieved. On the one hand new teachers need to be nurtured to become autonomous professionals, responsible for developing and delivering the mathematics curriculum in schools. On the other hand, trainers need to engage with policies that prescribe their own practices in training institutions and also the practices of their student teachers in schools.

A social environment of great complexity results in personal liberty vying with social control. The individual teacher juggles between deciding for herself and being told what to decide. She shares space with others in a way that meets common and alternative needs, but collective arrangements entail personal restraint. Yet surely in spite of all this complexity, teachers themselves do have some say, and would want some say, over how they conduct their own lives. They are not infinitely susceptible to social conditions and the guidance of their mentors. Teachers do have a voice of their own through which they express their own aspirations of what it is to be a teacher. How might teachers stick their heads above the parapet to speak more firmly in voices that might be claimed as their own? Yet, the notion of such ownership brings its own problems. The complex nature of teaching and its depiction in the social sphere prevents singular views of one's own participation. Many contemporary analyses dispute the individual's capacity to be aware of his or her own immersion in such collective arrangements. Here a culture of cynicism is observed, where, despite everyone's knowing that they are governed through a matrix of ideological hype, their actions remain largely unaffected.

[1]The British term "primary" will be used where the focus relates to the education of children aged 4–11.

Would-be teachers face two simultaneous journeys during the training process: first, the path followed by the teacher pursuing her personal aspirations and second, how the official story portrays the journey as a sequence of criteria to be fulfilled. How do these stories co-exist and in which ways do they intersect? How do they knowingly and unknowingly support each other and resist each other? And how do understandings of mathematics emerge from each?

In the first journey, the survival of mathematics must depend on the individual's wanting it to survive in her story. It would be so easy to downgrade mathematics to "just one of the subjects that I have to teach". For those with uncomfortable memories of mathematics in their own schooling, this might be the preferred option. How then might the pre-service teacher be assisted in advocating mathematics a little more strongly? How might the training process, with its multiple objectives and attendant budgetary and time constraints, impact a little more on the student teacher's inner motivations to work with the subject?

In the second journey the trainee is more like a robot on a production line collecting the components required to assemble the final product. Recent reform in a number of countries has seen governments wrestle with teachers and teacher education providers in deciding the content of the curriculum and the style in which it is delivered. Many policy initiatives have worked to a supposition that prescriptive adjustments to the professional environment will influence the activities that take place. For example, the resulting package in England, to be outlined in Chapter 4, comprised tight guidelines specifying and legislating what must be taught. This included a detailed curriculum prescribing how lessons should be administered, statutory guidance on how pre-service teachers should be trained and supplementary tests of mathematical content before they entered the profession. Few risks were taken. Mathematics as a school subject was largely down to official conceptions dictating its terms of reference.

These two journeys are, in English schools at least, happening at a time when new understandings of professionalism and managerialism are impacting on public conceptions of the teacher's role and external descriptions are being privileged over personal or professional motivations. The personal motivations, characteristic of the first journey, seem increasingly to be expressed in terms of fulfilling the requirements of the second journey. In this book we examine these two journeys, or perhaps alternatively, give an account of and account for "the" journey undertaken by trainee teachers from the two perspectives. But in centring itself in a project concerned with sharpening the definition and objectives of research in mathematics education, the book sides with the teacher in pursuing the development of her own professional voice. The professional landscape is highly populated with people supposing that they are acting in trainee teachers' best interests, whether they be university tutors, teachers encountered during school placements, government inspectors or researchers. This book privileges the task of creating a better understanding of how teachers might be equipped to assert their own voices.

Nevertheless, we do not see ourselves as liberators of oppressed teachers seeking release from restrictive structures. The structures often meet the demands of teachers themselves, providing support in areas where they lack confidence. Official versions

of events can easily become the common sense of the day. Yet, we see our research task as being to challenge these boundaries. We investigate the claim that in accepting the 'rulebook', teachers are complicit in limiting their professional judgement. The very fantasy of a quick fix in "raising standards", "redefining professionalism", securing an "evidence base" in research seems to appeal to teachers and their employers alike. Administrators or politicians need to be able to present policies in clear terms no matter how unclear or contradictory the underlying premises might be. Consequently, researchers in mathematics education need to assert a language that resists the onslaught of over-simplistic solutions.

To summarise, the book is primarily concerned with examining how trainee teachers conceptualise their own professional learning from the time they enter training through to the end of their first year of teaching in school.[2] That is, we are centrally concerned with issues of teacher identity. Yet conceptions of teacher identity fix understandings of mathematics and its teaching in schools. The book offers empirical and theoretical perspectives.

Empirically, we draw on two studies funded by United Kingdom research councils and conducted by the authors over a 5-year period. The studies were concerned with the professional learning of trainee teachers focusing on their experience of the training process. Two groups of around 30 trainees were interviewed in detail at different stages of their 4-year training. Many others responded to questionnaires. We hear their voices at various points in the training process to show how these voices adapt to include more of the official language required of them. In due course this language becomes part of them, even in terms of how they see themselves as teachers. Thus we examine how such trainees make the transition into the teaching profession. We further consider the influences which impact on the trainee during this period, such as university tutors, school-based mentors, government policy, curriculum materials. These studies took place at a time of great change, comprising a major programme of curriculum reform in which new policies for the teaching of mathematics took centre stage. Since the book is able to document aspects of this major initiative from beginning to end, we are able in a very limited way to evaluate the capacity of a holistic policy intervention to bring about qualitative adjustments to teaching practices. Many countries have experienced major curriculum reform in recent years. The English initiative, however, penetrated deeply, spanning the regulation of teaching in schools and radical changes to teacher training. It was truly an experiment on a grand scale into how much centralised control could be achieved. We can learn much from this attempt about the limits of centralised control and

[2] In the light of recent changes the book rethinks and builds on our earlier book *New teacher identity and regulative government: the discursive formation of primary mathematics teacher education* (Brown & McNamara, 2005). That book had comprised a substantial presentation of two projects funded by the UK Economic and Social Research Council: Brown, McNamara, Jones, and Hanley (1999), Brown, McNamara, Basit, and Roberts (2001). Other material arising from these projects from which our data is drawn include Brown, McNamara, Hanley, and Jones (1999), Hanley and Brown (1999), Jones, Brown, Hanley, and McNamara (2000), McNamara, Roberts, Basit, and Brown (2002), Basit (2003a, b), Brown, Jones, and Bibby (2004), Roberts (2004), Brown (2008e).

how this is processed through the actions of individuals. The studies pointed to this national programme being seen in a positive light by many teachers in primary schools. It provided clear guidance in an area where many such teachers experienced anxieties in relation to the subject. Some pointed to its being a trigger to creativity. Some others saw it as a possible challenge to their own professional autonomy. Longer-term benefits were less clear. The initiative had limited impact on raising pupil outcomes and its wind-down and impending closure were announced in 2009.

Theoretically, we turn to recent work in the field of psychoanalysis, and, in particular, the work of Slavoj Žižek, a Slovenian commentator influenced by the Freudian psychoanalytical work of Jacques Lacan. Žižek has had major impact on contemporary social theory. This theoretical avenue affords excellent views of how individual trainee teachers encounter the social framework in which they operate. Leaning to Foucault, we also consider alternative "technologies of self" that produce teachers in schools. Žižek argues that the seduction of an overarching rational structure guiding practice can provide a substitute for the deeper desires that we wish to satisfy. Such compliance, he argues, can give rise to particular forms of "enjoyment". Teachers, for example, may secretly like the rules they have to follow as they can give them a clear framework to shape their practice, and a quick fix in getting their achievements validated. Similarly, even though people may know that their actions or the stories that support them do not make sense, that may not inhibit their being pursued in the absence of clear alternatives. Žižek portrays a prevalent culture of cynicism, where there is an acceptance that actions by individuals do not make much difference. There are now too many versions of life for one centralised rational structure to have credence. This very complexity can activate the desire for simple solutions or for simple metrics to evaluate the suggested change. Yet the failure of these attempts to explain social processes opens a space for individuals to assert their own agency. Additionally, we look at how this production of discursive apparatus generates reductive conceptions of mathematics. Mathematics is situated amidst a multitude of alternative versions of what people claim it to be. Yet not one of these versions quite pinpoints it. People and places have been affected by the existence of mathematics. We suggest, however, that it is necessarily the discursive constructions that teach us what mathematics is. In the light of this analysis, we conclude by looking at how policy, teacher learning, school mathematics and research might be alternatively conceptualised.

These empirical and theoretical aspects are raised in relation to a number of concerns. First, we present an account of how trainee teachers understand their journey into teaching mathematics in the primary school. Second, we examine the conceptions of mathematics that pervade early schooling and how these conceptions might develop. Third, we discuss how policy, as implemented in major initiatives, impacts on such teachers. Fourth, we consider the role that research in mathematics education might have in accounting for the process of trainees' becoming teachers in school and in stimulating development in this area. Finally, we offer a theoretical frame that accommodates evolving and alternative conceptions of mathematics, how it is taught and the social parameters that guide these conceptions.

We open our theoretical work in Chapter 2 by considering how personal experience encounters social demand in conceiving school mathematics, in understanding how it might be taught and in deciding how teachers might be trained to teach it. Alternative theoretical models from contemporary hermeneutics and psychoanalysis are introduced to provide a framework for discussing mathematics teaching and teacher identity. As a prelude to the data being introduced in Chapter 4, these models provide a framework to consider how trainee teachers construct their identities through the training process and in response to policy frameworks.

Chapter 3 surveys some of the research that is available and relevant to the processes of pre-service teacher education. Whilst emphasising the paucity of research coverage in the British context within major journals, the chapter argues that wider coverage, such as that on offer in the United States, does not deliver the uniformly clear story or confidence one might wish for in building wider curriculum reform.

We then move in Chapter 4 to a case study of recent education reforms in England to contextualise the empirical studies upon which we draw. We document how regulative aspects of policy have shaped conceptions of teaching in schools, teacher education and curriculum reform. After introducing the empirical studies, we discuss the successive phases in the training process with respect to key transition points in the journey from school pupil to primary teacher of mathematics. Many of the trainees we encountered had been nervous about mathematics as pupils. Their anxieties clouded their entry into university. Yet university sessions provided a fun version of mathematics that became an effective blueprint for their future teaching. The impact on practical teaching approaches, however, seemed less obvious. Survival in the classroom and fitting into school occupied their attention. And since they had suffered with mathematics in their own schooling they felt they would be able to sympathise with children who were struggling with mathematics. The trainees' conception of teaching did not develop sufficiently for alternative styles to be effectively implemented in their own teaching. Teaching remained a delivery of mathematics but with an attempt to make it more enjoyable. Different influences impacted in successive phases of the training with uneven reconciliation being achieved of the many conflicting discourses. Mathematics was subsumed within broader conceptions of classroom administration. Yet wider policy changes had re-asserted an identity for mathematics that had become lost within broader primary education practices. These policies had resulted in teachers emphasising procedure rather than mathematical content. New teachers felt confident working within this guidance, which also enabled them to conceal any remaining unease with the subject.

Chapter 5 reflects on the empirical studies as a resource in building a more theoretical account of teacher identity and how this might be accounted for through research processes. We depict how individual trainee teachers see their own emerging sense of identity as a teacher. The multiple demands they face are combined in moving towards a coherent account of professional functioning. The chapter commences with some discussion of how the data represent teacher change and teacher conceptions of their own situations in relation to theoretical models of identity. It

provides examples of how trainee and new teachers produce an account of their professional practice against a backdrop of some unresolved issues. It further shows how trainee and new teachers appropriate the language of policy directives within their own vocabularies and how they use this language to encapsulate their own personal experiences. We propose, however, that any supposed resolution of the conflicting demands trainees encounter is illusory and that trainees work at producing images of themselves to conceal continuing difficulties.

Chapter 6 commences by discussing the data against a more theoretical treatment of the social construction of school mathematics. The chapter focuses on how trainee teachers discuss mathematics in the context of their own teaching and shows how school mathematics is a function of broader discursive practices. We shed light on the way in which conceptions of school mathematics are derived through this process. We then offer a more theoretical account of how school mathematics has become *commodified* through social processes. We argue that an administrative language used to articulate teaching practices interrupts a more direct focus on the mathematical content of the children's work. The apparatus associated with this administrative layer shapes classroom mathematics and children's experiences of this. For a teacher setting a mathematical task, there is the activity as performed by the child, the mathematics supposed to underlie it, and also the more unconscious desires being mediated by those forms. Yet it is argued that mathematics will always exceed specific versions of it in educational contexts.

We conclude in Chapter 7, switching from our research voice to our opinions, by arguing for alternative trajectories and implications for practice with respect to our key themes: teacher development, mathematics, policy and research. It is anticipated that the readers of this book would have professional involvement and potential impact in each of those areas.

First, teacher development, we shall argue, is a function of multiple and diverse priorities that are more or less achievable with the given educational resources, most notably the actual supply of teachers. Yet these teachers are answerable to a professional calling that is far from unambiguous. Teachers are required to respond to multiple demands that cannot always be reconciled in the practices of individual teachers. Set policy as they may, school authorities cannot secure absolute control. There are limits to what teachers can distil from the diverse demands they encounter. And they can only define themselves in relation to the constraints they see themselves as having recognised and accepted. For an individual entering training his or her sense of agency is modified and read differently against an emergent understanding of a new environment and of how he or she will be received. This entails a tricky meeting of a newly conceived agency rooted in personal aspirations and an expectation that he or she will be told how to teach. Agency on the part of the trainee mingles with dependency and gets shaped by the form of the external demands encountered. And the assistance on hand is similarly governed by conflicting priorities. For example, as we shall see in Chapter 4, in English schools the input of university-based teacher educators has been substantially reduced in favour of school-based training led by mentors with their own classroom responsibilities. Such changes are governed as much by cost and by ideology as by issues of quality.

Teachers are recognised to the degree to which they comply with external role determinations. There may be a perverse pleasure achieved through performing correctly within a given regulatory frame. Yet the gap between the cover story that the teacher tells and the conflict of priorities can be seen as a potential site for resistance where a more autonomous individual identity could be asserted.

Second, we contemplate how mathematics as a notion emerges from the training process. Mathematical achievement in schools is increasingly read through a register of *commodified* procedures and performativity, in a one size fits all model, spanning diverse nations and communities. Learning outcomes are dependent on the learning theories and assessment instruments being applied. Conceptions of mathematics are heterogeneous, socially derived and motivated by a range of ideological perspectives meaning that we cannot finally decide *what mathematics is*. Yet these social forms have a real effect on classroom practices and their governance. Mathematics gets to be known through, for example, particular results or standard methods. The activities of primary school mathematics have a strong association with the organisational and philosophical discourses of primary education more generally, and the link with a more explicitly mathematical discourse is increasingly marginalised through successive phases of training. School mathematics has been bureaucratised and is held in place by regulation. As teachers and as researchers, we need to learn how these social practices operate if we are to exert any influence.

Third, we consider the policy environment and the role of research. We first consider how policy is conceived and implemented and thus how a teacher's professional domain is shaped. What policies might bring about effective change? Yet the grip of educational policies on practice is generally rather more tenuous. Policy-making is not an exact science and control of educational practices, insofar as it operates, is dispersed across a number of diverse agencies governed by a range of alternative, and often conflicting, agendas with varying degrees of influence. At a structural level, policy makers do not readily identify as a coherent unit in relation to policies governing school mathematics and other stakeholders, such as advisory groups, trainers, mathematicians, research funding agencies, potential employers and universities/colleges work according to a variety of perspectives and priorities. Curriculum pronouncements that do not necessarily achieve harmony emerge from these various groups resulting in possible disconnections between policy setting, implementation by teachers and how such implementations are conceptualised by researchers. Moreover, no one person really knows how much influence he or she exerts in this panoply of political exchange, and no one quite knows who is in charge, or through which routes influence might be achieved. One consequence of this tussle is that teachers do not know who they are ultimately answerable to. Also, there is no one person who has a final word on how we might understand mathematics. We suggest that policy *diktats* cannot assume the behaviourist response their initiators desire. Yet it would be wrong to assume that the complexities defy all analysis. The task of analysis is more complex and cannot be predicated on the assumption that clear solutions will be found. It is not easy to locate simple causal links. This, however, does not stop interested parties claiming them, or others believing them, or, at least, acting as if they believed them.

Finally, how might we move forward in understanding research in mathematics education? The production of educational theory and research is a site of ideological and political struggle. Research intervenes in ideological exchange by providing empirically or theoretically supported arguments, but generally in relation to fairly localised contexts. Yet research discourses and the policy discourses they seek to support rarely meet in a shared language. Policy initiatives cannot be seen as products of individual politicians' imaginations. There is always a gap between conception, declaration and implementation, opened up by the complexity underlying any supposedly causal relationship. And such policies have had mixed results with a high cost in terms of teachers' being left out of the decision-making process. Teacher working practices are increasingly susceptible to external definition, yet still they participate, and seem to enjoy this participation. We argue that researchers need to resist the apparent narrowing of their domain, centred on current technicist or managerial conceptions of mathematics. Mathematics education is a social science and its resources and ambitions need to reflect that. There is a need for a language that does not trap us within restrictive styles of analysis to merely service the current priorities. This is about troubling certainties rather than producing them. There is no endpoint to be reached in a perfect set of guidelines.