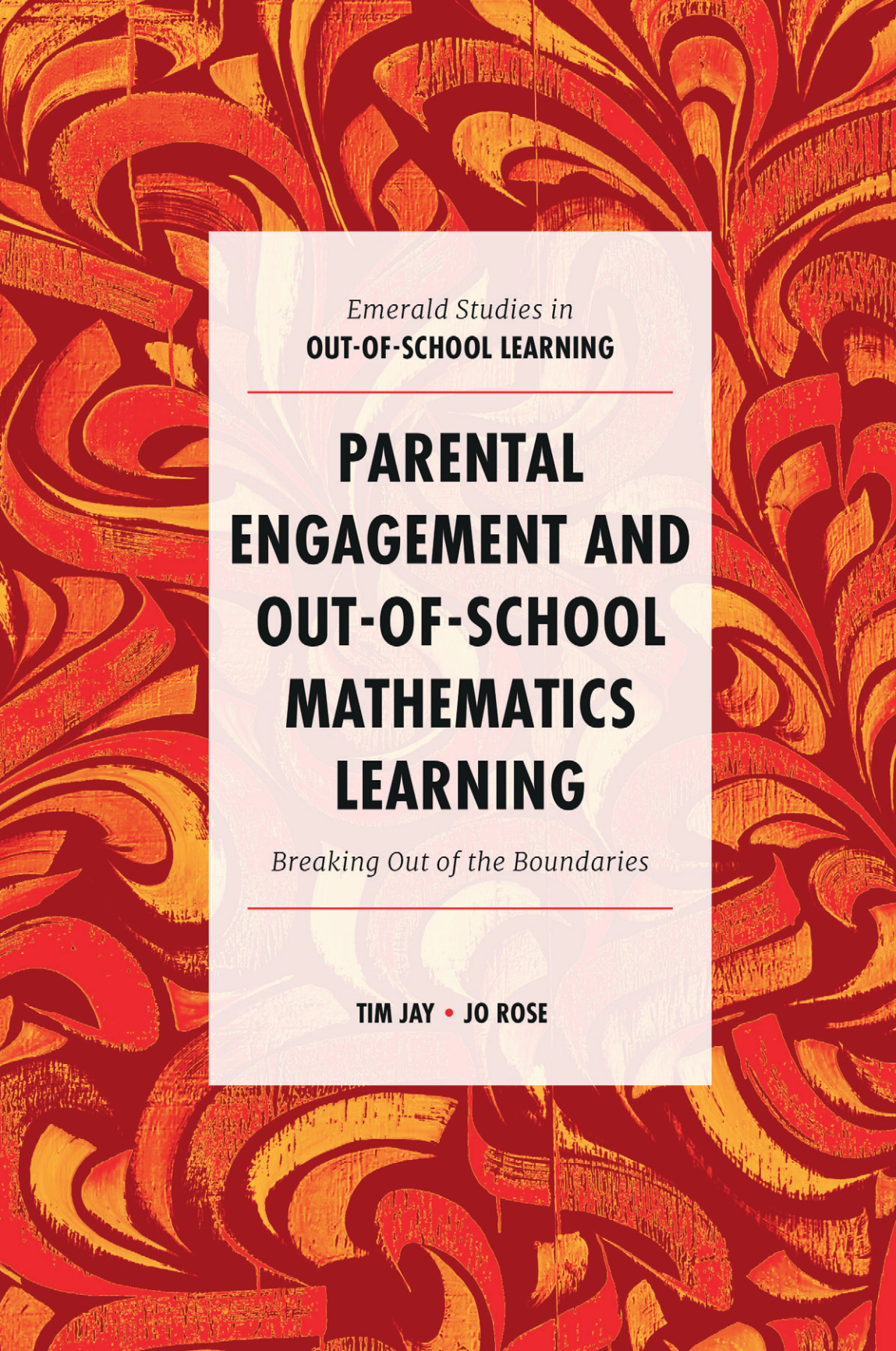




Emerald Studies in
OUT-OF-SCHOOL LEARNING

**PARENTAL
ENGAGEMENT AND
OUT-OF-SCHOOL
MATHEMATICS
LEARNING**

Breaking Out of the Boundaries

TIM JAY • JO ROSE

Parental Engagement and Out-of-School Mathematics Learning

Emerald Studies in Out-of-School Learning

Series Editors: Professor Tim Jay, Loughborough University, and Dr Jo Rose, University of Bristol

Emerald Studies in Out-of-School Learning focuses on the thinking and learning that children engage with outside of school, mainly in primary age groups from 4 to 11 years. Books in the series emphasise the ways in which such out-of-school learning does and does not align with children's classroom learning, and the potential barriers to, and opportunities for, synergy between these two contexts. A key feature of the series is the problematisation of out-of-school learning in terms of its alignment (or otherwise) with classroom learning.

The series will examine some of the complexities of researching out-of-school learning, and the need for new conceptual and methodological approaches and provides a space for work that looks at both informal and formal learning outside of the classroom, and will help to scope and shape this growing discipline.

Parental Engagement and Out-of-School Mathematics Learning: Breaking Out of the Boundaries

BY

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And

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United Kingdom – North America – Japan – India – Malaysia – China

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About the Authors

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Jo Rose is Associate Professor in Social Psychology of Education at the University of Bristol. Her research interests lie in the areas of educational partnerships and collaborative work, particularly in the context of supporting young people from disadvantaged backgrounds. She draws from the disciplines of psychology, sociology and education and particularly enjoys tangling with the myriad of ways that research methods can be combined to understand the complexity of collaboration in the context of education.

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Foreword

I am very pleased to write the foreword for this book, not only because Dr Jo Rose and Professor Tim Jay have been friends and colleagues for a number of years, but because this is a book that is timely, important and in particular, very much needed.

Jo, Tim and I share a research interest in parents' engagement in their children's learning; more than that, we are all agreed that this subject is not well enough researched, and frequently misunderstood. We've collaborated before on issues of 'out-of-school learning'; having been through periods of lockdown where almost all learning was 'out of school', the work presented in this book is even more important than it might otherwise have been. Jo and Tim emphasise the importance of relational work – between parents and children and importantly, between school staff and families, as well as between researchers, children, families and school staff. None of us are in the business of supporting learning on our own, even though we often seem to operate as though that were the case.

While there are a good many books about engaging parents in learning, there are few that look at how this can be supported and understood in the area of mathematics; as Jo and Tim point out in this work, maths is often seen as the exception to the rule – what works in other areas (parents supporting learning in the home) is often seen as not applicable to the study of mathematics.

Moreover, Jo and Tim's work over a series of projects has shown that not only is parent engagement in learning often misunderstood (which is a focus of a great deal of my own work), but the very concept of mathematics is also often misconceived. Parents (and school staff) may well maintain that they don't do maths at home with their children, all the while they are counting stairs with young children going up to bed, collecting car number plates to keep older children entertained on long journeys and discussing the intricate matter of just how many points a beloved football team needs to gain to avoid relegation. These are, as Jo and Tim rightly point out, all instances of mathematical thinking, but are rarely considered to be such – rather, maths-at-home is seen as counting change and weighing ingredients because that's what children (and parents) have been told at school.

It's worth pointing out that not everything in this book will be comfortable reading, and I think that's one of the positive things about it. We are enmeshed in educational systems which are frankly iniquitous: children from affluent backgrounds do better in our schooling systems than do their less advantaged contemporaries. If we wish to change that situation – and I do – then we cannot

continue to do what we have always done in the past. We cannot, as the clarion cry is so often heard, ‘return to normal’ after the disruption of the pandemic; ‘normal’ failed far too many of our children and young people. We need disruption to the system – and Jo and Tim outline how they have gone about such disruption, and the impacts that those changes have had. We need to reconceive how we understand not only parent engagement in learning but also mathematics itself, and research around it.

This book offers insights and suggestions which clearly arise from research grounded in the every day lives (and every day maths) of families and school staff. It suggests ways of moving forward, for parents, teachers and researchers. I particularly recommend it to those in my own context, as schools in Wales move into an era of greater autonomy under the new curriculum. I hope this book will challenge your ideas, support you to reconsider your own practice and thinking in this area, no matter how you relate to children acquiring mathematical understandings.

Janet Goodall

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Chapter 1

Introduction

This book is about children's out-of-school mathematics learning. Our interest in this area stems from several years of research working with children, parents and teachers, exploring ways in which children think and learn about mathematics out of school, and thinking about ways in which this does and does not align with the kinds of mathematical thinking and learning with which children are expected to engage in the classroom. We are going to start this book by explaining why we think this is an important book to write, and what we hope to achieve by writing it.

Children engage in a wide range of different forms of mathematical thinking and learning out of school that can often be more sophisticated than would be expected of them in the classroom. This will be one of the key themes of the book, as we explore children's play and activity and discuss ways in which we have worked with children and families to find the mathematics in out-of-school lives. There are two important caveats to the claim that children are engaging in sophisticated mathematics outside of the classroom, however. The first is that children are, on the whole, unaware of the mathematics with which they are engaging. This is not to say that children's thinking is disordered or that they are not making good decisions in their contexts, but that children do not always make connections between the thinking that they do outside of school that we might describe as 'mathematical' thinking and their experiences of classroom mathematics. The second caveat is that there are considerable disparities among children's opportunities to engage in activities leading to different forms of mathematical thinking and learning out of school that often align with different social demographic markers. Both of these caveats remind us that out-of-school learning is a challenging phenomenon to study (see also Rose et al., 2022), and that questions about relationships between out-of-school learning and the classroom are complex. We will explore what the research literature can tell us about children's out-of-school thinking and learning later in this chapter and in Chapter 2, and we will begin to share what we have found in our own work in Chapters 3 and 4.

Parents (by which we mean anyone with a caring responsibility for a child, not just biological parents) are very keen to support their children's mathematics learning, but find this difficult to do for a number of reasons. These reasons

include those to do with the nature of the school mathematics curriculum, difficulties around home-school communication and difficulties connected with their own experience of mathematics and schooling. Much of the time, parents struggle to know what to do for the best. This is important because there is increasing pressure on parents to support children's learning from various sources, and there is a risk of inappropriately blaming parents when children fail to achieve highly in mathematics in schools. As parents are encouraged to do more and more at home to support the learning that children are doing at school, there is also a risk that this reduces the time that parents and children have together for other forms of activity. We will begin to discuss some of the background research literature on parents' role in supporting learning later in Chapter 2, and will share our own research with parents in Chapter 4.

Important opportunities for children to engage with mathematical thinking and learning can sometimes be lost due to ways in which parental involvement is co-opted by schools and related organisations. In acting in the service of schools and schooling, parents can give up their position as the main educator of their children and the associated sense of their own expertise in supporting their children's learning. One of the main outcomes of the research projects that we report in this book has been a way of working with parents that disrupts this kind of parent-school relationship. We have supported parents to 'find the maths' in everyday life and activity and to explore ways of sharing their mathematical thinking with their children. In doing this, parents we have worked with have reconsidered their relationship with mathematics, and the ways in which they support their children's learning, finding for themselves more positive ways to engage with mathematics than they previously had access to. We have then also worked with teachers to encourage this same kind of thinking, and this same kind of relationship, with parents of children in their schools.

The projects that we draw on in this book have led us to explore a number of related issues around children's out-of-school mathematics learning, including, for example: the barriers to children's understanding of connections between out-of-school and classroom mathematics learning; the ways in which school practices limit children's (and parents') engagement with, and reflection on, out-of-school learning and the ethics of intervention studies that challenge education policy. Through the course of the research, we have reflected on the several ways in which we have questioned traditional conceptions and practices in education and educational research in trying to achieve our aims. With this book, we will share these reflections and use our research projects as case studies to make the argument that there is a need for a new approach to educational research that subverts and disrupts traditional models and approaches.

Why Mathematics?

We have chosen to focus on *mathematics* learning in our work, rather than learning of other curriculum subjects or other areas of interest, for a number of connected reasons. One of the authors of this book (Tim) was a secondary school

mathematics teacher for a time, and this experience gave him an interest in trying to understand better some of the specific things about mathematics that made it a difficult subject for some children.

A second reason is that mathematics qualifications are used as a way to manage access to further study and other opportunities. At the time of writing, there was discussion within government about the possibility of only allowing undergraduate students to take out a student loan to support their studies if they had a GCSE grade of 4 (approximately equivalent to the previous grade C) or higher in both English and Mathematics (<https://www.timeshighereducation.com/news/english-universities-await-clarity-on-impact-of-gcse-entry-bar>). Improvement in mathematics learning is a high priority for teachers and parents, and many feel some pressure to find better ways to support children.

A third reason for the focus on mathematics is that we know that parents have particular concerns about supporting learning in this area, relative to other areas of the curriculum. We wanted to learn more about the source of such concerns, and to consider what might be done to alleviate them.

What Counts as Out-of-School?

At this point in the introduction, we need to deal with the questions of ‘what counts?’ as out-of-school mathematics learning. The term ‘out-of-school’ is problematic, as it defines a phenomenon in the negative. This negative definition first of all makes out-of-school learning difficult to pin down. The first thing we might think of is learning that happens outside of school *space* – that is outside of school buildings, or school grounds. However, this would mean that the term ‘out-of-school learning’ would include learning that happens during school trips (to the museum, for example), which is not really what we are thinking about. It turns out that out-of-school *space* is a somewhat fuzzy boundary that doesn’t clearly separate one set of activities from another. A second way to deal with ‘out-of-school’ is to think about out-of-school *time* – which would refer to learning that happens outside of normal school hours, around nine in the morning until three in the afternoon. Again, this is a fuzzy kind of boundary when we consider activities like homework clubs, held outside of normal school time, often after school has finished for the day, to allow children to complete homework set by their teachers. Homework clubs seem very much to be more aligned with school than out-of-school learning, and so the ‘out-of-school *time*’ label doesn’t quite work for us either. A third way to think about ‘out-of-school’ would be to use it to refer to types of *activity* that are not typically found in school. However, this is perhaps even more fuzzy than the previous two options! While homework, set by a teacher to be completed by children at home, would not count as an out-of-school activity, would we count piano practice as a school activity or an out-of-school activity? How about a child researching the solar system because of an interest in space? How would we determine whether the child’s activity was sufficiently different to what they might normally be expected in a classroom to count as ‘out-of-school’? So ‘out-of-school *activity*’ does not work for us either.

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We have to decide to be pragmatic about this definition and accept the fact that it may not be possible to create a definition that clearly separates out-of-school learning from the classroom. Instead, we have opted for an inclusive ‘we know it when we see it’ approach.

Introduction of Key Themes

Throughout the book, we aim to question ways in which out-of-school learning does and does not align with classroom mathematics learning. There is a sense in which we will be questioning the idealistic and reductionist vision that many stakeholders (including representatives of governments, schools and parents) have, where out-of-school activity functions mainly as a means to raise children’s school attainment. While we will go into the details of support and evidence for this vision, together with reasons why it may be misconceived, later on in the book, we introduce here some of the main issues and themes that we will be returning to regularly.

Parental Involvement and Parental Engagement

There is universal agreement among researchers and practitioners that parents and families have a tremendous effect on children’s development and learning. Once children start formal education, some of the responsibility for children’s learning is taken on by teachers, but parents remain a hugely significant influence on children’s outcomes. Several reviews show that parental involvement in children’s learning lives has a positive influence on academic (Desforges & Abouchaar, 2003) and affective (Fan & Williams, 2009) outcomes. In fact, Desforges and Abouchaar assert that, ‘in the primary age range the impact caused by different levels of parental involvement is much bigger than differences associated with variations in the quality of schools’ (p. 4.). The difficulty though, in making use of this information, is the fact that parental involvement is not a simple construct, but made up of a variety of activities and attitudes. Some of these activities and attitudes include aspects of home life, including the quantity and quality of conversation with children (McNeal, 2001; Sui-Chu & Williams, 1996), the provision of a suitable home learning environment (Melhuish et al., 2008), parents’ aspirations and expectations for their children (Garg et al., 2002; Ma, 2001; Mau, 1997) and parents’ formal teaching of their children (Skwarchuk et al., 2014) – especially in early reading and number. Parental support of extra-curricular activities (including sports, music, arts and other activities) has also been shown to correlate strongly with children’s affective and academic outcomes (Bradley & Conway, 2016; Chanfreau et al., 2016). And then there are the positive effects of parental involvement in children’s school lives (Fan & Williams, 2009; Goodall & Montgomery, 2014).

So parental involvement in children’s learning potentially comprises several areas of activity, each one with its own contribution to children’s learning. This makes it difficult to say with any certainty which aspects of activity have what

effects on children's outcomes – be they academic, social or otherwise. A second complicating factor is that as well as varying in quantity, all of these activities vary in *quality* – in other words how parents and families carry them out. There is a good example of this in Fan and William (2009); they found that contact between parents and school regarding benign issues was positively associated with motivation outcomes, whereas contact between parents and school regarding children's difficulties was negatively associated with these outcomes. Another area where the quality of activity appears to be very important is homework. While some reports suggest that parental help and support in completion of homework is positively associated with attainment (Fan et al., 2017), others, including a meta-analysis reported by Patall et al. (2008) suggest that parental involvement in homework at this age may be negatively associated with attainment in some cases. Patall et al. found that parental involvement with reading homework was associated with positive outcomes, while involvement with mathematics outcomes was associated with negative outcomes. They suggest that this may be because parents focus more on a monitoring role with respect to mathematics homework, in comparison to sharing activities in reading.

For now, suffice it to say that the ways in which parents are involved in, or choose to support, children's learning, have large effects on children's learning, and their academic and effective outcomes. The only problem, and one that we will return to, is that it is very difficult to know what kinds of parental involvement have what effects.

Education Policy

Perhaps driven by some of the research referred to above, some governments have written parental involvement into legislation. For example, the Scottish Schools (Parental Involvement) Act (2006) requires local authorities to have a strategy in place to improve parental involvement in education in three ways; encouraging learning at home, improving home-school partnership and increasing parental representation in school governance. Similarly, the US No Child Left Behind Act (2001) sets out expectations of schools and local authorities in order to improve home-school relationships and increase parental involvement in children's learning. While not always enacted in law, English schools often have parental involvement policies, and advice and guidance is available from the Department of Education (Desforges & Abouchaar, 2003; Goodall & Voorhaus, 2011), NGOs (e.g. Education Endowment Foundation¹) and charities (e.g. National Numeracy²).

While no doubt driven by good intentions, government and school policies to increase the quantity and/or quality of parental involvement in children's education and learning have the potential for unintended negative consequences. The research briefly summarised above tells us that more parental involvement tends to lead to better outcomes for children; so why should we be concerned about policy that aims for more parental involvement? There are actually a few reasons why policy efforts to increase or improve parental involvement could be

detrimental. Firstly, studies that have provided the best evidence of positive effects of parental involvement have tended to be correlational; studies with the potential to demonstrate cause, or that aim to demonstrate the effectiveness of parental involvement interventions in improving children's learning, have been less successful in demonstrating positive effects. Secondly, as discussed previously, the research to date does not give us 'one size fits all' guidance for what parents should be doing. There is definitely a sense, though, that more is not always better, and that the quality of parental involvement is likely to be at least as important as the quantity. Thirdly, a major risk of policy initiatives to raise levels of parental involvement in children's learning is that it can create a deficit model of parental behaviour; this in turn can lead parents, and those working with parents, to have more negative views of parents' abilities and behaviours, leading to reduced levels of involvement in children's education and learning. We will explore each of these issues a little further here.

No 'One Size Fits All'

Crozier warns against one-size-fits-all interventions for supporting parental engagement; not all parents are the same, have the same needs, face the same barriers or share the same conceptualisation of parental engagement (Crozier, 1999, 2001). This principle connects with a key issue for us in our work researching and encouraging parental engagement in mathematics learning; that of avoiding a deficit model approach in our interactions with and thinking about parents. In fact, one of the motivations for us in pursuing this line of research is the number of times that an educational professional has told us something like, 'Our parents are rubbish'. While obviously somewhat disappointing to hear, we interpret these kinds of statement as a problem to be addressed, rather than an objective comment on the 'quality' of parents of children at a school. These statements tell us that teachers in some schools recognise that there are problems of communication and of expectations that need to be solved before teachers and parents feel that they are working together in a positive and constructive way to support children's learning.

One step that may be required for teachers and parents to work together in a constructive way is some reframing of relative responsibilities for difficulties. 'Hard to reach' is a phrase that many teachers use to describe groups of parents that are not regularly engaged in school activity and who teachers suspect may not be supporting children's learning at home as well as they might. Crozier and Davies (2007) provide some useful insight here when they suggest that rather than considering *parents* as being hard for *schools and teachers* to reach, that we can instead usefully consider schools and teachers as being hard for parents to reach. Crozier and Davies found that parents that they worked with in their study had very positive attitudes towards their children's education and learning, and were not 'obstructive' or 'difficult'. Rather, the structures and actions of schools and teachers frequently inhibited parental engagement among some groups of parents.

For us, there are clear links between some other sections of this chapter, and a sense that a one-size-fits-all approach to parental engagement is not an effective way to improve learning. This may, for example, help to explain why many trials of interventions intended to improve parental engagement have not been successful. Where interventions are implemented at scale, without sufficient adaptation to the particular needs and context of schools and parent populations, they are unlikely to be successful. Similarly, if teachers responsible for implementing interventions as part of a trial are not fully committed to working closely with parents and families to adapt a programme to their particular needs and context, then again the trial is unlikely to show improved learning.

Returning to that ‘Our parents are rubbish’ statement, we suggest that some teachers may at times have a model of the ‘ideal’ parent that parents of children in their school are not perceived to live up to. This starting point means that such teachers can think about what might help parents support their children’s learning in a certain way, and often this involves trying to teach parents new knowledge and skills that they are perceived to lack. A big part of our work has been about empowering parents to use their existing knowledge and skills and to see how parents negotiate their own approaches to parental engagement when encouraged to do so.

Outlines of Chapters

Chapter 2 builds on this introduction by diving into the detail of relevant literature in this field. We explore previous research on parental engagement with schools and learning in general, before looking specifically at engagement with mathematics learning in particular. We also explore research on cultural differences in out-of-school mathematics thinking and learning, and consider previous efforts to develop interventions to improve parental engagement. Finally, we outline the gaps in the literature that we have attempted to address with our own work.

Chapters 3 and 4 describe two of the projects that have formed the foundations of our work in this area. Chapter 3 focuses on ‘Children’s economic activity and mathematics learning’. This project, funded by the Leverhulme Trust, allowed us to investigate children’s economic activity outside of school as a locus for mathematical thinking and learning. We were interested to see how the mathematical thinking and learning that children engaged in as part of this self-directed and self-motivated activity did or did not align with the mathematical thinking and learning that children experience in their classrooms. Chapter 4 focuses on ‘The Everyday Maths project’, in which we worked with groups of parents to explore barriers to effective engagement with children’s mathematics learning, and develop activities and resources to empower parents to work around these barriers and to support their children’s mathematics learning effectively.

In Chapters 5–9 we further develop some themes through our thinking and reflections on our research. In Chapter 5, ‘The politics of purpose,’ we look at ways in which different agencies and stakeholders involved in children’s education

often have different purposes in mind. We explore how this can give rise to problematic situations and how these might be resolved. Chapter 6, 'Methods of engagement', looks at the importance of good relationships in fostering effective parental engagement in learning. We consider approaches we have taken to developing positive relationships between parents, teachers and researchers, and reflect on what we have learnt through our research. In Chapter 7, we consider 'The "what" and the "how" of our projects: participants' expectations about our research' and discuss how we have managed the introduction of quite novel, and therefore sometimes uncomfortable, approaches for teachers and parents to think about supporting children's learning. In Chapter 8, we broaden out these discussions in 'Exploring uncertain territory'. Here we discuss how we, as the research team, managed working on projects where we needed to let go of some of the control of exactly where studies went and what we might find. In Chapter 9, 'The ethics of disruption', we reflect on ways in which we have set out to change relationships and disrupt usual practices in the course of our research. We consider ways in which this has presented risks and how we have justified and ameliorated such risks in our work.

In Chapter 10, we describe some of the challenges of translating research to practice in this field. We discuss some of our work with teachers and reflect on some of the challenges of scaling up research in parental engagement in mathematics learning. And finally, in Chapter 11, we share some concluding reflections on the research presented in this book and discuss some ways in which we hope that this research might inform future research and practice in education.