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Pratt, Nicholas

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Research in Mathematics Education

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A contemporary theory of mathematics education research, by Tony Brown

Nick Pratt^a and Julie Alderton^b

^a*Plymouth Institute of Education, Plymouth University, Plymouth, UK;* ^b*Faculty of Education, University of Cambridge, Cambridge, UK*

What is mathematics teaching? How do we improve mathematics teaching? Why do we want to improve mathematics teaching? What do we understand by improvement? Brown poses these questions at the beginning of the preface to this, his tenth book. These are big questions which set the tone for the book, without promising any final resolutions. Rather, it invites the reader to consider new ways of looking and offers opportunities to reconsider assumptions that may constrain our thinking. Brown's main intellectual influence over his career and in this book, are the psychoanalytic theories of Jacques Lacan. We were not familiar with this theoretical approach. In our recent work, we have made use of the work of Michel Foucault (e.g. 2007; 2014) to take a post-structural perspective on issues such as assessment and inclusion in mathematics education, but since Brown identifies his intended audience for the book as *the mathematics educators that he has encountered over the years*, we feel well positioned to share our thoughts and reflections on his work.

Brown's main focus in this text is, as the title suggests, to outline a contemporary theory within which to undertake mathematics education research. As the preface makes clear, there are at least three elements to this which are central to the mission. First, a belief that much current research in the field "increasingly finds its terms of reference set according to assessment driven requirements and researchers have become complicit in promoting particular conceptions of teaching" (p.vii). Second, a wish to theorise mathematics education in a way which goes beyond the individualised, constructivist psychological ideas that tend to dominate the research field, drawing on social theory but not straying into sociology. And third, "to insist on an explicitly mathematical dimension in socially oriented discussion" (p. xv); that is, to ensure that research is focused on the specific relationship between education practice and the nature of mathematics as a subject.

All three of these are ideas with which we are very sympathetic and which drew us in to the early parts of the text. In chapter 1, which introduces the main themes in the book, there are lots of interesting and stimulating ideas marked out for the rest of the text to tackle. Brown notes, first and foremost, that 'mathematics' and 'education' are not comfortable bedfellows. Indeed, one objective of the text is to challenge the idea that mathematics 'is a discipline beyond social discourse' (p. 2); but by finding a middle ground, theoretically, between the psychology of Piaget and Vygotsky and sociology. And the wider aim in doing so is to challenge the normalising role of mathematics education research whose "efforts are often predicated on raising standards in a competitive environment to ensure adequate capability across the population but possibly rather less on wider inclusion across the spectrum of educational needs and aspirations" (p. 9). Moreover, and reflecting our own interests too (Alderton & Pratt, 2021), Brown also wishes to focus researchers on the "choice [that] needs to be made as to the sort of mathematical activity that is worth living" (p. 6).

Chapters 2 and 3 tackle the question of the nature of mathematics and people's relationships with it. Again, the argument is rooted in the discursive construction of the subject and how people are included or excluded from it not by any essential objective nature but by "how it is packaged for human consumption" (p. 12). Reference is made to authors such as Barad (2007) and de Freitas (e.g.

de Freitas & Sinclair, 2014) drawing, though the phrase isn't used directly, on post-humanist materialism, which sees mathematical conceptualisation as intrinsically intertwined in the person and materiality. Thus, the argument goes, the production of mathematics is a fundamentally social and cultural affair, illustrated nicely by Brown's comparison between circles and stellated octahedra, with the observation that there is no essential difference between them other than that the former are much more embedded in our everyday experiences for reasons that are cultural, not intrinsically mathematical. The important corollary of this is that there is no objective description of what mathematics is outside of human experience; rather, "mathematics is *only* produced through activities taking place in its name, but this name has been linked to certain political preferences that do not reveal their true purpose" (p. 30, emphasis in original). The author's mission in writing the book is therefore to empower individuals "to release their own powers to generate diversity in their mathematical understandings rather than conformity" (p. 23) – an admirable mission, albeit acknowledged as somewhat optimistic in the current climate of managerial schooling.

As readers coming to all this from a sociological standpoint the challenge presented in the opening chapters felt familiar to us, but in chapter 4 Brown begins to offer a new perspective that was of interest because of its roots in Lacan's psychoanalytic theory, and more directly in the numerous works of Slavoj Žižek and Alain Badiou. In going in this direction, he is true to his word in intending "to unsettle some of the common presumptions of mathematics education research in generating new ways of looking" (p. v) and it certainly had this, positive, effect on us. These ideas are returned to in the seventh and eighth chapters. In the former he discusses subjectivity and also the ontology of mathematical objects, fulfilling part of his original aim to develop a theory of mathematics education which takes account of the subject itself. Key to this is the point, outlined early in the book, that "pedagogical contexts (SK and PCK) define their objects" and that pupils and teachers therefore do not simply produce one version of mathematics uniformly across schools and within classrooms, but experience different versions of the subject "crucially linked to the geography of the supposed interface of human subject and object" (p. 135). This is a theme that we agree is vital and it alone offers the mathematics education research community plenty to think about.

In chapter 8, Brown essentially develops an ongoing discussion between the author and one of his previous critics, Wolff-Michael Roth, in which he attempts to "tease out some of the chief differences between sociocultural [Roth] and Lacanian [Brown] conceptions of mathematical learning" (p. 108). Within this defence of his work, Brown opens up some more Lacanian ideas which are of real interest, particularly around the nature of the subject and possibilities for teacher learning. Coming from psychoanalysis, we are told that Lacan's work

entails the production and analysis of symbolic material, or of a story ... a valuable entity, which methodologically produces the research objects that orient the mode of enquiry. This story is not subservient to something that it is trying to represent ... (how a meaning has been fixed, or usage familiarised). Indeed, the story is productive of that thing and a useful barometer of that thing. It entails looking at one's own looking to see how objects (meanings) are generated within a story that never settles. (pp. 123-124)

Moreover, in the final chapter (9) Brown expands on the key idea of the 'subject of desire', an idea introduced briefly in Chapter 4; that subjects, teachers in this case, are not static but constantly changing in relation to the type of teacher they strive to be and that they "desire to close the gap between the fantasy of [specified forms of] teaching and the reality in the classroom" (p. 47). Again, these ideas resonate with us having worked with Foucauldian theory; in notions such as technologies

of the self, regimes of truth, and governmentality (Foucault, 2007, 2014). Indeed, we nodded our heads in knowing familiarity when Brown claims, in the final chapter, that “there is always a risk that we begin to believe the stories we tell; they produce and control life rather than report on it...” (p. 134). But working with Foucault also creates the danger of wallowing in one’s pessimism; of seeing the world as hopelessly gridlocked and immutable. What was of interest to us therefore was the seemingly more optimistic perspective of Brown’s Lacanian theorising which advocates that:

The story or image never lasts. It always needs to be renewed. Learning might be understood as being about constant adjustment to a new mode of apprehension. For Lacan (2008, p. 17), “Truth is always new, and for it to be true it has to be new” because life as lived always exceeds the models that we try to place upon it. And the failures of these models as we use them produce desire to get things right. Lacan’s subject of desire is always reaching beyond the current state of affairs, a perpetual quest to improve on the current story motivated by spotting the “holes in discourse” (Lacan 2008, p. 27). A learner would then be seeing and experiencing the world as coming into being, experiencing aspects of this world as part of herself, a self that is also evolving in the process.

This is a more hopeful view of teachers’ potential development (perhaps enlightenment?) and, being rooted in psychoanalysis, Brown also advocates the use of deliberate descriptive activities for those learning to teach (both initially and ongoing), activities which encourage actors “to describe the worlds of their teaching, which so often would have been relatively private” (p. 60). Foucault might argue that this potential for change underestimates the role of the state in managing the possible stories that teachers can tell through the pastoral power of governmentality which makes it impossible for teachers to resist desiring the orthodox version of mathematics teaching practice (Pratt & Alderton, 2019). It is good to be challenged, therefore, from our sociological perspective by a theorisation that seems to have the potential for change built into it; and that troubles the psychological perspective from which ‘countless studies in mathematics education research have sought to isolate the mathematical dimension of wider discussion’ (p. 135).

Whilst most of the book is theoretical, to illustrate the potential use of his theorisation chapters 5 and 6 (and to some extent 7) contain empirical examples from previous studies. Although it is good to see how the author is attempting to link theory and practice, we found these chapters less accessible. The reader is left to do much of the analysis for her/himself from the descriptions of practice, with only a limited amount of data to consider and coming, as they do, in the middle of the book we didn’t feel theoretically equipped to follow the claims being made. More generally, the book is written by drawing on material from a series of shorter published articles, referenced at the start of each chapter, and one of the dangers of constructing a longer text in this way is that it can be hard to create the coherence that starting from scratch more easily offers. For us, this book suffered to some extent here. In a paper, as we know only too well, there is usually little room to articulate the theoretical stance being adopted in full; but one can usually assume that readers of the journal will have some understanding of it. In a long text, and particularly one aimed at a more general “mathematics education research audience” (as stated on the back cover), there was an opportunity and, we felt, a need to provide the reader with a more thorough description of Lacan’s work from the outset so that s/he could make use of it in understanding the rest of the text. Our feeling was that we never quite got to see enough of this explanation to make sense of Lacan in sufficient depth to share in the analyses offered. Though integrated throughout the text, the main thrust of the theoretical explanation is essentially limited to four pages in chapter 4, copied verbatim from Brown, Rowley, and Smith (2014), and then some further explanation in chapters 7 and 8.

Whilst we found these ideas fascinating, the way they were offered left us needing to look elsewhere to fill in the gaps – which in hindsight we recognise perhaps as Brown’s intention, to motivate the reader to put in the hard work to make sense themselves of such a new and potentially useful perspective.

The design of the book, building on previous papers, also came out in the fluency and accuracy of the writing itself. In places this was vivid and engaging – for example in Brown’s description of mathematics and education which, he says, “wave tenuously to each other from disparate conceptual domains” (p .1) – lovely! But in other places we found the writing more opaque; as well as containing a number of typographic errors which were slightly distracting.

In summary then, this is a book that we found engaging and challenging. The ideas it develops may not sit comfortably with those coming at mathematics education research from a psychological perspective in confronting the notion of mathematics as static and uniform; nor with sociologists who might want to see things more strongly in socio-political terms and issues of power. But this is its point, and whilst we didn’t quite feel that it managed to go as far as its title suggested, it raises the kinds of questions that all those working in the mathematics education research community should be considering, whatever their ultimate stance. It also offers a starting point for a way forward and the messages it contains have the potential to enrich mathematics education research by challenging us to see mathematics as an activity constructed in context and the teaching of it as something which needs constant revision, not political normalisation.

Correspondence details

Julie Alderton, jha32@cam.ac.uk, Faculty of Education, University of Cambridge, 184 Hills Road, Cambridge, CB2 8PQ, UK

Nick Pratt <https://orcid.org/0000-0002-7112-7792>

Julie Alderton <https://orcid.org/0000-0002-1408-7640>

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