# Collective Mindset: The role of culture, community and metacognition in the development of shared beliefs about intelligence

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## Declaration

This thesis results entirely from my own work and has not been offered previously for any other degree or diploma.

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## Dedication

I would like to dedicate this thesis, with loving memories, to Mike Furlonger. My Dad had amazing grit and battled Motor Neurone Disease with positive persistence. He started this doctoral journey with me, but did not get to see me complete.

# Collective Mindset: The role of culture, community and metacognition in the development of shared beliefs about intelligence

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## Abstract

The beliefs that we hold about intelligence are influential, especially our beliefs about its malleability. Is our intelligence unchangeable and fixed, or is it possible to grow it? Perhaps even more importantly, in a school context, how might the 'collective' beliefs about intelligence developed between teachers and children influence their beliefs about their capabilities and their learning behaviours? Research suggests that an individual's implicit belief about the malleability of intelligence supports the development of a mastery-approach goal orientation, which can positively impact on achievement and outcomes. While this may appear to be a simple and logical conclusion, this study suggests that it may be more problematic putting this theory into practice in the real-world social setting of a primary school. It seeks to engage critically with Mindset Theory to understand how teachers might acknowledge and ameliorate for challenges associated with implementation in a social-cultural context. This case study uses an ethnographic approach to investigate a primary school in England in which teachers are deliberately and collaboratively adopting a pedagogical approach that aims to support the development of growth Mindset for individual learners. This study aims to contribute to Mindset Theory by investigating interactions in real-world social learning contexts with a multimethod, qualitative approach. Focusing on the social and physical learning environment, data were generated through participatory observation, interviews and focus groups involving practical activities with teachers and children. Thematic Qualitative Analysis suggests that teachers in the case study school are developing a culture that encourages beliefs about the malleability of intelligence and strategies for mastery goal setting. Findings point to the importance of features in the learning environment of community, metacognition, challenge and goal setting, which underpin key practices cultivated in the case study school through sustained and collaborative professional learning. They highlight the value of dialogue and shared metacognitive processes interactions between teachers and children. Analysis indicates the importance of teachers and children recognising that beliefs about intelligence are complex and influenced by an individual's experiences and interactions within and beyond the classroom environment. It suggests the possibility of understanding a new, social model of pedagogy informed by Mindset Theory.

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# 1 Introduction

1.1 Research context and rationale

Beliefs about intelligence and efficacy have been the sustained focus of a large body of educational research (Dweck, 2000; 2006; 2017; Klassen *et al*., 2011, Tschannen-Moran, Salloum and Goddard, 2014). Recent research in these areas has particularly focused on learner characteristics and the impact that beliefs can have on the successes and outcomes of learners (Duckworth *et al*., 2007; Takahashi, 2011; Donohoo, Hattie and Eells, 2018).

In the current policy environment in England, there is a strong emphasis on goal setting, pupil progress, challenge and mastery for deeper learning (Department for Education and the Standards and Testing Agency, 2017). In addition to the use of school league tables and inspection grades, based largely on national test results, there has also been a sustained rhetoric and focus on the attainment gap relating to social disadvantage (Education Endowment Foundation, 2017). In this context, an increasing number of educational settings have begun to engage with whole-school teaching interventions that relate to particular beliefs about intelligence. Many are adopting pedagogical approaches believed to be informed by a specific theory of motivation that is referred to as 'Mindset Theory'. In this context, 'Mindset' is defined as how beliefs that an individual holds about the fixed or changeable nature of their intelligence might impact on their learning behaviours and outcomes (Dweck, 2006; 2017).

With a proliferation of new activities in schools related to the development of Mindset Theory, it is important to guard against misunderstanding in its interpretation and false application. A lack of understanding of theory and underpinning principles can lead to misuse, which is referred to in existing literature as 'false' growth Mindset (Yeager *et al*., 2013; Dweck, 2006; 2017; Dweck and Yeager, 2019, p. 490). This false pedagogical approach is where an individual mistakenly claims to use teaching practices that develop growth Mindset. This provided a strong rationale for research to support understanding of whole-school approaches to the development of Mindsets. The investigation of effective and sustained implementation of pedagogical approaches informed by Mindset Theory are justified to help to avoid misuse and misinterpretation (Yeager *et al*., 2013; Dweck, 2006; 2017; Dweck and Yeager, 2019).

Existing research suggests that these beliefs about malleability can be developed to positively impact on achievement and outcomes (Good, Aronson and Inzlicht, 2003; Blackwell, Trzesniewski and Dweck, 2007; Dweck 2006; 2017). The work of Carol Dweck in developing Mindset Theory within the field of Social Psychology provides a useful framework for considering how 'Implicit Self-Theories', beliefs about the nature of intelligence, might impact on learner behaviours. A body of research applying Mindset Theory has established that individuals with predominantly 'fixed Mindset' beliefs consider intelligence to be an unchangeable trait, which can lead to learner behaviours of avoidance and helplessness. Conversely, research also suggests that individuals with predominantly 'growth Mindset' beliefs consider intelligence to be something that can grow, which can lead to learner behaviours of embracing challenge and persistence.

This study investigated the ways in which Mindset Theory might effectively be developed and sustained in a social real-world school context.

## 1.2 Research purpose

This empirical research contributes to understanding of every-day teaching practices and principles that support the embedded and sustained development of Mindsets in a social learning context. This case study used an ethnographic approach to investigate a primary school adopting pedagogies that aimed to support the development of growth Mindset for individual learners. The investigation started with a focus on problems associated with introducing such pedagogical approaches in a real-world, social setting. As it developed, it also focused on how specific practices have been combined in a model where the social interactions in learning encourage teachers and children to develop growth Mindset together.

This study critically evaluates and applies Mindset Theory to develop understanding of the complexity of its implementation in a school setting. The literature review in Chapter Two also critically considers research underpinning Mindset Theory and discusses concerns expressed about statistical analysis and replicability of results from some of the studies upon which development of the theory has been based. Through the analysis and discussion, this study also raises questions regarding the categorisation and gradation of goal types within Mindset Theory. It explores how they might be developed in relation to other theoretical frameworks for goal orientation.

This study contributes to Mindset Theory with consideration, not only of the nuanced challenges and problems that it set out to investigate, but also of possible benefits in developing a social, collective model of Mindset that was constructed through this study's analysis of practice. My research questions developed to focus on actions and interactions associated with developing and sustaining the belief that the teachers and children in my case study school shared in their conjoint capacity to develop Mindsets together. The investigation considered the ways in which teachers and children tackled difficulties such as incongruence, defiance and conflicting cultural messages, as they worked to support each other.

## 1.3 Research approach

An individual, intensive case study with a detailed, focused and in-depth approach informed theory generation to advance practice (Dooley, 2002; Yin, 2017). While other stakeholders, such as parents, policy makers and leaders, have considerable influence on the development of Mindsets in a school, the design of this study has maintained a close, bounded focus on the beliefs of teachers and children. It uses a hybrid qualitative Thematic Analysis approach, combining inductive and deductive reasoning, and takes some steps to develop joint construction of meaning in collaboration with participants.

Mapping and reviewing theory and research in education and psychology informed the construction of a theoretical framework that was applied as part of Thematic Analysis. This framework focused on aspects of the professional learning and change processes suggested in research literature as important to the development of Mindsets. This thesis explains how

teachers in the case study school tackled problematic issues of implementation to develop a culture that encourages beliefs about the malleability of intelligence and capacity for teachers and children to act on these beliefs with agency. It considers how professional learning processes and the development of key features of the learning environment influence the development of beliefs and the important roles that dialogue and regulation play as they develop beliefs and practices together. It investigates how individuals interact and influence each other, contributing to an understanding of how pedagogies informed by Mindset Theory might effectively be mobilised in a primary school context.

### 1.4 Research question

What are the characteristics of a social model for developing growth Mindset and what are the processes and conditions for its development within a case study primary school? This includes the following sub-questions:

- How do the teachers understand intelligence and how do they relate this to their every-day practices?
- How do the teachers strive to develop children's conception of intelligence as malleable?
- How do the children understand intelligence and relate this to their experiences in school?
- How do social aspects of pedagogical approaches add to the development of Mindsets and related learner characteristics?

# 2 Literature Review

2.1 Introduction and overview

This chapter underpins my study (Fink, 2014) and is the outcome of an iterative and cumulative process of literature review (Hart, 2005; Branley, Seale and Zacharias, 2018) including my ongoing recursive review process (Bogdan and Biklen, 2007; Kamler and Thompson, 2014; Wisker, 2015). This introductory section provides an overview and positions the review in relation to aspects of my ethnographic approach (Agar, 2004).

In three main sections, I review selected key sources, position the study, develop a conceptual framework and identify gaps in the existing research (Wellington, 2015):

- Mindset Theory
- Individual and collective beliefs of teachers and children
- Culture change and professional learning

The first section investigates how existing research suggests beliefs associated with Mindset can be formed and sustained and what problematic issues may be associated with these processes, to create a conceptual framework for understanding the development of pedagogy informed by Mindset Theory in a real-world primary school context. In the second section, I go on to discuss three specific types of belief and their relationship to Mindset Theory: individual teacher beliefs; learner personal capability beliefs; and collective teacher beliefs. The third section is particularly important to understanding the dynamic processes of change that were taking place within the school during the year when my study took place. Taken together, the three main sections of this chapter provide a framework that is further developed in my analysis and discussion of findings, as appropriate to the iterative development of a qualitative study (Rudestam and Newton, 2014).

*2.1.1 The initial and ongoing review processes*

This study was designed in response to concerns about the implementation of Mindset Theory at scale in the real-world social context of schools. At the outset of my study, I completed a structured review of research literature most relevant to the proposed focus of my study to inform choice of topic and methodology. My initial search was informed by the 'Preferred Reporting Items for Systematic Reviews and Meta-analyses' process (Moher *et al*., 2009) to identify relevant high-level primary research (Cohen, Manion and Morrison, 2018), to ensure that my design built on existing empirical, school based studies (Hart, 2005).

This helped me to refine my focus and generate further questions about problematic aspects of implementing Mindset Theory in real-world social settings. My provisional question was: 'What empirical research is there that focuses on practices for developing growth Mindset in primary schools?' This helped me to develop criteria and key terms (Fink, 2014). I searched the previous period from 2012-2016 in the Education Source database. I screened titles and abstracts using exclusion and inclusion criteria and only included papers (in English) focusing on practices in primary education.

In the early stages, I collaborated with a critical friend to check my assessments for inclusion. The criteria helped to maintain the focus (Hart, 2005) and reflexive collaboration added

quality to their application (Denscombe, 2017; Seale, 2018). The final selection included six papers, which significantly informed the initial focus of my study and my methodological approach (Cohen, Manion and Morrison, 2018). This robust foundation provided a starting point for a more iterative and responsive review process (Bogdan and Biklen, 2007; Kamler and Thompson, 2014; Wisker, 2015). I then used an ongoing process of search and review (Branley, Seale and Zacharias, 2018; Bogdan and Biklen, 2007; Wisker, 2015).

Theory building through inductive research requires continued engagement with the research literature as the study unfolds and evolves (Rudestam and Newton, 2014). As my research progressed, I tracked backwards and forwards between analysis, data generation and reading (Agar, 1999; Wellington, 2015). As themes emerged during analysis, they provided a focus for continued, responsive search and review in an integrative, non-linear process appropriate for ethnographic approaches (Agar, 2004; Wellington, 2015). Based on my contextualised research question, analysis focused and informed the development of a 'specifically qualitative' literature review (Braun and Clarke, 2013, p. 312). The relationship between literature and analysis was dynamic (Agar, 2004; Braun and Clarke; 2019).

This ongoing process opened the review out to include a wider and more diverse range of materials (Denscombe 2017; Cohen, Manion and Morrison, 2018; Hammersley and Atkinson, 2019) including academic, professional and web-based documents (Hart, 2005; Wellington, 2015). I drew critically on peer reviewed journal articles, scholarly books by established authors, books based on research, professional social media posts, websites and government papers and publications. I used a reading log to support critical evaluation of the relevance and rigour of the key sources included in my review and to maintain focus (Clough and Nutbrown, 2012).

This iterative approach to literature review was designed to align to both my methodology and epistemology, allowing the study to grow organically as part of a dynamic process where theory supports the construction of meanings from empirical data (Alvesson and Sköldberg, 2018). It was challenging to report the dynamic nature of this process and to represent effectively the ways in which theorising and analysis were intertwined throughout the development of the study. In addition to new editions of established sources and conceptual shifts or emerging contradictions in newly published research, new themes crafted in my analysis also had to be accounted for and this required iterative re-writing of this literature review chapter (Branley, Seale and Zacharias, 2018).

One of the greatest challenges during my study was capturing the dynamic and non-linear process in the form of a linear report. I wanted to represent the complexity of the chronology, while maintaining clarity in communicating the relationships between the literature review and the different parts of the research for myself, participants and other readers (Agar 2004; Wisker, 2015). To manage this, I decided to make explicit, throughout the thesis, the way in which the process of my literature review was constructed and clarify its role in my methodology (Agar, 2004).

## 2.2 Literature Map Section One: Mindset Theory

This section of my review first outlines key concepts relating to Mindset Theory, critically evaluates research and literature underpinning its application and goes on to focus on research relating specifically to education. Central to the concerns that provoked my study, Mindset Theory is adopted as a key element of the theoretical framework developed during the process of my research. The focus of my overarching research question is what the characteristics are of a social model for developing growth Mindset and what processes and conditions support this in my case study primary school. This review therefore begins by evaluating and critically questioning Mindset Theory to develop understanding of the complexity of its implementation in a school setting, rather than simply accepting it as an attractive proposal. This process helped me to consider how my own beliefs about intelligence and the concerns that I might have about Mindset Theory might influence my research. In the reporting of my study, it also became important to consider how participant and reader beliefs and assumptions about intelligence and motivation might influence their reading of the research (Agar, 2004; English, 2016).

### *2.2.1 Mindset and theories of intelligence*

Mindset is a theory of motivation concerned with the beliefs that individuals hold about their intelligence, either as a predetermined and fixed trait, or as something that they can develop and that is malleable (Dweck, 2006; 2017; Dweck and Yeager, 2019). In this context, Mindset refers to the ways in which the beliefs that an individual holds about the malleability of their own intelligence impact on their learning and achievements (Dweck 2000; 2006; 2017; Dweck and Yeager, 2019). This section draws on both my initial foundational review of the literature and on my ongoing and iterative review during the research process (Wisker, 2015; Branley, Seale and Zacharias, 2018). It positions Mindset Theory in relation to incremental and entity theories of intelligence and discusses the beliefs and characteristics that are associated with different Mindsets.

This review of the body of research relating to Mindset Theory in the context of education addresses key concerns relating to the potential for misuse and misconceptions relating to its application in practice. Finally, this section draws together findings from my review of literature as a whole to identify the theoretical and methodological gaps in the current body of research that informed the development of my research question and design. This section is particularly important in informing my analysis of data in relation to the aspects of my research question that focus on teachers' understanding of intelligence and children's conceptualisation of intelligence as malleable.

The nature of intelligence is a widely contested concept, with different theoretical constructs and definitions having been developed into expansive fields of academic literature and research (Philip, 2016; Sauce and Matzel, 2018; Sternberg, 2018; 2019). For the purpose of this study, an established definition is adopted to identify intelligence as intellectual and cognitive capability 'typically defined in terms of a person's ability to adapt to the environment and to learn from experience.' (Sternberg and Kaufman, 2011, p. 504). This adaptation to environment is crucial to most theoretical constructs of human intelligence (Sternberg and Kaufman, 2011; Sternberg, 2019). Outdated conceptualisations of

intelligence as a fixed trait have progressively been countered with persuasive arguments that intelligence is a learnable trait that can be developed (Sauce and Matzel, 2018; Sternberg, 2018).

As early as the turn of the last century Alfred Binet, who introduced standardised tools for measurement of children's intelligence, countered the argument that intelligence could not be changed (Philip, 2016). In his final work (Binet, 1909, translated into English 1975), concluded that 'with practice, training and above all, method, we manage to increase our attention, our memory, our judgement and literally become more intelligent than we were before.' (Translation Binet, 1975, p. 107). He explained intelligence as something that evolves, rather than as a fixed trait, and suggested that it can be developed through training and effective pedagogical approaches (Sternberg and Kaufman, 2011; Philip, 2016). Another early theorist who made this distinction between beliefs about intelligence was Cattell (1943; 1963). He identified 'entity theorists' as considering intelligence to be a predetermined and unchangeable trait and 'incremental theorists' as considering it possible to change intelligence over time. These different conceptualisations of intelligence became known as Implicit Theories of Intelligence and underpin the development of Dweck's (2000) theory of motivation.

Mindset is a theory of motivation that focuses specifically on these Implicit Theories of Intelligence and is concerned with how an individual's conception of intelligence as a fixed or a changeable trait impacts on their behaviour as a learner (Dweck, 2000; 2006; 2017). It was initially developed in the field of social psychology as 'Implicit Self-Theories' and arose out of Dweck's early research which was concerned with behaviours associated with learner helplessness (Deiner and Dweck, 1978; 1980). Mindset Theory is a socio-cognitive model that grew out of this work and focuses specifically on the impact that Implicit Theories of Intelligence might have on learner motivation and outcomes (Dweck, 2000).

Within the model of Mindset Theory, individuals who hold incremental beliefs and consider intelligence to be a changeable, malleable trait are referred to as having 'growth' Mindset beliefs, while individuals who hold entity or 'fixed' Mindset beliefs consider that intelligence is unchangeable (Dweck, 2000; 2006; 2017). Dweck's work is also influenced by the continued evolution of Implicit Theories of Intelligence, which now acknowledge that intelligence is influenced by both predetermined, inherited factors while also being malleable. Sauce and Matzel (2018) suggest that these are not mutually exclusive influences and that a high influence of heritability does not mean that intelligence cannot also be malleable. Mindset Theory acknowledges that intelligence can be influenced by both environmental and genetic factors.

Throughout my research process, careful consideration was given to the use of terminology when discussing these Implicit Theories of Intelligence and Mindsets. I established the use of specific terms to support clarity of communication with participants in the field during my research process (Agar, 2004). These terms were informed by my ongoing review of existing literature and research. An example of this is my choice of terms used to refer to Implicit Theories during the process and reporting of my study. I decided to adopt the terms Dweck (2000; 2006; 2017) had established of 'fixed Mindset' and 'growth Mindset' to refer to beliefs and behaviours associated with 'entity' or 'incremental' theories of intelligence. I

decided to use this terminology within my study because it has become widely used in both popular and academic literature. The terms 'fixed' Mindset and 'growth' Mindset are in common usage in primary education in the UK and were used by the case study school. The use of these familiar terms was important to a study focusing on every-day practices. This was intended to facilitate opportunities to clarify meanings attributed to the terms to support clear communication with participants during the development of my study and with the audience of this thesis (Agar, 2004). I continued to evaluate the use and intended meanings of these terms, by myself and by participants, during the study and my analysis.

Another important decision about the use of terminology in my study was provoked by the sometimes interchangeable use of the terms 'intelligence' and 'ability' by practitioners. This was also evident in some of the research and academic literature reviewed. While Dweck's work extends to consider other personal characteristics, and some papers include the term 'ability' (Dweck, 2006; 2017; Yeager and Dweck, 2012), the central focus of my study was specifically intellectual and cognitive capability. To maintain and clarify this focus I therefore chose to refer to this as 'intelligence' rather than including the term 'ability'. This is not to suggest that intelligence is not related to wide ranging concepts of achievement or capability, and this relationship is explored in more detail in the Literature Review, Findings and Analysis and Discussion chapters of this thesis.

The decision made around this use of the terms 'intelligence' and 'ability' in my study also took into consideration possible confusion that different interpretation and common usage of the term 'ability' might generate. For example, concern is expressed in some academic literature that the use of the term 'ability' to describe grouping by prior assessed attainment in educational contexts could lead to a conflation of the concepts of 'ability' and educational attainment within the established and prescribed curriculum (Marks, 2013; Francis *et al*. 2017). These concerns extend to the suggestion that this might then support a discourse justifying inequality as an inevitable or natural outcome in education. To emphasise these concerns about the problems associated with the legitimacy of the concept and the use of the term 'ability', it is only used in my thesis when unpicking these debates and it is presented in quotation marks.

*2.2.2 Introducing Mindset and the beliefs and characteristics of individuals*

This section initially provides a very brief overview of some of the key concepts and claims from existing research associated with Mindset Theory. This is to provide a foundational, contextual introduction to the existing claims made in relation to this theory, which are related to my research questions and are critically evaluated in much greater detail as this chapter develops. Research in the field of motivation and Mindset Theory suggests that individuals can hold a combination of growth and fixed beliefs about their intelligence in different proportions (Dweck, 2006; 2017; Beatson, Berg and Smith, 2019).

Individuals with predominantly growth Mindset beliefs are characterised as enjoying challenges, striving to learn and consistently seeing their own potential to develop new skills (Good, Aronson and Izlicht, 2003; Claro, Paunesku and Dweck, 2016). Research suggests that these individuals may consider failure as beneficial to learning, see challenges as opportunities and place greater value on the learning process than on performance

(Blackwell, Trzesniewski and Dweck, 2007). They are also reported as responding to setbacks with achievement behaviours, adopting new strategies and seeking solutions with mastery-orientated responses to challenge (Deiner and Dweck, 1978; Burnette *et al*., 2013; Gunderson *et al*., 2013; Hochanadel and Finamore, 2015). In contrast, individuals who hold predominantly fixed Mindset beliefs are identified as perceiving challenges as tests that are intended to expose a lack in their capacity to achieve outcomes. When encountering a setback, mistake or failure these individuals are more inclined to opt for helpless behaviours; these may include avoidance, cheating or setting low expectations and goals that are designed to evidence attainment but require little effort (Mueller and Dweck, 1998; Blackwell, Trzesniewski and Dweck, 2007; Gunderson *et al*., 2013).

Mindset Theory specifically focuses on how goal setting is influenced by beliefs about intelligence and plays an important role in motivation and development of learner characteristics that may impact on educational outcomes (Grant and Dweck, 2003; Wang, Liu and Chye, 2010; Senko, Hulleman and Harackiewicz, 2011). Educational research concerned with motivation has focused for many years on the different types of goals that learners set for themselves (Pintrich and Schunk, 2002; Senko, Hellerman and Harakiewicz, 2011; Dinger *et al*., 2013; Dickhäuser *et al*., 2016; Senko and Dawson, 2017; Urdan and Kaplan, 2020). The type of goals set by individuals are thought to be determined by the outcome that they are aiming for; whether they aim to be seen to perform well in an exam or test or to develop new skills and knowledge (Senko, Hulleman and Harackiewicz, 2011). This research suggests that, given a choice of task, a learner who wants to be seen to perform well might select a familiar and easy task to ensure a high score, setting themselves a 'performance goal'. Given the same choice of task, a learner who wants to develop new skills and knowledge may choose a less familiar or more challenging task and focus on the things that they might learn from the experience (Dinger *et al*., 2013; Dickhäuser *et al*., 2016).

The body of research in relation to Implicit Self-Theories and Mindset Theory suggests that, if an individual holds predominantly growth Mindset beliefs, it may lead them to set mastery-approach goals (Dweck, 2000; 2006; 2017). If they have predominantly fixed Mindset beliefs they may be more inclined to set performance goals to validate their intelligence (Dweck and Leggett, 1988; Stevenson and Lochbaum, 2008; Haimovitz, Wormington and Corpus, 2011). These are goals that focus on either mastering learning processes to improve learning or on providing evidence of their comparative attainment and out-performing others. The terms 'performance goal' and 'mastery-approach goal' are used respectively throughout my study when referring to these different goals that are either designed to evidence performance or to increase progress and goals (Dweck and Leggett, 1988; Blackwell, Trzesniewski and Dweck, 2007; Stevenson and Lochbaum, 2008; Haimovitz, Wormington and Corpus, 2011). However, it is important to note that in Dweck's model of Mindset Theory it is suggested that goals have an indirect influence with deep cognitive engagement and expending effort as key mediating factors (Dupeyrat and Mariné, 2005).

Identifying this role of goal orientation as a key influencing factor on cognitive engagement, expending effort and learner outcomes, makes it the focus of much of the research about Mindset Theory and Implicit Theories of Intelligence in academic contexts (Dupeyrat and Mariné, 2005; Sevincer, Cluge and Oettingen, 2014; Haimovitz and Dweck, 2017; Costa and

Faria, 2018). Through systematic meta-analytic review, Costa and Faria (2018) investigated the relationship between Implicit Theories of Intelligence and academic achievement. Studies were included across a wide school and university educational age range, using quantitative measures to report academic outcomes and Implicit Theories of Intelligence. Pearson's correlation coefficient (r) was utilized to ascertain effect sizes across the 46 studies included in the review. Analysis identified a significant but low-to-moderate association between Implicit Theories of Intelligence and academic achievement. While results confirmed findings from other literature that suggested incremental beliefs about intelligence would have a significant and positive effect on academic outcomes (Burnette *et al*., 2013), surprisingly, some studies also reported a positive association between entity beliefs and outcomes. These studies were predominantly in the context of verbal language learning programmes or quantitative subjects such as statistics or mathematics suggesting that the possible positive influence of entity beliefs may be domain specific.

While her self-reporting assessment tool for Mindsets focuses on beliefs about general intelligence, domain specific beliefs about intelligence have become the focus of many studies relating to Mindset Theory (Dweck, 2006; 2017; Boaler, 2013; Park *et al*., 2016). Since the inception of my study, these domain specific studies of Mindsets have become a growing area of interest in the international academic and research literature (Boaler, 2016; Andersen and Nielsen, 2016; Boaler *et al*. 2018; Schrodt *et al*., 2019). For example, Park *et al.* (2016) investigated beliefs about intelligence in an empirical, school based study that particularly focused on Mindsets in the subject of Mathematics and the cues that are specific to this subject domain. Their findings suggest that even in early education in primary settings, the instructional practices that teachers self-reported in mathematics and teacher goal orientation were linked to children's motivational framework development and achievement outcomes.

In another domain specific study, Beatson, Berg and Smith (2019) suggest that in some areas of study it may be beliefs about intelligence as a fixed entity that are an advantage and that lead to positive outcomes. This empirical study is small in scale and focuses on the outcomes of just one first year cohort of University accounting students, it raises interesting questions about negative assumptions that may be associated with fixed Mindset beliefs and challenges the general discourse that these beliefs about intelligence are a disadvantage. Their findings point to confidence and positive outcomes for the students identifying themselves as having fixed beliefs about intelligence. However, as with many other studies reviewed, sustained impact was not part of the design and it is therefore not possible to determine whether there might be longer-term advantage and sustained positive outcomes.

The wide variation in scale, methodology and approach to analysis in these domain specific studies provides a range of information relating to the theme, while also provoking further questions about how the detail of each study could inform my decision-making processes and analysis. Dupeyrat and Mariné (2005) had previously argued that the indirect mediation of deep cognitive engagement and expending effort suggested in Mindset Theory is investigated best using causal modeling. They point to the way in which this is illustrated in Greene and Miller's (1996) study, where correlational analyses suggested achievement and mastery-goal orientation were not related, however path analysis identified an indirect

influence, with deep-processing strategies mediating this relationship. This highlighted the importance that the suitability of the approach to analysis may have on the reporting of findings in meta-review and that this is just one area that can be problematic when using meta-analytic review to inform pedagogical decision-making in educational settings.

The complexity and differences between real-world school settings and the variety in details of specific interventions make the use of randomised control trials and the conflation of outcomes in meta-review troublesome in educational contexts. These factors made it important for me to consider the overall findings and effect sizes when reading reports, but also to examine the detail of the individual interventions, cultural contexts, methodological approaches and the variation in individual study effect sizes when using larger scale quantitative reviews such as these to inform my study.

In Mindset Theory it is suggested that in the face of challenges or setbacks it is goal orientation and levels of cognitive engagement and expended effort that are the mediating factors between an individual's Mindset beliefs and their resulting achievements (Dweck, 2006; 2017; Stevenson and Lochbaum, 2008; Haimovitz, Wormington and Corpus, 2011). In both the wider research literature and the literature relating specifically to Mindset Theory, it is suggested that learners who set mastery-approach goals are also identified as being more likely to report self-regulatory behaviours in their learning (Dweck and Leggett, 1988; Pintrich, 2000; Schunk, 2005; Molden and Dweck, 2006; Burnette *et al*., 2013). For the purpose of this study, self-regulation is defined as activating metacognitive knowledge and skill in combination with self-efficacy and personal agency (Zimmerman, Schunk and DiBenedetto, 2015). Self-regulation allows individuals to turn their metacognitive thinking processes into practical strategies for the management and control of cognitive, social and emotional aspects of learning (Veenman and Elshout, 1999; Efklides and Vlachopoulos, 2012).

The relationship between mastery-approach goals and successful learner outcomes has been well established in the research literature over time. However, a recent meta-analysis has questioned this relationship (Hulleman *et al*., 2010) and in a review of achievement goal measures it is reported that researchers use the same term across different studies to define conceptually different ideas that have different outcomes. They found that the use of goal-relevant language was important to the outcomes for learners setting mastery-approach goals: however, goals with and without this language were bracketed under the same label of 'mastery goals'. They suggest that a misleading discrepancy caused by conflating these different types of goals by using a blanket label prevents useful research synthesis in this area or the effective development and application of theory.

In a recent comprehensive narrative review drawing on research literature from the last three decades, Urdan and Kaplan (2020) provide a detailed overview of the development of achievement goal theory, highlighting the disparity of views within the field and some of the contradictory research findings. Their paper points to the importance of developing future research in sociocultural, real-world contexts, while the contentions they highlight surrounding the impact of more specific types of goal setting on learner outcomes suggest the need for further investigation of the relationship between Mindsets and the role that goal setting, cognitive engagement and expending effort have on achievement.

While the orientation of goal setting is central to Mindset Theory, wider research in the field of motivation has called into question ideas previously accepted about the role that different types of goals play in successful learner outcomes (Bråten and Strømsø, 2004; Senko, Hulleman and Harackiewicz, 2011). This research suggests that performance goals that focus on outperforming peers may have a positive effect on educational outcomes. While Mindset Theory suggests the mediating influence of two goal orientations, this wider research has suggested for some time the need for a finer gradation to distinguish differences in types of performance goal orientation (Church, Elliot and Gable, 2001; Bråten and Strømsø, 2004; Senko, Hulleman and Harackiewicz, 2011).

Bråten and Strømsø's (2004) empirical research findings point to a difference in outcomes for learners who set high performance goals, with the aim of outperforming others, and those who intentionally set low performance goals to avoid failure. These different types of performance goal are referred to in the wider literature as 'performance-approach goals' and performance avoidance goals' respectively (Church, Elliot and Gable, 2001; Senko, Hulleman and Harackiewicz, 2011). Further research in this area has reinforced this debate about the need for differentiation in relation to performance goals that individuals set (Dinger *et al*., 2013).

Dinger *et al*.'s (2013) study investigated the relationship that self-perception, achievement motives and Implicit Theories of Intelligence have with achievement goals, intrinsic motivation and academic achievement. They surveyed 524 high school students using self-report of motivational characteristics and made an analysis of the relationship with their grade point average using structural equation modeling. Their research findings suggested that holding an incremental theory of intelligence may lead to a higher prevalence of mastery-approach goal setting and a lower prevalence specifically of performance avoidance goals. While this was a high school sample, their findings became relevant to my study, pointing to the importance of investigating the relationship between Implicit Theories of Intelligence, Mindset Theory and different forms of performance-goal setting in the primary school context.

The body of research concerning Mindset, motivation and the characteristics of individuals is continuing to grow and it is now international. However, it is important to note that while there are studies of practice from England, both my initial literature review and the ongoing process of reading and reflecting highlighted the predominance of research literature from North America. This review process revealed that Dweck and her associates had been involved with the conduct a profuse amount of the existing published research in this area. The proliferation of their research provided me with a substantial foundation of work to draw on, but also provoked questions about potential for collaborations to lead to experimenter confirmation bias influencing outcomes. While there are a growing number of studies conducted by other researchers, the evidence base within the UK was still not strong (Rienzo, Rolfe and Wilkinson, 2015). My study therefore aimed to contribute to the growing body of knowledge concerned with the application of Mindset Theory in the cultural context of the UK education system and the context of the UK researcher with perhaps more objective distance from investment in Mindset Theory.

*2.2.3 Mindset in education*

Mindset has more recently become a focus of research in the field of education, where growth Mindset beliefs and associated learner characteristics are being positively related to student achievement in school and college settings (Good, Aronson and Inzlicht, 2003; Blackwell, Trzesniewski and Dweck, 2007; Claro, Paunesku and Dweck, 2016; Warren *et al*., 2019). One of my concerns about this translation into the context of education was that some of the earlier work on Mindset Theory was not done in education settings. In one early, pivotal piece of school-based research, Blackwell, Trzesniewski and Dweck (2007) drew attention to the relationship between Mindsets and student achievement. Their report consisted of two studies that focused on attainment in mathematics, student motivation and Mindsets.

In the first study, over 350 seventh grade students in an American high school were surveyed using multiple Likert scale self-report measures of motivation and Mindset. While this survey method of ascertaining fixed and growth Mindset beliefs through self-report arguably has limitations compared with observations of students at work in classrooms, it does usefully allow a large sample of learners (Speer, 2005; Kamiya, 2016). Following this assessment, the seventh graders' mathematical attainment was monitored over two years and findings suggested that students who believed that intelligence was malleable associated expending effort and hard work with successful outcomes. Conversely, students who believed that intelligence was fixed were found to give up more easily and avoid challenge. Those students who self-reported beliefs that were consistent with growth Mindset were found to outperform those who reported their beliefs as consistent with fixed Mindset. This study attracted attention to the possible value of interventions in education settings that might influence beliefs about intelligence and goal setting orientation for better student outcomes.

In their second school-based study, Blackwell, Trzesniewski and Dweck (2007) investigated the hypothesis that if students were taught about intelligence as malleable it might impact on motivation and attainment. An experimental group received Mindset focused study skills sessions for eight weeks and a control group had study skills without Mindset. While students in both groups had started the study with decreasing mathematical attainment, the group receiving teaching that involved learning about principles of Mindset Theory significantly improved in their outcomes in comparison with the control group. However, this second study was shorter; it lasted for only one term and sustained impact was not assessed so it was not possible to draw any conclusions about longer-term impact of the intervention. As with their first study, self-report surveys were used which may have been vulnerable to conscious or unconscious bias due to social desirability (Alvesson and Sköldberg , 2018), which could be thought to challenge the trustworthiness of the research findings.

In another larger-scale school based study, over 1,500 students from fifteen schools embarked on another approach to learning about Mindset (Paunesku *et al.*, 2015). Instead of face-to-face teaching, the students received a 45 minute online programme teaching them about Mindset Theory. While this study also had a positive impact on attainment with an increase of 6.4% of students achieving expectations in core subjects, as with many other

studies of Mindset Theory, it was based on self-report, with the possible risk of bias through the influence of socially desirable responses (Pajares, 1992; Speer, 2005; Kamiya, 2016). Dweck's self-reporting survey (2000; 2006; 2017) is often still adapted in this way for use in more recent studies, without acknowledging that it was originally developed over twenty years ago.

At that time of earlier studies in this field, awareness of Implicit Theories of Intelligence was much less prevalent. Wider general knowledge of these theories today might lead to a change in the way research participants would respond and could raise concern about conscious and unconscious social and ideological bias that could lead to a lack of accuracy of survey findings (Alvesson and Sköldberg, 2018). While Paunesku *et al*. (2015) did demonstrate how a short-term intervention might effectively be delivered across a number of schools without great expense, as with earlier studies, it failed to monitor sustained impact. While, as with Blackwell, Trzesniewski and Dweck's (2007) work, it was not possible to ascertain longer-term impact from Paunesku *et al*.'s (2015) study, together these studies helped to pave the way for a growing body of research about Mindset interventions based in schools.

My initial literature review had focused very specifically on international studies conducted in primary school settings to inform my initial decision-making processes (Wisker, 2015; Branley, Seale and Zacharias, 2018). Inclusion and exclusion criteria were established and applied to focus on empirical studies in real-world school settings (Fink, 2014). The final selection included American (Park *et al*., 2016), Romanian (Laurian-Fitzgerald and Roman, 2016), Danish (Andersen and Nielsen, 2016) and UK based studies (Rienzo, Rolfe and Wilkinson, 2015; Fraser, 2018; Seaton, 2018). One of these UK based studies included data from a secondary school, but with the focus for the purpose of this selection being on their primary feeder schools (Seaton, 2018). Andersen and Nielsen's (2016) randomized control trial from Denmark reported only quantitative data. Other multimethod designs combined individual teacher interview with focus groups and incorporated the use of surveys and artefacts (Rienzo, Rolfe and Wilkinson, 2015; Laurian-Fitzgerald and Roman, 2016; Fraser, 2018; Seaton, 2018).

Only one of the studies in my initial review process pointed to the development of an embedded, whole-school approach to the development of teaching practices. The others focused on specific interventions, such as providing parents with a scaffold for praise that focuses on effort in reading (Andersen and Nielsen, 2016) or staff training to become 'Mindset Champions' (Seaton, 2018). The development of this selection, including the process of evaluating papers that were excluded, not only informed my understanding of relevant recent research outcomes but also informed my decision-making in terms of the use of a multi-method single case study research designed to investigate an embedded, whole-school approach. This selection also formed the foundation for the development of a critical reading log that grew throughout the research process.

My ongoing literature review included a wide range of sources including theoretical texts, meta-analysis and reviews relating to Mindset Theory in educational environments and wider contexts. A proliferation of research about Mindset Theory has made it the subject of larger scale mixed-methods studies, systematic review and meta-analysis (Reynolds and

Birdwell, 2015; Claro, Paunesku and Dweck, 2016; Sarrasin *et al*., 2018; Sisk *et al*., 2018). In a review of qualitative and quantitative studies, the independent educational charity Demos, explored the impact of Mindset interventions in the UK (Reynolds and Birdwell, 2015). In this 'Mind over Matter Report' the correlation between successful outcomes and growth Mindset orientation is well established and strong. These findings do not align with those of The Education Endowment Foundation (EEF), which funded one of the few UK based studies identified in my initial review of the literature (Rienzo, Rolfe and Wilkinson, 2015). The EEF is an independent, UK based grant-making charity that aims to eliminate the correlation between poverty and educational achievement. In their study, Rienzo, Rolfe and Wilkinson (2015) researched Mindset interventions across thirty-six schools in the UK. Unlike previous American studies and the 'Mind Over Matter' report (Reynolds and Birdwell, 2015), findings suggested little impact of Mindset interventions on the academic attainment.

The interventions in this EEF study (Rienzo, Rolfe and Wilkinson, 2015) involved the training of undergraduate students to deliver a six-week programme of Mindset workshops to children in Year 5, aged 9-10. Teachers whose children were in the intervention group also attended two half-day sessions of training on the implementation of Mindset Theory in the classroom. While two months additional progression suggested some very small improvement in mathematics, the effect size in English suggested that learning gains were even lower and were not statistically significant. This was low enough to suggest that the children's progression could have just been the result of chance. While the overall effect size of the interventions was identified as low positive, as with other studies, it did demonstrate higher effect sizes for students in lower socio-economic groupings. Pre- and post-intervention measures suggested that achievement gains were closer to a significant difference for children in lower-socioeconomic groupings than for their peers.

These findings were consistent with other international research, including a study conducted by Claro, Paunesku and Dweck (2016) in Chile. Their analysis suggested that Mindset is a reliable predictor of outcomes with a national sample of students. This study involved almost all schools across the diverse socio-economic strata in Chile. Rather than investigating the effects of an intervention, this study considered the relationship between Mindset and family income. Analysis revealed that the relationship between Mindset and achievement was strong across all socio-economic groupings. It also suggested that while students for families with lower socio-economic status were less likely to have a growth Mindset orientation, if they did they achieved substantially higher attainment than expected. As with Rienzo, Rolfe and Wilkinson's (2015) study, this suggests that the effects of economic disadvantage on poverty might be ameliorated and the attainment gap reduced, by growth Mindset orientation for those in lower socio-economic groupings. This pointed to the potential that pedagogies underpinned by Mindset Theory might have, not in place of other interventions, but as part of a wider drive to counter social disadvantage and inequalities.

During my ongoing literature review, two other recent meta-analyses investigated first the relationship between Mindset and achievement and then the relationship between deliberative Mindset interventions and achievement (Sisk *et al.*, 2018). As with the other studies included in this review (Rienzo, Rolfe and Wilkinson, 2015; Claro, Paunesku and Dweck, 2016), both of these meta-analyses reported the pattern of weak overall effects.

However, while they did not identify a statistically significant relationship between achievement gains and Mindset, they did reveal that educational interventions underpinned by Mindset Theory had greater gains for children from families with low socio-economic status.

Sarrasin *et al.* (2018) also conducted a meta-analysis that investigated the relationship between Mindset, motivation, achievement and brain activity. Their analysis included ten peer-reviewed studies where interventions incorporated the explicit teaching of neuroplasticity. They found that there was inconsistency in results with little justification given for these differences in findings. Again, this study suggested low positive effect overall on motivation, achievement or brain activity but that these interventions may be more beneficial for those students at risk of underachievement with an effect size for these students of .78 in mathematics. It was concluded that the inconsistency might be explained by differences in subject area focus of the studies or variables in other student characteristics.

In an education investigation that specifically focused on the role of standardised assessment tools in the generation of achievement gaps, Good, Aronson and Inzlicht (2003) worked with adolescent, low income, minority and female students. While their findings did support their concern about standardised testing and following their Mindset intervention students' test scores were increased, there was no control for participant ethnicity. This prevented comparison between minority groupings in the analysis. Only administering the test after the intervention prevented them from establishing whether any of the groups within the sample were already outperforming each other prior to the intervention.

Other recent studies have also suggested positive effects in the implementation of Mindset interventions (Paunesku *et al*., 2015; Rienzo, Rolfe and Wilkinson, 2015; Schmidt, Shumow and Kackar-Cam, 2015; Claro, Paunesku and Dweck, 2016) for disadvantaged and underachieving groups of students. Together this body of research suggests that introducing Mindset interventions may have low positive impact overall, but particularly points to the possibility that such interventions may have more positive outcomes for children from disadvantaged groupings. These claims that Mindset interventions might more substantially improve outcomes for specific groups to reduce the attainment gap, are particularly important in the current context in the UK where this lack of equity is a contentious and continuing challenge for education (The Centre for Social Justice, 2015; EEF, 2017).

Based on this body of research it is reasonable to conclude that there may be a relationship between the influence that an individual's beliefs about intelligence as malleable has on their goal setting orientation and achievement, and that these beliefs and goal setting approaches can purposefully be developed in school settings. An increasing number of schools are therefore attempting to adopt pedagogies that support the development of growth Mindset for individual learners. It must be noted however, that these have been predominantly experimental research studies that deal with the usual challenges of complexity, including fidelity of intervention and matching of samples across different schools. Concern is also expressed that existing self-reporting assessments for Mindsets that are used in research are not appropriate to evaluation that supports progress in applied settings (Yeager *et al*., 2013). This suggests the need for the development of practical

classroom tools that teachers can use to structure observation and reflection that inform the development of Mindsets.

*2.2.4 Change, intervention and influences on Mindsets*

Importantly, research suggests that an individual's Mindset can be changed by experiences or interactions with others and their environment (Dweck, 2008). This is particularly relevant to my investigation of pedagogical practices designed to develop children's beliefs about intelligence as malleable in a real-world social context. Interventions targeting beliefs have been shown to change behaviours, including the development of mastery-approach goal orientation (Good, Aronson and Inzlicht, 2003; Dweck, 2006; 2017; Blackwell, Trzesniewski and Dweck, 2007; Gunderson *et al*., 2013; Paunesku *et al*., 2015; Yeager *et al*., 2016). Existing research indicates that individuals setting mastery-approach goals may become more active regulators of their own learning processes, informing strategy and allowing them to adjust or change their learning approach (Garner, 2009; Zimmerman, Schunk and DiBenedetto, 2015). These possibilities for changing Mindsets are important to the focus of my study, in which teachers are developing a pedagogical approach designed to develop and sustain children's beliefs about the malleability of their intelligence and influence learner characteristics and behaviours.

Approaches taken with many established school based interventions for the development of an individual's growth Mindset build on the designs of the early intervention programmes (Blackwell, Trzesniewski and Dweck, 2007; Paunesku *et al*., 2015) and follow a simple pattern. They include teaching about physical scientific processes in relation to neuroplasticity, the malleability of the brain, learning and making mistakes (Moser *et al*., 2011; Ng, 2018). This is then followed by opportunities for learners to reflect on and apply this knowledge to their own context (Dweck and Yeager, 2019). These short term interventions are variously delivered through face-to-face workshops or online programmes (Blackwell, Trzesniewski and Dweck, 2007; Paunesku *et al*., 2015; Yeager *et al*., 2016; Dweck and Yeager, 2019). This direct and explicit teaching of growth Mindset has been demonstrated in previous research to improve achievement and outcomes for individuals (Aronson, Fried and Good, 2002; Good, Aronson and Inzlicht, 2003; Blackwell, Trzesniewski and Dweck, 2007; Paunesku *et al*., 2015; Yeager *et al*. 2016). This literature was particularly relevant to the focus in my research question on how teachers strive to develop children's conception of intelligence as malleable.

While the body of research includes evidence of many Mindset interventions that develop children's understanding of intelligence as malleable, the focus of much of this research is predominantly on short term, experimental studies (Hochanadel and Finamore, 2015) many of which are in secondary school contexts (Donohoe, Topping and Hannah, 2012). There is less evidence of how these approaches are mobilized in primary school contexts, and where there is evidence in this area it again focuses on short term interventions rather than how approaches can be embedded in every-day pedagogical practices. While a variety of intervention approaches have been demonstrated to be effective, research fails to provide many detailed examples of sustained practices embedded in every-day teaching activity in primary schools. My study therefore aimed to contribute to this discourse and to the

emerging body of research focusing on every-day practices to understand sustained practical approaches for the development of Mindsets in primary school settings.

Existing research about change suggests that interactions relating to success, and particularly the type of praise that children are given, may influence the development of their Mindsets (Haimovitz and Dweck, 2016). An extensive body of research suggests that when children receive praise for learning processes, they understand intelligence as something that can be developed and show greater perseverance with the task (Elliott and Dweck, 1988; Mueller and Dweck, 1998; Cimpian *et al*., 2007; Henderlong Corpus and Lepper, 2007; Zentall and Morris, 2010; Skipper and Douglas, 2012; Brummelman *et al.* 2014a).

In Seaton's (2018) UK based empirical study using mixed-methods, the importance of changing the use of language by both children and teachers was highlighted in promoting perseverance. In this study 37 teachers from a secondary school and five of its feeder primary schools participated in shared, sustained professional development and became what they termed 'Mindset Champions'. This led to changes in self-reported Mindsets for both teachers and children, which was maintained when reviewed after three months. Other research also indicates that when given 'person' focused praise for their intelligence in response to success (Henderlong Corpus and Lepper, 2007), expressions such as 'you are a very clever girl', may lead children to understand intelligence as being something that is fixed and inferred from performance. These studies suggest that choice of language and expression may play an important role in influencing how praise is interpreted and the potential influence this may have on changing an individual's Mindset.

It is also suggested in the body of research about Mindset Theory that if children receive praise for a specific practical process they have used, it helps them to understand what to do when learning becomes difficult (Sun, 2015). Praising learning processes, such as applying effort to a task, provides cues for improvement and helps children to adopt strategies to support achievement. However, long established research also cautions against teachers praising effort if it is meaningless and the child needs to use a different strategy (Henderlong and Lepper, 2002). Concerns are also expressed about how teachers giving over-inflated praise (Brummelman *et al*., 2014b), platitudes intended to provide comfort (Rattan, Good and Dweck, 2012) or extrinsic rewards, may have an undermining effect on children's perceptions of expending effort as useful (Deci, Koestner and Ryan, 2001). This research points to the powerful influence that praise has on children's perceptions, while also highlighting the potential for the damage that an inappropriate use of praise might have. This suggested the importance of focusing on the accuracy, detailed understanding and careful interpretation of theory when implementing pedagogical approaches in my study.

In my initial search of the literature, two studies from real-world primary school settings particularly focused on the influence on developing children's Mindsets of teachers giving praise for learning processes, rather than for 'ability' (Rienzo, Rolfe and Wilkinson, 2015; Andersen and Nielsen, 2016). In one of these studies a randomized control trial with children in second grade from across seventy-two classrooms, Andersen and Nielsen (2016) identified ways in which parents can be involved in the use of praise for children making effort. The study involved the parents in a daily reading programme for three months and measured the progress of children's reading scores as a measure of attainment in the

evaluation of a growth Mindset reading intervention. The findings pointed to the value of teaching parents about focusing on expending effort and of providing them with a scaffold to support the process.

In their study, Andersen and Nielsen (2016) reported quantitative measures showing two months progress for the study's experimental group over the control group. However, this had diminished to one month of progress after seven months, suggesting the importance of developing sustained and embedded practice over short-term interventions. A further study focusing on praise, published during the process of my study, involved children in focus groups and interviews to provide rich qualitative data with their comments illustrating interpretation (Seaton, 2018). The multimethod approach of this study, involving children's voices as well as those of teachers, provided more detailed and nuanced information about the implementation and impact of interventions and informed my choice of a multi method approach (3.3.1).

In other recent research, adults' reactions to failure are also identified as influencing the development of children's Mindsets (Haimovitz and Dweck, 2017). Beliefs about the malleability of intelligence are thought to provoke different responses to critical feedback and failure. Established research literature suggests that an individual with a predominantly growth Mindset will use critical feedback as an opportunity to learn, while an individual with a predominantly fixed Mindset may view it as invalid, or avoid situations where it might occur (Burnette *et al*., 2013). It is reported that the way in which teacher feedback is given can imply that learning goals are shared between the child and the teacher and that they are working together to achieve them (Hooper, 2016 cited in Haimovitz and Dweck, 2017). This primary research focusing on feedback in a real-world setting suggests that when this responsibility for the learning goal is seen to be shared with the teacher, children are less likely to attribute any lack of success to their own lack of intelligence. They are then more willing to examine the problem again, with a view to solving it together.

Another recent school based study in America, conducted by one of Dweck's students, also focused on feedback and suggests that providing feedback on learning processes with an evaluation of movement towards achieving learning goals particularly supports development of growth Mindset (Sun, 2015). This suggests that it is not simply putting an emphasis on expending effort as a learning process, but the importance of children explicitly understanding the relationship between the learning process and successful outcomes in their own work. This study also placed emphasis on the value of children explaining learning processes during a task, regardless of whether the outcome is successful, to evaluate both effective and ineffective processes.

Within Mindset Theory, failure and mistakes are advocated as a learning opportunity (Dweck, 2006; 2017). In my initial literature review process, an empirical school based study was identified as contributing to the development of this thinking about the role of failure and making mistakes. Fraser (2018) conducted an evaluation of a school-based study embedding growth Mindset principles in practice that draws attention to the need for teachers to actively support children in this process. Focus groups provided evidence of children making positive use of mistakes, however the research also identified that some

children still felt frustration and found making mistakes difficult; triggering responses characteristic of holding fixed Mindset beliefs.

Other studies had previously reporting in this area had assumed a relationship between adult's beliefs about the malleability of intelligence and their children's beliefs (Haimovitz and Dweck, 2017; Dweck and Yeager, 2019). However, a number of recent, key studies have not identified this as a significant relationship (Gunderson *et al*., 2013; Sun, 2015; Haimovitz and Dweck, 2016; Park *et al*., 2016). Instead, recent research with parents and teachers in North America suggests that it is an adult's belief about whether failure is motivating and their consequent responses to failure, that are mediating influences and an important predictor of their children's Mindsets (Haimovitz and Dweck, 2016; Park *et al*., 2016).

Fixed Mindset beliefs are thought to be influenced, or 'triggered', by specific stimuli that are personal to the individual. This literature became particularly relevant to my analysis and the focus in my research question on how children relate their understanding of intelligence to their every-day experiences. It is suggested that if learners can identify them they can then be purposefully countered to create opportunities for the development of growth Mindset beliefs (Dweck, 2006; 2017). This research suggests that when children identify what triggers responses associated with fixed Mindset beliefs they can build strategies to manage and change their behaviours. These triggers can occur when learners experience disagreement, conflict, challenges that involve empathy, feelings of exclusion, criticism, comparison with others or feel threatened (Dweck, 2006; 2017; Murphy and Dweck, 2010; Yeager and Dweck, 2012). Challenge, difficulty and failure are identified in the literature as being possible 'triggers' for an individual's fixed or growth Mindset. These triggers may lead an individual with a predominantly fixed Mindset to use avoidance or give up easily in the face of a setback (Rhodewalt, 1994; Hong *et al*., 1999; Blackwell Trzesniewski and Dweck, 2007; Haimovitz, Wormington and Corpus, 2011).

Recent research suggests that responses to stimuli that trigger Mindset beliefs can also be ameliorated by teacher explanations of the value of setbacks and mistakes in learning; seeing setbacks, hard work and the challenge of emotions as part of a meaningful learning process (Sun, 2015; Hooper, 2016, cited in Haimovitz and Dweck, 2017). Recent research also suggests that teachers may be able to provide cues to help strengthen learner understanding of these beliefs through teacher modelling of responses to difficulty and setbacks (Haimovitz and Dweck, 2017). This cueing process aligns to ideas in wider research relating to skills acquisition, where meta-analysis suggests high effects of teaching strategies providing opportunities for learners to observe expert skills in social modelling (Hattie and Yates, 2014). This modelling is sometimes referred as the 'principle of ostension' (Hattie and Yates, 2014, p. 73), where teachers demonstrate and highlight aspects of good examples and incorporate explicit recall, analysis and interpretation of examples.

*2.2.5 Mindset misuse and misconceptions*

For sustainable scaling up of Mindset across a school, it is suggested that ongoing every-day experiences that reinforce growth Mindset should be established (Yeager *et al*., 2013). However, concern is expressed that scaling up from implementation for the individual to implementation by a team may not be straightforward and that there is a risk that the essential psychological messages underpinning practices may be lost in the complexity of the process (Yeager *et al*., 2013; Rienzo, Rolfe and Wilkinson, 2015). A lack of understanding of the underpinning principles of the approach can lead to misinterpretation of the theory and misuse, known as false growth Mindset, where an individual may mistakenly purport to use practices that develop growth Mindset (Dweck, 2006; 2017; Yeager *et al*., 2013; Dweck and Yeager, 2019). False growth is suggested to not only limit teachers' capacity to help children to develop their understanding of intelligence as malleable; it may instil fixed beliefs about intelligence. This study therefore also investigates how a school can minimize the risk of false growth Mindset in a collective context and contributes to understanding of avoiding misuse and misinterpretation in shared practices.

Oversimplification in professional learning contexts, in combination with ill-informed reports in the media and social media, have led to the development of some worrying misconceptions in relation to Mindset Theory. Inferences that engagement with the approach can replicate the successes of Albert Einstein and Michael Jordan in any individual may, at best, lead to valid scepticism within the education community (Chivers, 2017) and, at worst, lead to the development of ill-informed practices and the development of false growth Mindset. Mindset Theory actually suggests that growth Mindset is an underpinning belief that develops an individual's motivational framework to focus on competence improvement and that incrementally impacts upon their learning and achievement (Dupeyrat and Mariné, 2005). Mindset Theory does not suggest that individuals with a predominantly growth Mindset have the same intelligence across all areas of learning, or that they will always find learning easy or enjoyable (Blackwell, Trzesniewski and Dweck, 2007). These are common misconceptions and there is an emerging body of research literature regarding domain specific Mindsets, which adds to the growing debate relating to the subject and context specificity of such beliefs (Chen and Usher, 2013; Boaler, 2016; Park *et al*., 2016; Boaler *et al*., 2018; Boyd and Ash, 2018).

Common misinterpretation and misuse is sometimes the result of confusing or conflating Mindset Theory with other beliefs about personal competence. It is sometimes mistaken for positivity, being open-minded or simply interpreted as an 'I can' culture of affirmations (Dweck, 2006; 2017). The prevalence of common oversimplification, such as advising that teachers should just 'praise effort' or 'add yet' to the end of a statement to encourage growth Mindset, is identified in research literature as leading to the possible development of false growth Mindset (Dweck and Yeager, 2019). In some research literature, the link between the focus of an intervention and Mindset Theory is difficult to attribute, particularly in studies where Mindset beliefs are not the only focus of the intervention. For example, from my initial review of literature, one of the studies also focused on positive role models from the local community and employability (Rienzo, Rolfe and Wilkinson, 2015). This combining of approaches makes it challenging to identify which element had particular

influence. To combat this difficulty control groups were introduced, however this then made it hard to extrapolate the effect of the intervention from teacher effect.

In other studies included in my initial review of literature, the development of beliefs about intelligence were combined with the introduction of specific approaches for teaching English (Andersen and Nielsen, 2016) and the development of cooperative learning processes (Laurian-Fitzgerald and Roman, 2016). In Traux's (2018) study, identified as relevant in my ongoing review of the literature, the development of Mindset Theory was combined with approaches to teaching writing. Findings in that study point to the impact that the difference between individual teachers and their use of language may have, suggesting possible limitations in the control effect that real-world groups have if they are taught by different teachers.

There is also common misinterpretation of Mindset Theory as not focusing on successful curriculum outcomes. Such approaches that help children to learn about learning can play an important role in accessing the content knowledge of the school curriculum (Boyd, 2019). The importance of successful outcomes in Mindset Theory is sometimes overshadowed by the focus on failure and mistakes or praise for effort. While existing research suggests that the complexity of developing beliefs about intelligence can be supported with structured strategies and classroom interventions, it is important to avoid meaning being lost through oversimplification or misinformation. In the development of growth Mindset, clarity about the underpinning belief minimises the risk of false growth or fixed Mindset. (Dweck, 2006; 2017; Dweck and Yeager, 2019). This pointed to the importance of considering how the social and physical learning environment may help or hinder learning as it shapes the accuracy and critical interpretation of ideas through every-day social learning activities and assessments (Mercer and Hodgkinson, 2008; Clarke, 2014; Biesta, 2015).

The coherence of the theoretical framework underpinning Mindset Theory has been well established through extensive research in the field of social psychology (Dweck and Leggett, 1988; Dupeyrat and Mariné, 2005; Dweck 2006; 2017; Blackwell, Trzesniewski and Dweck, 2007; Gunderson *et al*., 2013; Sun, 2015; Park *et al*., 2016). There is little published criticism of the theory itself; however, concerns have been expressed in social media by academics who have questioned methodology and statistical analysis of one of Dweck's early studies (Brown, 2017; Chivers, 2017). A recently published article also questioned the replicability of the original research approach from Dweck's early studies (Li and Bates, 2019). It may be difficult to replicate the research from more than two decades ago, in a different social era where changes in understanding of perseverance and expending effort as being important to learning may influence participant responses. Dweck and her colleague Yeager (2019) conducted a re-analysis of the data from the replication study and published a response where they express concern about the lack of accuracy in replication. They also point to a lack of detail in reporting of the replication as problematic and in the possibility of loss of meaning in translation of data not generated in the same language as the original study.

Criticism of a more recent study suggested that the title of a published paper overstated claims. The criticism centred on the absence of statistical tests to make direct comparison between the effects of parents' response to failure and intelligence Mindsets (Haimovitz and Dweck, 2017; Haimovitz, Yeager and Dweck, 2017). Dweck and colleagues defended the

research and the report by stating that the paper claimed that these correlations differ from each other and that the conclusions of the paper did not rely on the correlations differing from each other. They provided explanations in a detailed response paper and while they defended their original title they decided to change the title to clarify the hypotheses and avoid potential for further misunderstanding (Haimovitz, Yeager and Dweck, 2017). Criticisms in published research and academic literature focus on the low-positive overall effect size and limitations in the implementation of Mindset Theory, rather than on the theory itself. While this could be reassuring in some ways, it might also raise the concern about uncritical acceptance of the theory possibly leading to uncritical application.

Another challenge concerning uncritical acceptance might stem from the publication of Dweck's (2006) book that popularized the theoretical proposition of Mindset Theory. 'Mindset: How you can fulfil your potential' was a popular trade-stand publication, designed to appeal to a very wide audience that included teachers, businesses, parents and personal relationships. While this book made the theoretical constructs underpinning the theory more accessible, with practical examples articulated in a researcher voice that can be understood by a wide audience (Ratcliffe *et al*., 2004; Bell *et al*., 2010), the brevity of each section allows for little consideration of the complexities underpinning the concepts. It draws on a combination of popular literature and academic sources with footnotes and recommended reading rather than full citation. It also omits to clearly explore important details such as the potential bias in social acceptance for self-report or the influence of power differentials in social hierarchies.

While Mindset Theory has been developed through extensive research and peer reviewed publication, if reading does not go beyond Dweck's 2006 publication, it may open interpretation of the theory up to oversimplification. It is therefore open to critique from academics around lack of criticality, while it may make it accessible to a wider audience and encourages them to challenge their thinking they are not encouraged to challenge the ideas presented. It is important that teachers read more widely to develop a more complex and nuanced interpretation of concepts to inform effective translation of theory into action in their own context (Greaves and Moore, 2018, Walker *et al*., 2019).

*2.2.6 The methodological gap for Mindset*

There is a methodological gap for Mindset Theory in multi-method, qualitative research where self-reporting is validated with observation of actual practices in the classroom (Yeager and Dweck, 2019). A recurring theme in the wider research relating to Mindset Theory that also applies to the small number of school based, empirical studies that are beginning to emerge in peer reviewed publications, is that they rely heavily on self-reporting scales and focus on short-term interventions. There is a small but growing number of focused studies on classroom practices and whole-school developments, but they are often reliant on self-reporting methods for data generation. For example, in Fraser's (2018) study consideration was given to how principles that support the development of growth Mindset could be sustained through an embedded approach. This UK based primary school study focused on the introduction and development of teaching practices over a year and combined teacher interview and classroom observation in the data generation process. However, the six single lesson observations were very short, which provided a limitation to

the possibility of the data representing every-day, embedded practices. This further fuelled my interest in how to gain better understanding the influence that the interactions and dynamics of social learning might have on children's beliefs about their intelligence. A multimethod approach including observations over a sustained period might provide more detailed descriptions of the nuances and complexities of every-day practices (Dooley, 2002; Christiensen, 2010; Yazan, 2015; Yin, 2017).

A review of previous research in the field of Mindset Theory also suggests that future studies should consider different ways in which the environment provides cues that inform the development of children beliefs about intelligence being malleable (Dweck and Yeager, 2019). Developing a school context where the whole organisation embodies a Mindset is described by Dweck and colleagues as being potentially powerful in influencing beliefs, values and behaviours of individuals and the organisation (Murphy and Dweck, 2010; Sun, 2015; Park *et al*., 2016; Yeager and Dweck, 2019). However, it is also suggested that more is required than for teachers to simply develop growth Mindset and their motivational frameworks, they need to learn how this can be operationalised practically and critically in the classroom (Haimovitz and Dweck, 2017). Developing an holistic learning environment where instructional tasks and pedagogical practices that foster a growth Mindset permeate, has been suggested as a sustainable and embedded approach (Dweck and Yeager, 2019). However, lack of detail or sustained research activity leaves a gap in this area of research. It is important to build on emerging research that provides accounts of sustained development of Mindsets over time (Park *et al*., 2016; Fraser, 2018).

In another year-long intervention study about practices that develop individual growth Mindset (Park *et al*., 2016) demonstrated that cumulative teacher related effects influenced children's outcomes in mathematics during early phases of primary education. However, previous research suggests that it takes more than one school year for instructional practices to have direct influence on outcomes for children and that effects are cumulative over longer periods of time (Sanders and Rivers, 1996; Park *et al*., 2016). This informed the choice of school for my study; seeking out a school that claimed to have developed practices underpinned by Mindset Theory over several years (3.2.5).

Recent research relating to the impact of Mindset Theory and motivation in business contexts has been extended beyond the beliefs of the individual. Research in commercial contexts asked if organisations can have a 'company' Mindset in the same way an individual can and investigates what effects this has on the organisation, its employees and productivity (Dweck, 2014). Further research in this area considers how the influence of the organisational environment and the beliefs prevalent in the setting might shape the self-concept and Implicit Theories of Intelligence held by individuals (Murphy and Dweck, 2010). In a report of five related studies, Murphy and Dweck (2010) identified a shift in the way in which individuals presented themselves during recruitment, placing emphasis on their 'smarts' or their 'motivations' to align to the organisational norms. The last two of these studies considered the 'downstream' effects of organisational beliefs on individuals and how their beliefs might be shaped over time in employment.

A gap has been identified in the published research in this area, relating to the influence of the organisational environment and how prevalent beliefs might shape self-concept and

Implicit Theories of Intelligence held by individuals in education settings (Hymer and Gershon, 2014). King (2019) suggests that adolescents influence each other's Mindsets, describing them as 'contagious' in the school settings where the study took place. However, their study relies on quantitative data and does not use a methodological approach that illuminates the detail of the interactions between the students or between teachers and children that might have led to changes. My study addresses these gaps in published research with reference to a primary school context, adopting a sociocultural approach (Lave and Wenger, 1991; Engeström, 2011; Farnsworth, Kleanthous and Wenger-Trayner, 2016) and investigating the features of a social model for the development of growth Mindset.

## 2.3 Literature Map Section Two: Individual and collective beliefs of teachers and children

It is important in the context of my study to consider what beliefs are, how they are formed and how they change. In this second section of the literature review, the complexity of the formation of beliefs and belief systems is introduced and related to the epistemological underpinning of this study. It considers three specific types of belief and their relationship to Mindset Theory: teacher beliefs, learner personal capability beliefs and collective teacher beliefs. This section is particularly relevant to the focus in my research question on teachers' understanding of intelligence and on how they strive to develop children's conception of intelligence as malleable.

### *2.3.1 Complexity of beliefs*

There is a wide range of contested interpretations of the construct of a belief and attempts have been made by researchers over many years to create distinctions between beliefs and knowledge (Furinghetti and Pehkonen, 2002; Leatham, 2006). The complexity of the relationship between beliefs and knowledge, combined with the attempts of researchers to make these distinctions between these concepts, has sometimes led to this being referred to as a messy construct (Pajares, 1992). Beliefs are characterized by some researchers as being a type of knowledge that is different from other types of knowledge because of the strength of their evaluative and affective properties (Speer, 2005). In this way, beliefs can be understood as a distinctive form of knowledge that enables individuals to evaluate and act on other knowledge that they hold.

Beliefs can be thought to filter new knowledge and integrate it with old knowledge, creating opportunities for conceptual change. It is suggested that this influence may be increased by making implicit beliefs explicit, challenging the adequacy of beliefs and confronting conflicting beliefs (Kagan 1992). Existing research explains the importance of personal experiences and external influences on the development of beliefs (Kulinna, Silverman and Keating, 2000; Speer, 2005). As such, they can be understood as assumptions that are held by an individual about themselves and their world formed through experience (Pajares, 1992). Aligned to the epistemology underpinning my research (3.1.6), for the purpose of my study beliefs have been considered to be a form knowledge that is shaped by experience, that is socially constructed and reconstructed and that filters other forms of knowledge.

Developing a belief is complex and may be affected by a wide range of influences (Pajares, 1992), not least that it is part of a belief systems and does not stand-alone. This concept of a belief system is described in literature about Mindsets as a Meaning System (Hong *et al*., 1999; Molden and Dweck, 2006). Within these complex belief systems, it is suggested that there are core beliefs that are very strongly held and peripheral beliefs that are held with less conviction. What is thought to differentiate these beliefs is experience; core beliefs being ingrained through experience while peripheral beliefs are adopted more theoretically (Phipps and Borg, 2009). These beliefs can operate in harmony, but if they are conflicting it is thought that they cause tensions and dissonance. How each belief relates to the other beliefs that an individual holds is also thought to determine the strength with which the belief is held (Leatham, 2006). In this way, an individual may make sense of their beliefs by grouping them and positioning them where they seem most logical. The strength with which

a belief is held would then relate to how it coheres with other beliefs. This became particularly relevant to my analysis, as the complexity of holding conflicting beliefs about intelligence became an important focus in the development of my themes.

*2.3.2 Teacher beliefs and agency*

There is a wide field of literature spanning the last three decades that focuses specifically on the beliefs that teachers hold (Kagan, 1992; Pajares, 1992; Calderhead, 1996; Richardson, 1996; Phipps and Borg, 2009). Established in the early 1990s, the body of research and literature that theorises this concept has identified these beliefs as particularly pertaining to the children they teach, learning, classroom and curriculum (Kagan, 1992). It is suggested that these beliefs are influenced strongly by their own personal experiences of learning and have been found in early studies to have been firmly established before they enter into higher education (Holt Reynolds, 1992; Phipps and Borg, 2009). These personal experiences are thought to often outweigh even the influence of their initial teacher education (Kagan, 1992; Richardson, 1996; Phipps and Borg, 2009). They are also thought to have a lasting influence on a teacher's pedagogical approach and instructional practices (Phipps and Borg, 2009). This was important in my study, because a focus developed during the ongoing research process on the ways in which teacher beliefs about intelligence and failure influenced the development of every-day pedagogical approaches adopted in my case study school.

Teacher beliefs have been strongly associated with classroom decision-making in the research literature over many years (Cross, 2009; Meirink, *et al*., 2009; Kuzborska, 2011; Wallace and Priestley, 2011; Biesta, Priestley and Robinson, 2015; Boyd and Ash, 2018). These teacher beliefs act as a filter for new knowledge and experiences, which influence teachers' pedagogical practices in the classroom (Pajares, 1992). In this way, teacher beliefs about what is important and credible filter pedagogical knowledge and impact on how it is used. They play an important role in influencing both instructional and non-instructional aspects of teaching (Kagan, 1992, Erkmen, 2012). This has been described as a bi-directional relationship, where the teachers' experiences in practice influence the formation of their beliefs and their beliefs then influence their practice (Richardson, 1996; Phipps and Borg, 2009). This influences teachers' decision-making and makes teachers' beliefs one of the most important forces that impacts on their practices (Pajares, 1992; Calderhad, 1996; Richardson, 1996; Speer, 2005).

Teachers' beliefs are often associated with congruence in their teaching that implicitly and explicitly models consistency in values and pedagogical approaches (Kagan, 1992; Boyd, 2014). Within a congruent style of teaching, implicit modelling reflects beliefs in every-day practices and can be aligned to purposeful, explicit modelling through deliberate reflection and reconstruction (Hattie, 2012). While correspondence is identified between teacher beliefs and their classroom practices in some studies, there are also reports of either intermittent correspondence or of an absence of any correspondence (Basturkmen, Loewen and Ellis, 2004; Farrell and Lim, 2005; Basturkmen, 2012; Farrell and Guz, 2019). It is suggested that constraints on practice in the real-world of the classroom may mean that pedagogical approaches may not always reflect the beliefs that teachers hold (Farrell and

Lim, 2005; Farrell and Guz, 2019). Understanding this complexity and the related constraints became important to my study as gradually the role that the, sometimes contradictory, real-world relationship between espoused beliefs and teacher behaviours played in the change process became apparent in my case study school.

The congruence between beliefs held by a teacher and their every-day practices may also be affected by a variety of other, more complex, influences (Kagan, 1992; Basturkmen, 2012; Farrell and Guz, 2019). These influences may include the tacit nature of some teacher beliefs, where the teachers themselves are not aware of their own beliefs or are not able to articulate them (Kagan, 1992; Leatham, 2006; Farrell and Ives, 2015; Farrell and Guz, 2019). Influences may also include a lack of will or confidence in their beliefs, or variance in the degree of conviction with which the belief is held (Farrell and Guz, 2019). More recent studies, suggest that these psychological influences could lead to a lack of congruence between espoused beliefs and decision-making informed practices (Bastukman, 2012). However, it is interesting to note that there is general agreement that teacher beliefs are still a strong influence on pedagogical practices (Leathman, 2006; Cross, 2009).

As this established body of research has grown, more detailed investigation has focused on the ways in which the psychological, social and physical environment influences alignment of beliefs and practices in real-world classroom contexts (Borg, 2003; Bastukman, 2012; Kamiya, 2016). These influencing factors can enhance or impede the development of practices that are congruent with beliefs, either providing reassuring anchors and affirmation or conflict and hindrance. These more recent studies, often using case study methodologies in real-world classroom settings, uncover the complexity of possible incongruences between teacher beliefs and practices (Cross, 2009; Bastukman, 2012). Consistency between explicit and implicit modelling of behaviours can suggest congruence between espoused and actual beliefs.

It is also suggested that it is also possible for a teacher to hold beliefs that are not aligned to their espoused beliefs because of these contextual and social influences. For example, power relations or status effect may influence the congruence of an individual's practices. This might occur if a teacher is instructed to develop specific, non-negotiable practices by someone they view as having power (Kamiya, 2016), or if they defer to the decisions of others that they view to be more knowledgeable, experienced or skilled. It is therefore natural that in some social contexts beliefs and practices do not appear to be aligned as a result of these social, psychological and environmental influences (Basturkmen, Loewen and Ellis, 2004; Farrell and Lim, 2005; Farrell and Guz, 2019). This heightened my awareness of possible challenges of incongruence between beliefs and practice in my case study school.

In the context of this study metacognition is used to mean an individual's knowledge, monitoring and regulation of their own cognitive processes (Watkins, 2015), while self-regulation is used to mean both metacognitive knowledge and skill combined with self-efficacy and personal agency (Zimmerman, Schunk and DiBenedetto, 2015). The nature of metacognition and its relationship with self-regulation, is a continually contested subject in research literature (Gascoine, Higgins and Wall, 2017). However, it is suggested that

metacognitive and socially metacognitive practices increase visibility and awareness of thought processes such as decision-making and increase opportunities for self-regulation (Chiu, 2008; Chiu and Kuo 2010). This raised the question of whether opportunities for social interaction in collaborative professional learning could provide greater depth of information for data generation in my case study school. They might provide a fuller picture during my investigation, uncovering nuances and contradictions in the relationship between beliefs and practice in the complex, social context of my study.

### *2.3.3 Researching beliefs of teachers and children*

As with the research relating to Mindset Theory, much of the wider research about teacher beliefs has relied on self-report (Richardson, 1996; Speer, 2005). As understanding has developed around the complexity of these beliefs and the acknowledged discrepancy between beliefs, espoused beliefs and practices (Phipps and Borg, 2009; Kamiya, 2016; Farrell and Guz, 2019), there has been a recognition that self-report alone is an unreliable method for data generation (Pajares, 1992; Speer, 2005; Kamiya, 2016). Where teacher beliefs are not aligned with practices as a result of social, psychological and environmental influences (Farrell and Lim, 2005; Farrell and Guz, 2019) direct observation alone is not a reliable source and the use of multiple data generation methods has been advocated to more reliably elicit teacher beliefs (Leatham, 2006; Erkmen 2012).

The complexity of accessing and interpreting information about beliefs has implications for choice of methodological approach, particularly in relation to the trustworthiness of the data (Nowell *et al*., 2017). For studies investigating beliefs in education, the use of multiple qualitative methods provides fuller information and greater understanding of perceived realities when uncovering these beliefs (Speer, 2005; Erkmen, 2012; Usher, 2015). This influenced decisions that I made during the research process, to analyse teacher self-report and to draw on other methods as I considered the different beliefs and principles underpinning every-day practices in my case study school.

Specific qualitative methods are identified in the research literature as allowing an in-depth understanding of how teacher beliefs develop. These methods include semi-structured interviews, observation, open ended response techniques, thought listing and concept mapping of terms (Kagan, 1992; Usher, 2015). Direct questioning is not thought to be effective in eliciting beliefs and indirect methods are recommended (Kagan, 1992). Approaches recommended for this less direct approach include metaphor elicitation, post lesson reflection and stimulated recall following observations using video or audio recordings (Erkmen, 2012).

### *2.3.4 Capability and collective beliefs*

Individuals formulate beliefs about their present and future capabilities through their experience of and interaction with their environment (Bandura, 1997; 2000; Eccles and Wigfield, 2002). They use a number of frameworks, internal and external, to interpret these experiences. The learning environment within the classroom therefore provides an important context for the examination and development of capability beliefs (Usher, 2015).

Extensive studies in this area, including self-efficacy, perceived competence and academic self-concept, suggest a strong relationship between beliefs and student outcomes (Usher, 2015). Mindset Theory could be considered as a specific form of capability belief that suggests individuals are capable of improvement and able to affect their own outcomes by developing specific learner behaviours.

Comparison is another way in which an individual may formulate beliefs about their own capabilities (Usher, 2015). They evaluate their achievements in comparison with others and with their own expectations and the expectations of others. This comparison of their own achievements with the achievements of others within the immediate learning context influence academic self-concept (Schunk, 2005; Marsh and O'Mara, 2008). This is also connected with the development of performance-approach goal orientation discussed in the first main section of this chapter (2.2.2). As individuals compare and evaluate their performance against expectation, it is also thought that feedback plays an important role in the formulation of capability beliefs in the classroom.

The importance of critical feedback that is carefully framed to be productive and supportive rather than dismissive and harsh is therefore emphasised by Hattie and Timperley (2007). Harsh feedback about capability can have a strong, long-term effect on an individual's beliefs about themselves; while other positive, specific mastery focused feedback can be used to increase an individual's belief in their own capability. Assessment and matching the appropriate type of feedback given to the level of expertise of the individual in any given task is also identified as important to this process (Hattie and Timperley, 2007). This body of literature relating to feedback and capability beliefs became useful as the analysis of my data grew and social influences on giving and receiving critical feedback became central to one of my themes.

There have been extensive studies in education contexts that examine the role of capability beliefs and how these beliefs are developed (Zimmerman, Bandura and Martinez-Pons, 1992; Bresó, Schaufeli and Salanova, 2011; Usher, 2015). Self-efficacy is one such belief that identifies the degree of confidence that an individual has in their capacity to achieve a task or goal (Bandura, 2001). As with other capability beliefs, experience plays a significant role in the development of self-efficacy. Experience of success and failure influences an individual's self-concept; overcoming challenge and difficulty may reinforce a sense of efficacy, while failure that does not lead to improvement may reduce it (Bandura, 1997; 2000; Usher, 2015).

As my study developed this area of research relating to capability beliefs became particularly relevant to analysis, with responses to challenge, difficulty and failure also being central to Mindset Theory (Dweck, 2006; 2017; Dweck and Yeager, 2019). An individual's perceived mastery experiences, their experiences of successfully mastering a challenge, are also a strong predictor of their efficacy beliefs (Usher, 2015). It is also thought that a combination of active experience and reflection may increase an individual's consciousness and understanding of their beliefs (Brush and Saye, 2017).

In their collection of school and teacher education based case studies Brush and Saye (2017) investigated how reflections can be effectively scaffolded to support this process with

planned and structured activities or with responsive questioning. They explain how reflection helps to transform experiences into conceptual understanding and encourages individuals to apply this understanding into different contexts (Kolb, 2015; Brush and Saye, 2017). This area of research points to the value of providing mastery experiences and scaffolded reflection to encourage the development of self-efficacy for individuals. However, this research also points to the need for stronger explanation of the nature of a scaffold, which is relevant to my study where self-concept and capability beliefs were being developed.

Recent meta-analysis of research places emphasis on the significant impact on achievement and outcomes of teacher and collective efficacy (Klassen *et al*., 2011; Hattie and Zierer, 2017). While self-efficacy is the belief of an individual about their capability to achieve goals, teacher and collective efficacy are beliefs about the conjoint capabilities of a group (Klassen *et al.*, 2011). Collective efficacy can be defined in the literature as 'a group's shared belief in its conjoint capabilities to organise and execute the courses of action required to produce given levels of attainment' (Bandura, 1997, p. 23). This focuses on the shared belief of the individuals in a collective capacity to achieve desired goals (Takahashi, 2011). It is important to recognize this as a group attribute and not as the aggregate of the beliefs of the individual teachers (Bandura, 1997; Tschannen-Moran, Salloum and Goddard, 2014). As analysis developed during my study, it pointed to the value of a 'collective' approach; not as being the sum of the parts, or as the mean average of a group score, but as the mutually supported orientation and reciprocal will of the group to achieve goals.

The similarities between efficacy and Mindset informed my investigation into how setbacks in the development of an individual's Mindset might be ameliorated in a social approach, in a similar way to that of collective efficacy (Klassen *et al*., 2011). However, this comparison does not overlook the nuanced and important focus in Mindset Theory of specific goal orientation and response to challenge, difficulty and failure (Mueller and Dweck, 1998; Gunderson *et al*., 2013). Through the ongoing iterative process of literature review, informed by my data generation and analysis, a focus developed in my study on the value of developing an individual's beliefs through ethical and critical consideration of theory. This process has also suggested the importance of directly teaching, or scaffolding, strategies for developing learner characteristics and goal setting to allow agency through self-strategy. In this way, this study investigates how principles underpinning the development of self-strategy and models of teacher and collective efficacy might inform understanding of collective approaches to the development of beliefs about the malleability of intelligence.

### *2.3.5 Children's social learning and capability beliefs*

Towards the end of the last century, academic discourse grew that centred on how the social and physical dynamics of whole-class teaching and small groupings impact on children's perceptions of themselves and their capabilities (Gillies 2014; Capar and Tarim, 2015; Alexander, 2018). I have drawn selectively on research and literature in this field, narrowing the focus down using the themes that evolved during my ongoing literature review (Wisker, 2015; Branley, Seale and Zacharias, 2018). This was particularly important to my analysis in relation to aspects of my research question that focus on how social aspects of pedagogical approaches impact on the development of Mindsets and related learner characteristics. This

process raised several questions for my study about how the structures and organisation of grouping might support and create barriers to children's learning in the context of developing pedagogies underpinned by Mindset Theory. It highlighted the importance of considering how grouping impacts on children's identity and behaviour as learners (Hart, *et al*., 2004; Yarker, 2011; Marks, 2013; Boylan and Povey, 2014), the effects of grouping on perceptions of capability (Gillies 2014; Capar and Tarim, 2015) and the importance of the quality of dialogue and interaction during group work (Alexander, 2018).

The advantages and disadvantages of different practices for grouping children in the primary school classroom have led to much comment in the academic literature in England and further afield (Alexander, Rose and Woodhead, 1992; Yarker, 2011; Boylan and Povey, 2014; Capar and Tarim, 2015). Whole-class teaching is one such practice that has seen a recent resurgence in popularity in the UK with recommendations from Government that suggest this supports a more interactive and knowledge focused approach to learning (Mujis and Reynolds, 2017). For the purpose of my thesis, whole-class teaching is defined as being where the class progress through curriculum content at more or less the same pace. Research suggests that this way of working can allow more teacher interaction with individuals than when children work individually or in groups (Mujis and Reynolds, 2017). It also suggested that they are more likely to remain focused on the learning task during whole-class teaching than individualised instruction but that this is dependent on high teacher expectations.

Whole-class teaching approaches have been incorporated into the formula of many established pedagogical approaches. For example, whole-class teaching was the primary approach in the opening and closing sequences of the lesson structure introduced through National Strategies in England at the turn of the last century (Hardman, Smith and Wall, 2003). It has also been central to other established approaches such as Circle Time approach (Glazzard, 2016) and the innovative enquiry practices of Philosophy for Children (Trickey and Topping, 2004). Within the last decade, there have been even stronger moves towards incorporating more whole-class teaching into primary school lessons using 'mastery' learning approaches and 'direct instruction' (Visible Learning MetaX, 2016; Mujis and Reynolds, 2017). However, concerns are expressed that this way of organising teaching and learning needs to include specific criteria including the use of interactive questioning, clear structure and presentation, good pace, modelling and concept mapping (Mujis and Reynolds, 2017). The sustained promotion and advocacy of these teaching approaches nationally in primary settings, and their use in my case study school, made it important to consider the impact that the social dynamics of whole-class teaching may have on developing learner Mindsets.

During the 1990s, practices in small-group organisation where the group membership was determined by prior attainment became prevalent in primary schools (Pollard, 1994; Galton, 1999). Criticism of these practices included concerns that they may create conditions where learners might be limited by perceptions of predetermined potential (Hart *et al*., 2004; Yarker, 2011; Marks, 2013). These 'ability' groupings and language used to describe them are the concern of a body of research relating to 'ability-thinking' and 'ability-labelling' (Hart *et al*, 2004; Marks, 2013; Boylan and Povey, 2014). The use of grouping by prior attainment

in my case study school made this literature important to analyse during the development of my study.

In primary contexts, concern has also been expressed that this organisation of groupings by 'ability' symbolises a way of thinking that might shape how children view themselves and their capacity to learn (Hart *et al*, 2004; Marks, 2013; Boylan and Povey, 2014). An influential study entitled 'Learning Without Limits' (Hart *et al*., 2004) foregrounded the limits that practices that were 'ability-based', including grouping organisation, might impose on children. It proposed pedagogical principles designed to avoid perpetuating determinist assumptions of 'ability'. It argued that flexible and responsive grouping supports the mutual respect required for effective social learning. A further piece of research, in the context of a whole primary school, led to the publication of the book 'Creating Learning Without Limits' (Swann *et al*., 2012). This study did not provide detail relating to how children's beliefs about themselves and their capabilities were influenced or of how teachers managed the difficulties and complexities encountered in the process of dispensing with established thinking and the language of changing beliefs about 'ability'

Academics and practitioners continued to challenge the national assessment system in the English primary school curriculum, which was based around Attainment Level measures that were thought to encourage this 'ability-thinking' (Yarker, 2011; Boylan and Povey, 2014). Concerns expressed in this literature included the problematic conflation of the concept of wider 'ability' with curriculum attainment and the narrow measures of assessment, designed to meet institutional and political needs; that 'ability' was reduced to achieving a narrow set of curriculum goals. There was also concern that a language of 'ability' and 'ability-labelling' that were used in schools, with the attribution of an Attainment Level to each child, might limit personal beliefs about capability (Baines, Blatchford and Kutnick, 2017). Research suggested that this 'ability-labelling' might prevent teachers from engaging in critical dialogue about the limits to which these context-bound curriculum assessments might determine how we judge what children know, understand or do (Boylan and Povey, 2014; Baines, Blatchford and Kutnick, 2017).

Despite this ongoing criticism of some practices, grouping children in small groups by assessed prior attainment and whole-class setting have continued to grow in popularity in primary schools (Boylan and Povey, 2014). Oakes (2005) suggests, in her influential text about effective grouping practices, that one of the complexities has been the multiple definitions of the term 'ability grouping' and how it has been interpreted in many different ways in different contexts. Steenbeergen-Hu, Makel and Olszewski-Kubilius (2016) also discovered, in their analysis of existing meta-analytic studies in this field, that the interchangeable use of a range of terms added to the complexity when trying to investigate practices and draw comparisons. As my study evolved, it was therefore important to ensure that specific practices were clearly defined, using consistent terms to support theoretical argument developed in my analysis. To try to avoid conflation with the discourse of the 'ability-labelling' and 'ability-thinking' arguments, I decided to adopt the term 'within class grouping by attainment' in my analysis and discussion. I use this to refer with consistency to practices where small groups of children are grouped by the teacher using assessed prior attainment (Steenbeergen-Hu, Makel and Olszewski-Kubilius, 2016).

*2.3.6 Quality of pedagogy for children's social learning*

The quality of pedagogical approaches impacts on outcomes of group working. Cooperative learning approaches have grown out of the field of social interdependence theory and provide structured pedagogies for the organisation of group work (Johnson and Johnson, 2002; Slavin, 2014). Lou *et al.*'s (1996) investigation into the advantages of group work systems identified cooperative learning approaches as having positive effects on outcomes for small groups. This body of literature was relevant to themes that evolved during my data analysis and that related to the ways that the classroom environment was organised. Over the last four decades, research has developed to investigate the positive and negative influences of this social interdependence in the classroom and the pedagogies that involve children working in cooperative groups (Lou *et al*., 1996; 2013; Gillies, 2014; EEF Toolkit, 2018).

A central tenet of cooperative learning approaches is that promotive interactions enhance positive outcomes (Johnson and Johnson, 2014; EEF Toolkit, 2018). This way of grouping values what social interaction can add to the learning process, drawing on the long established work of Vygotsky's (1978; Moll, 2014) Zone of Proximal Learning. Within this process, those who provide help benefit from reconstructing information cognitively while children receiving help benefit from peer tuition (Gillies, 2014). This area in the research literature was particularly important in relation to my research question focus on what social aspects of pedagogies might add to the development of Mindsets and related learner characteristics.

While there should be a distinctive focus in cooperative learning on achieving the group task, it is also suggested that delegation of authority and responsibility given to individual group members is also important (Johnson and Johnson, 2013; Gillies, 2014). Mujis and Reynolds (2017) suggest, in their review of research evidence relating to effective teaching practices, that the greatest gains occur when cooperative groups are mixed with respect to prior assessed attainment. Children gave and received greater numbers of explanations in groups of this nature, whereas children grouped closely by prior attainment engaged in less interaction. When grouped together, higher attaining children considered it unnecessary to provide support for each other, while lower attaining children felt less well equipped to do so. However, this research also suggests that the differentials in assessed capabilities should not be too wide within the groups. As my study developed, my data analysis pointed to the importance of investigating the detail of the different grouping structures used in my case study school, and the ways in which they impact on children's perceptions of their capabilities and beliefs about Mindset.

Despite extensive reports of positive learning outcomes from cooperative learning (Hattie, 2009; Johnson and Johnson, 2013; Visible Learning MetaX, 2016; EEF Toolkit, 2018), research also suggests that authentic approaches to cooperative and collaborative learning have actually remained relatively uncommon in schools (Galton *et al*., 1999; Kutnick and Blatchford, 2014; Baines, Blatchford and Kutnick, 2017). Since the early 1990s, the quality of the pedagogies for learning through group work have been questioned (Alexander, Rose and Woodhead, 1992; Baines, Blatchford and Kutnick, 2017; Alexander, 2018). Pedagogies leading to authentic cooperative learning include teaching children a repertoire of tools that

they can adopt to intentionally structure social interaction and give them the agency to work effectively together (Alexander, Rose and Woodhead, 1992; Baines, Blatchford and Kutnick, 2017; EEF Toolkit, 2018). In this way children's skills development in reaching consensus, decision-making and shared problem solving should be intentionally structured, rather than being an accidental by-product of sitting in a group (Johnson and Johnson, 2013; Gillies, 2014).

Alexander's (2004; 2018) influential work on the use of dialogue suggests that much of the talk that takes place in classrooms simply allows children to narrate, tell or explain and rarely encourages them to generate their own questions or speculate through enquiry. He suggests that children often experience this monologic culture of recitation, rather than high quality dialogue that involves argument, exploration and analysis. This area of research became particularly important to my study, as my analysis developed to investigate different ways in which dialogue in social learning interaction might influence children's beliefs about their capabilities and their Mindsets. This was particularly relevant to the aspect of my research question that focuses on how teachers strive to develop children's conceptions of intelligence as malleable and how social aspects of their pedagogical approaches might add to the development of Mindsets and related learner characteristics.

Whether children are working in a whole-class context, in small groups, individually or competitively, most learning in the classroom can be considered to take place in a social context (Nuthall, 2004). This makes the ongoing relationship with peers and with adults influential on social and emotional aspects of learning and also on children's cognitive, intellectual experiences. It requires teachers to be able to engage children in questioning and tackling challenging problem solving activities and to facilitate sustained dialogue, enquiry and positive argumentation (Nuthall, 2002; Nottingham, Nottingham and Renton, 2017; Alexander, 2018). It is suggested that a range of skills, strategies and underpinning principles should structure these social learning opportunities, such as the sparing use of questions, developing responses that move dialogue forward and helping children to connect, clarify and develop ideas (Nuthall, 2002).

When compared with other pedagogical approaches, a review of research in the field of dialogic teaching suggests particularly positive gains for children in low-performing and average schools when structured dialogic teaching approaches are adopted; not just in participation in dialogue but in wider learning outcomes (Resnick, 2015). In Resnick, Asterhan and Clarke's (2015) review of research, findings indicated that structured dialogic approaches may lead to improvements in standardised testing and that children retained knowledge for up to three years longer. English's (2016) work also suggests that dialogic teaching can support the building of community and develop awareness of whose voice is being heard and whose voice is silenced. It identifies how dialogic structure might help teachers to address the needs of individual learners and the needs of the whole group with greater equity. This research literature suggested the importance of considering the ways in which teachers in my case study school strive to achieve this.

Despite the cognitive and social gains identified in the research literature relating to dialogic teaching approaches, there are also many challenges to consider in the implementation of such strategies (Teo, 2019). These difficulties include the physical and political issues of

overcrowded classrooms and the valuing of written outcomes over verbal contributions in formal assessment contexts. In some cases they also include lack of teacher experience or skill in facilitating the dialogic interactions effectively (Reznitskaya *et al.*, 2009; Teo, 2019). In addition to these concerns relating to teacher competence, there are also difficulties where teachers have established views about their role and find it difficult to relinquish and share authority and responsibility with children (Teo, 2019). To address this, it is suggested that teachers should reimagine their role to consider themselves as co-learners or co-enquirers to co-construct knowledge with children through dialogue (Skidmore and Murakami, 2016).

Skidmore and Murakami's (2016) less authoritarian, more egalitarian model of co-enquiry reconstructs the relationships between children and teachers to allow them to learn and discover ideas together through small-group talk (Teo, 2019). In this way, scaffolded activities can allow responsibility and authority to move gradually from the teacher to children (Skidmore and Murakami, 2016). This aspect of the research literature became relevant to my study as the roles and responsibilities for learning, taken by both children and teachers, unfolded as central to one of my themes. This literature provided lenses through which I could consider the advantages and disadvantages of the ways in which the dynamic nature of the classroom environment and the social interactions within that space, were purposefully structured to encourage learners to take responsibility in my case study school.

Concern has been expressed that for quality dialogic interactions children also need to be taught skills of self-reflection and critique, to be able to acknowledge and understand the possibility of their own fallibility (English, 2016). These skills are identified as important to children developing effective critical questioning and engaging in enquiry. It is also suggested that building respect for others and empathetic recognition can help to engender an environment where these capacities can be developed. In the shift in classroom language towards reasoning and social, academic discourse and argumentation, critique is also made of the possible lack of accuracy in content. Emphasis in the research literature is placed on the important role that the teacher should play in ensuring that children's responses are not misleading when facilitating small-group exploratory talk (Nuthall, 2004; Hattie and Yates, 2014; Skidmore and Murakami, 2016).

This emphasis on the teacher's role in ensuring accuracy provoked questions during my analysis around how a balance might be maintained in the teachers' mediating role, between achieving accuracy and autonomy. Resnick, Asterhan and Clarke (2018, p. 17) suggest that for high quality dialogic interactions children should be 'accountable to knowledge, to reasoning and to community'. The gradual movement of responsibility and authority from teacher to children, mediated by the teacher's responsive scaffolding during dialogue, can not only help them to construct new knowledge, it can help them to maintain accountability and quality in each of these areas (Mercer, 2000; Alexander, 2018). However, this responsive approach is identified as requiring teachers to not only have extensive subject knowledge but also the pedagogical knowledge required to allow them to respond to less predictable, evolving classroom dialogues (Brophy, 2006).

## 2.4 Literature Map Section Three: Culture change and teachers' professional learning

This third section of the literature review focuses on teachers' learning processes and culture change in a school. My study took place during the third year of the school's work to implement practices that are underpinned by Mindset Theory. Change in pedagogical culture involving values and norms underpinning every-day practices and teachers' professional learning that makes this process possible are central to this investigation. This section is particularly relevant to the aspect of my research question that focuses on the processes and conditions for a social model for developing growth Mindset in my case study primary school.

### *2.4.1 Concept of culture*

Culture is a complex and contested concept in the context of a school, while also considering the influence of teachers' professional learning on changing a culture. Definitions of culture in the research literature have moved from simple models of organisational development, considered to be an exact behavioural science (Hersey, Blanchard and Dewy, 1988), to a wider acceptance of multiple models that acknowledge a lack of governing behaviours, the complexity of contextual interpretation, uncertainty and the disjointed and unpredictable pace of change (Handy, 1993; Fullan, 2003). The anthropologist Geertz's model is significant in this advancement in interpretation, identifying culture as 'webs of significance' that are continually recreated in process and that are not controlled by laws and interpreted by people (Geertz, 1994). Such models allow consideration of the complexity of change and the contribution of differing perceptions and interpretations in my study school over a sustained period of time.

The term 'climate' is widely used to describe the behaviour of members of the organisation and culture as being about the values and norms (Mujis *et al*., 2014). Schools with a strong professional culture are identified in the research literature as supporting teacher improvement and retention (Kraft and Papay, 2014). An ordered, collaborative environment with supportive senior leadership, effective continuing professional learning, a culture of trust and meaningful evaluation characterizes this. This literature became important to my study as the processes of culture change to support the development of Mindset Theory in a real-world context was critically questioned during analysis.

### *2.4.2 Teachers' professional knowledge*

There are wide-ranging definitions specifically relating to teachers' professional knowledge and what knowledge is valued by teachers (Munby, Russell and Martin, 2001). The practical knowledge that is created in the every-day experiences of teachers in the context of the classroom is often differentiated from formal knowledge generated by external researchers (Walker *et al.,* 2019). This differentiation is often conceptualised as a 'gap' between theory and practice (Beycioglu Ozer and Ugurlu*,* 2010) that limits prospects of exchange between teachers and researchers (Engeström, 2011).

The metaphor of a gap between theory and practice tends to separate these bodies of knowledge (Loughran, 2013) rather than treating them as inter-related domains of public

knowledge and practical wisdom (Boyd and Bloxham, 2007). As inter-related domains they can be combined in a variety of ways, suitable to context and purpose, to use both public knowledge and practical wisdom for the development of teacher professional knowledge. This area of research became important as my study evolved and the processes of developing teachers' knowledge about Mindset Theory was established as central to my findings.

To some extent a shift took place over time in the UK, from teachers predominantly being the subject of educational research, to teachers sometimes leading their own research processes in the creation of professional knowledge or participating in collaborative practitioner research. From as early as the 1970s, Stenhouse broke the ground to bring about the valuing of teachers as creators of professional knowledge through action research (Stenhouse, 1981; Bell *et al.*, 2010; Cordingley *et al*., 2015). The British Educational Research Association (BERA) was also launched at this time, promoting research-informed policy and practice Influential arguments developed about focusing on the real-world needs of the classroom and of teachers engaging in their own professional knowledge creation (Hargreaves, 1996; Cordingley *et al*., 2005; Graves and Moore, 2018).

The National Educational Research Forum (NERF) was established in 1999 to coordinate research activity, followed in 2000 by the formation of the Evidence for Policy and Practice Information and Coordinating Centre (EPPI) to promote the use of systematic enquiry to inform policy. These organisations provided an infrastructure that valued teachers' professional knowledge development through engagement with research. The Teacher Development Agency (TDA) then established research awards that acknowledged the value of small-scale research by teachers. Increased focus on engagement with research continued as the Centre for the Use of Research in Education (CUREE) and the Applied Education Research Scheme (AERS) were founded in 2007. This national picture of the research culture provides a backdrop to my case study which is nested in the wider cultural context of research engagement.

The Education Endowment Fund (EEF) was created in 2011 (Nelson *et al*., 2017). Research funding was made available to teachers in 2013 by the UK Government through Teaching School Alliances. In 2017 the Chartered College of Teaching was established as the teachers' recognised professional body with a brief to encourage and support engagement with and in research. In contrast to these efforts to promote teachers' engagement with research, recent changes to funding in the UK may make it more challenging for in-service teachers to complete Masters programmes. Understanding the history and context of teacher engagement in and with research was important to my analysis, particularly in relation to the aspect of my research question that focuses on the processes and conditions for the development of a social pedagogical model for developing growth Mindset.

There is an international body of literature calling for greater consideration of how research is best developed with teachers, how findings are shared and how impact should be measured (Levin 2013; Coe *et al*., 2014; Cordingley *et al*, 2015). Concern is also been expressed about the degree to which research, may be influenced by Government policy (Whitty, 2006; Biesta, 2015; Aldridge *et al*., 2018). Disciplinary professional knowledge can be shaped by politics when teacher and researcher decisions are influenced by government

agendas (Becher and Trowler, 2001). In the real-world setting of my case study school, it was therefore important to reflect on the influences of internal and external political drivers during analysis and discussion.

A recent meta-analysis of systematic reviews in this field suggests that engagement with and in research contributes to the development of effective practices in many ways (Coe *et al.,* 2014; Cordingley *et al*, 2015). Across the reviews there were a range of activities that related to teachers' engagement with and in research for the development of professional knowledge. However, of the approaches included, teachers engaging with public knowledge and adapting it to their own context was found to be most effective in impacting on outcomes.

This research-informed practice is associated with a variety of positive outcomes for learners and with the implementation of teaching strategies that are evidence informed (Bell *et al*., 2010). However, when teachers in the UK were asked in a national survey by the EEF what influences their decision-making, academic research was perceived to have only a small to moderate influence (Nelson *et al.,* 2017). This provoked questions during my analysis about the engagement of the teachers in my case study school and their awareness of the detail of research published in the field of Mindset Theory.

An even more recent national survey conducted by the EEF had similar findings in relation to teachers' perceptions of academic research (Walker *et al.*, 2019). It reported that teachers identified their own experience, the experiences of other teachers and schools or non-academic continuing professional development as the most likely knowledge sources that they would draw on. Teachers did claim to have a positive disposition towards research, but reported that they found it difficult to understand or to translate into practice in their own settings (Nelson *et al.,* 2017; Walker *et al*., 2019).

Published research is often criticised for being inaccessible to a non-academic audience and difficult to generalise from, while teachers also felt they lacked appropriate knowledge to build on and that there is not enough clarity about the practical implications of the research for teachers and policy makers (Ratcliffe *et al.*, 2004; Bell *et al*., 2010). Criticisms are made of recent approaches to engaging teachers in and with research for the development of teachers' knowledge through meta-analysis such as the EEF's Tool Kit (2018) or Visible Learning's MetaX online platform (Visible Learning, 2016). The suggestion is made that pooling research to create dashboards or scales that rate and rank effectiveness may create a 'what works' hierarchical system with which teachers engage at a shallow level or generalise the findings in inappropriate contexts (Rømer, 2019).

There is a risk that teachers misunderstand or misinterpret the theories underpinning these data platforms and engage with activity that is ranked at a high level of effectiveness but that may not be relevant to their own setting (Hattie, 2012). Teachers may attempt to replicate something so closely, that interpretation and application of professional knowledge is not contextualised to the needs of their own students or setting. There is also the danger that complexities that are important to the interpretation of findings from meta-analysis may be oversimplified in synthesis (Hattie, 2009). If it is cascaded through a trajectory from national policy to the classroom, the messiness of this implementation process offers a

further distortion to this process of interpretation and application (Trowler, 2003; 2012). This study therefore considers interpretation of research and understanding of how it can be used effectively to inform decision-making and avoid misunderstanding and misuse.

*2.4.3 Teachers' professional learning*

Teachers' professional learning has been identified as a priority in improving teachers' performance, which is a high priority in the UK education policy agenda, and can be thought of in terms of acquisition, participation or construction (Hodkinson and Hodkinson, 2005). Learning design that combines participation and construction has most potential for impact through teachers' professional learning, while acquisition approaches focus predominantly on content and lack personalisation or self-actualisation. Construction and participation create a stimulus for improving practice and teachers' growth as they combine knowledge and experiences with sources of external knowledge. This was particularly relevant to the aspect of my research question that focuses on what the processes and conditions were for the social model for developing growth Mindset in my case study primary school.

Collaborating with an external knowledge broker for external specialist expertise can complement a school's existing, internal support systems and make a positive contribution to teachers' professional learning (Cordingley *et al*., 2005; Cordingley *et al.,* 2015). This relates to research skills development, such as analysis and reporting, and to the introduction and modelling of pedagogical approaches and professional knowledge (Bell *et al*., 2010). This increases the resources available to teachers and opportunities for teachers' professional learning to explore the relationship, or interplay, between theory and practice (Boyd, Hymer and Lockney, 2015). However, it is important in this process that any external facilitator is sensitive to the complexities of situated learning and the particular context (Korthagen, 2010).

Sources of expertise may also include research evidence from academic literature, and research literature interpreted in ways that are relevant to context (Cordingley *et al*., 2015). My case study school's engagement with an external knowledge broker in its initial professional development relating to Mindset Theory, made this area of research literature relevant to my study. It was also relevant to the school's decision several years later to engage with me in researching their practice. This made this field of research about the role of the knowledge broker important to both the content and process of my study.

Limited impact of professional development for teachers is thought to be the result of a separation between theoretical approaches and how they are translated into practice with specific groups of pupils or in specific contexts (Timperley, 2011; Hattie, 2009; Mujis *et al.,* 2014). In a climate of accountability, many teachers view engagement with research as a way of providing a rationale for their approach to enhancing pupil outcomes (Greaves and Moore, 2018). However, it is important that this interpretation and application is not too general, that it is sufficiently contextualised and that teachers make sense of it for themselves (Cordingley *et al*., 2005; Mujis *et al*., 2014; Boyd, Hymer and Lockney 2015).

*2.4.4 Teacher enquiry*

The concept of teachers becoming adaptive experts by engaging in cycles of enquiry has gained currency with both researchers and teachers (Hammerness *et al*., 2005; Timperley, 2011; Mujis *et al*., 2014; Timperley, Kaser and Halbert, 2014). Through these iterative processes, teachers respond to situations by seeking out solutions, gaining knowledge, trying new approaches, evaluating and then refining skills to improve their practice. They proactively find opportunities to develop their learning in the context of every-day practice (Cordingley *et al.,* 2015) and monitor their progress in a self-regulated cycle of learning (Mujis *et al*., 2014). This provides situated learning opportunities where teachers construct practical knowledge that is relevant to their own context.

High quality teacher enquiry is identified as having three key features: addressing worthwhile social issues; taking place in the teacher's own working context or the community and context to which it is relevant; and encourages collectively constructed knowledge. It encourages communication where argumentation and different perspectives allow teachers to explore their learning in a deeper, richer way to inform individual and collective action. It provides opportunities for critical and transformative contextualised professional learning for teachers (Carr and Kemmis, 2003). This research literature suggested the importance of understanding not just accuracy of interpretation of Mindset Theory by teachers in my case study school, but also the process of contextualising it to their own social learning environment.

Critics of teacher enquiry suggest that there is the danger that this form of learning may suffer from a lack of critical edge if not supported by external experts (Hodkinson and Hodkinson, 2005). This implies that if there is a lack of engagement with external sources of expertise there could be the danger of confirmation bias, and points to external critique as an important contributor to the quality of the research process. This made it important to consider teacher agency within my study, and particularly the ways in which decisions about the involvement of external sources of expertise had been balanced against teacher autonomy to maintain contextual relevance (Nutley, Jung and Walter, 2008).

Participatory action research is an example of a systematic, structured and evidence-based approach to teachers' professional learning. (Friedman, Razer and Sykes, 2004; McNiff and Whitehead, 2011). This approach encourages knowledge creation through engagement with research literature and experimentation in practice (Loughran, 2013). Its situated and participatory nature, with reflection-in-action rather than reflection on-action, gives it relevance and makes it meaningful to the specific context (Schön, 1987; Bell *et al*., 2010). As my study evolved, it became important to select research literature that could help me to understand through analysis the ways in which the teachers in my case study school were, or were not, investigating and developing their own practice.

Creating space for discussion can help teachers to acknowledge and explore these contradictions constructively, avoiding problems being ignored (Kemmis, 2006). Hard truths raised by these contradictions can be challenging to acknowledge and act upon in an accountable environment, but such contradictions can be a catalyst for innovation (Engeström, Sannino and Virkkunen, 2014). This suggested the importance, of considering

whether teachers in my case study school had chosen an enquiry approach suited to both teachers and context and that created agency while avoiding risk or harm. This literature also suggests that valuable opportunities for teachers to critically explore their own learning may be created where enquiry processes are supported. This pointed to the value of considering what structures are in place for this learning in my case study school.

*2.4.5 Collaborative enquiry*

Collaboration in this context can be defined as teachers working with at least one other professional on a sustained basis to explore their practice together (Cordingley *et al*., 2015; Nelson *et al*., 2017). This may involve engagement with external sources of expertise or establishing opportunities where groups of teachers can engage in collaborative and sustained professional learning together and support each other (Bubb and Earley, 2013). International studies highlight the value of these professional learning collaborations as a potential catalyst for improving teachers' professional practices (Cordingley *et al*., 2015; Harris, Jones and Huffman, 2017; Hargreaves and O'Connor, 2018; Harris and Jones, 2019).

These collaborative opportunities for teacher researchers to develop an interactive research model support local interpretation and provide autonomy for them to explore issues relevant to their own context (Nutley, Jung and Walter, 2008). Where collaborative models and strategies are developed as part of a school's professional learning approach it is important to assess their validity, viability and how impact will be evidenced (Harris and Jones, 2019).

While a high proportion of teachers surveyed recently in the UK reported positive professional learning culture and an encouragement to engage with research in evidence informed collaborative enquiry, smaller proportions reported that there were formal processes in place to support this engagement (Walker *et al.,* 2019). A positive school culture where teachers are trusted to engage in enquiry correlates with high levels of research engagement (Brown and Zhang, 2016; Coldwell, 2017; Walker *et al*., 2019). This literature provided lenses through which I could investigate the understandings that the teachers had of these processes and unpick some of the detail of how the collaborative nature of the processes impacted on the development of new pedagogies that involved the development of both beliefs and behaviours. This was particularly important to my analysis in relation to the aspect of my research question that asks what the characteristics are of a social model for developing growth Mindset in my case study primary school.

However, when establishing a model of professional collaboration it is important that strategies are identified that generate evidence of impact on both teachers and children and inform the development of practice (Harris and Jones, 2019). Generating evidence through collaborative strategies provides the group with information that helps them to monitor, evaluate and adjust the practices that are the focus of the collective enquiry (Hargreaves and O'Connor, 2018). Where a collaborative model is adopted, collaborating on monitoring the difference that it is making is important; constantly checking together what evidence there is that it is having a positive impact and using the information constructively to help each other to make adjustments if it is not (Timperley, Kaser and Halbert, 2014). Establishing a clear focus for this collaborative work is key if impact on teaching and learning is to be assessed

meaningfully (Harris and Jones, 2019). This was interesting in relation to my case study school and their pupil progress review system, which I was invited to observe during the process of my study.

Peer collaboration and critical friendship can provide support and motivation for teachers in their professional learning (Bell, *et al.,* 2010). Teachers can re-frame ideas and then embed them in practice together (Loughran, 2013). Dialogue in collaborative enquiry provides opportunities to enrich ideas as teachers support and challenge each other's thinking as partners in the collaboration (Cordingley *et al*., 2005; Cordingley *et al*, 2015). While effective learning for teachers can be developed and sustained through individual teacher enquiry, collaborative enquiry provides a context of professional support and motivation. This literature highlighted the importance of critically questioning the potential for confirmation bias and mutual affirmation in these collaborative learning processes. It raised the question of whether, while collaboration may offer opportunities to co-construct new knowledge through the sharing of different understandings and perspectives, there may also be a danger of it creating 'blindspots' through affirmation (English, 2016) and a lack of a critical dimension to professional learning practices.

Initially I had chosen to work with an 'ecological' perspective, derived from Bronfenbrenner's theory of 'the ecology of human development' (1992). However, as my study progressed I developed my analysis process using a Communities of Practice framework (Wenger 1999; Engeström, 2011). A Community of Practice is a specific, socio-cultural form of learning community with shared purpose and collaboratively developed ways of working. It can be argued that collaborative cultures cannot be contrived and that the school culture will influence teachers' professional learning (Hargreaves, 1996). However, they can be developed and there is value in dedicating resources to the establishment of a social learning culture through approaches such as Communities of Practice (Wenger 1999; Engeström, 2011).

Membership of a Community of Practice is voluntary and negotiated thorough participation, shared ways of working and a shared sense of purpose. This means a staff team may not always operate as a Community of Practice, even where they have structured models for working together (Lave and Wenger, 1991; Farnsworth, Kleanthous and Wenger-Trayner, 2016). Being employed as a team member does not equate to being a member of a Community of Practice (Skerrett, 2010). As newcomers gradually negotiate their understanding of the purpose, history and rules of the group they earn their membership.

Supporting a productive and professional school-wide culture of improvement is central to securing the collective engagement of all teachers (Kraft and Papay, 2014). Schools organised as places for deliberate and systematic learning, where the influence of organisation, leadership and teaching on student outcomes is the focus of collaborative professional learning have high adaptive capacity (Mujis *et al.,* 2014). Leaders influence the development of collective teacher beliefs by setting the tone for every-day interactions within the school, which includes building a culture of trust (Tschannen-Moran, Salloum and Goddard, 2014). Trust, when combined with the development of positive relationships and collaborative activity, is associated with high performance (Harris and Jones, 2019). Where this is not the case, teachers focus their energy on protecting or defending themselves and

rectifying the wrongs they feel they have suffered (Tschannen-Moran, Salloum and Goddard, 2014; Tschannen-Moran and Gareis, 2015).

Extending trust through open communication and involvement in decision-making is important in building a culture of mutual trust (Tschannen-Moran and Gareis, 2015). Teachers who perceive themselves to be in an environment of mutual trust are more likely to disclose accurate information about problems and potential solutions. Mistakes can then be viewed as learning opportunities that inform adjustment of practice (Tschannen-Moran, Salloum and Goddard, 2014). As my study developed, this literature became important to developing understanding of relational aspects of the pedagogical model being developed to support growth Mindset and congruence between teaching and learning. Again, this was particularly important to my analysis in relation to the aspect of my research question that asks what the characteristics are of a social model for developing growth Mindset in my case study primary school.

## 2.5 Literature Review Chapter Summary

This literature review provides a narrative of the initial and ongoing process and critical review of key sources relevant to my research question (Agar, 2004). A central issue for my study is the relationship between Implicit Theories of Intelligence and Mindset Theory as a theory of motivation. My review discusses the different beliefs, characteristics and behaviours of learners associated with predominantly fixed and growth Mindset in existing research literature. It highlights the importance of considering the role that goal orientation, cognitive engagement and expending effort play in this process. It suggests a positive relationship between growth Mindset beliefs, outcomes for individual learners in existing literature and the possibility of particular gains for disadvantaged groups.

Central to the development of my study is the complexity of beliefs and belief systems. Beliefs are identified through my ongoing review process as a distinctive form of knowledge that enables an individual to evaluate and act on other knowledge that they hold. My review clarifies the complexity of this area and the ways in which existing research suggests beliefs are the greatest predictor of teacher behaviours. Through my review, the influence that the psychological, social and physical environment of real-world contexts, such as power relations or status effect, can have on the congruence between espoused beliefs and teacher behaviours also became central to my study. It suggests the importance of investigating through my study how metacognitive and socially metacognitive learning experiences help to make beliefs and decision-making processes visible.

One of the problems identified in the reporting my research process was in explaining how the use of the term 'collective' evolved to describe the development of Mindsets in the social learning environment of a school as an organisation. As my reading began to develop, I variously tried the terms 'social', 'community', 'collaborative' and 'shared'. I settled on the term 'collective', informed by Bandura's work on self and collective efficacy (Bandura, 2000; Klassen *et al*., 2011). The difficulty was capturing the emerging ideas in my study and explaining that at the beginning of the research I did not know what a 'Collective Mindset' was, or what the nature of the approach developed in the case study school would be, even though I had provisionally given it a name to help to anchor ideas as they evolved.

This literature review chapter contextualises my investigation, informing the focus of analysis and the development of my epistemological and methodological stance. My review and conceptual framework are further developed in the 'Findings and Analysis' and 'Discussion' chapters of this thesis, as appropriate to the iterative development of qualitative studies (Braun and Clarke, 2013; Rudestam and Newton, 2014).

# Methodology

3.1 Overview

This study adopts an applied, ethnographic case study methodology for the investigation of an approach to teaching and learning informed by Mindset Theory. This choice of methodological approach was meaningful to the context of my study, where beliefs about intelligence were a focus of whole-school development planning (Bryan, Carpenter and Hoult, 2010; Robson, 2011) and where my research problem concerned the ways in which teachers and children make sense of this (Walsh and Seale, 2018). A criticism of the existing research in the field of beliefs about intelligence and efficacy concerns the lack of qualitative and interpretive methodologies to inform change (Klassen *et al*., 2011). This is important to my study because learner characteristics and behaviours in response to such beliefs are central to aspects of my investigation. This chapter explains how I set out to design a flexible qualitative research approach that provided opportunities to deepen understanding through richly detailed descriptions and explanation (Geertz, 1994; Walsh and Seale, 2018). It clarifies how a case study design using ethnographic approaches was developed to focus on personal stories and subjective interpretations of events (Merriam, 2009; Bryan, Carpenter and Hoult, 2010; Creswell and Poth, 2018).

Variety in the nature of 'qualitative' fields of research design makes it important to define the specific nature of this study in terms of theoretical foundations and at an epistemological level (Hammersley, 2014). This chapter therefore outlines how a socio-cultural perspective informed my research design, where beliefs, behaviours and identity are considered to be influenced by interactions with the environment and with others (Takahashi, 2011). In the context of my study individuals were regarded as influencing, and being influenced by, their environment and the collective beliefs of the school community (Wenger, 1999; Farnsworth, Kleanthous and Wenger-Trayner, 2016). This chapter also expands on how I chose to combine qualities of socially constructivist and participatory approaches, particularly focusing on the co-construction of knowledge, within a naturalistic and interpretative paradigm (Savin-Baden and Howell Major, 2013; Creswell and Poth, 2018; Lincoln, Lynham and Guba, 2017).

*3.1.1 Case study design*

Definitions and application of the terms 'case' and 'case study' are contested and vary widely across disciplines and fields of study (Yazan, 2015; Schwandt and Gates, 2017). Studies vary in scale and can involve anything from an individual participant to multiple organisations or societies (Swanborn, 2010; Pring, 2015; Schwandt and Gates, 2017). To provide context for this chapter, it is therefore important to clarify from the outset that my study is a single case study of teachers and children in a primary school. Different perspectives were considered to investigate participants' experiences and understandings, as together they cultivated every-day practices for the development of beliefs about intelligence as malleable.

Different established approaches to case study contribute to my research design. Case study was selected as appropriate to an interpretive understanding of an emerging contemporary

phenomenon in a real-world context (Stake, 1995; Yazan, 2015; Yin, 2017), with the development of a pedagogical approach informed by Mindset Theory as the phenomenon. An individual case study was designed to further understanding of the complexity of activity within this specific context (Stake, 1995; Creswell and Poth, 2018); while depth and detail in the analysis of the case offered substantial narrative, allowing both the complexities and the contradictions of the real-world, social context to become visible (Flyvbjerg, 2006).

One of the initial challenges in establishing a design for my study was deciding where to set boundaries, to ensure that it was meaningfully answering the research question while remaining manageable (Denscombe, 2017). Chong and Graham (2013, p. 24) advocate a 'Russian doll' nested model, where the unit of the study as the 'micro' level of the case unit of study nests within 'meso' and 'macro' levels of context. In this case, the 'micro' level was initially identified as the teachers and children, while the 'meso' and 'macro' levels would be the wider school community and the national educational contexts. Utilising this model helped me to establish these parameters and to focus on teachers and children in the social and physical classroom environment as the unit of study. It also helped me to acknowledge the relationship and complexity of 'blurring' between this unit of study and the wider 'meso' and 'macro' cultural and political contexts (Chong and Graham, 2013; Yin, 2017, pp. 263). As a case study using ethnographic approaches, it was important that my study design could evolve over time (Walsh and Seale, 2018), which would make these boundaries a potentially dynamic aspect of the study that were reviewed and evaluated as it progressed.

The study took place over a year, and the systematic gathering of detailed information about the social and physical learning environment was designed to lead to a comprehensive understanding of how it works (Berg, 2004). Case study is sometimes misunderstood as lacking generalisability and producing information that cannot be used in different contexts, or containing bias toward verification in evidence that confirms preconceived ideas (Flyvbjerg, 2006; Cohen, Manion and Morrison, 2018). However, it is also argued that when researchers provide a full and detailed account, by immersing themselves in the context being studied and using qualitative methods, transferability can be useful to other situations (Malterud, 2001; Flyvbjerg, 2006; Lincoln, Lynham and Guba, 2017). In the context of my case study, this was important to establishing the trustworthiness and dependability of the qualitative methodology adopted for both the research process and reporting (Nowell *et al.*, 2017).

Flexible data generation methods that involved dialogue were embedded into every-day activities and settings that were familiar to my participants. These methods were incorporated into my design in this way to bring together understandings from the different perspectives of the teachers and of the children (Byrne, 2018). I considered carefully how together we could investigate the multiple realities and interpretations that they contributed, including conflicting and outlying interpretations. This provided a methodological foundation for a design that would best address my research question, concerned with beliefs and a social model of learning, while also maintaining flexibility to adapt and respond to the focus of my study as it evolved (Walsh and Seale, 2018).

There was no intended manipulation of participant behaviour during the research process. The school had engaged in its own professional learning programme about Mindset Theory almost three years prior to the start of my study. The intention of my research was explanatory, using analysis of direct classroom observation in conjunction with semi-structured interviews and focus groups aimed to illuminate naturally occurring practices (Leatham, 2006; Erkmen 2012; Gray, 2014). This approach to generation and analysis of data in naturalistic environments over the full school year, was intended to help gain insight into the dynamic every-day pedagogical practices that had evolved and were still evolving in my case study school. Adopting a case study methodology that involved ethnographic approaches allowed the school's pedagogy informed by Mindset Theory to be investigated in depth, in a real-world school context (Flyvbjerg, 2006; Yazan, 2015; Yin, 2017).

### *3.1.2 Theoretical foundations for ethnographic approaches*

For this case study of interactions between teachers and children in the physical and social learning environment, I chose to adopt reflexive ethnographic approaches. As with case study methodology, there is also considerable diversity in the prescription and practice of ethnographic research (Cohen, Manion and Morrison, 2018; Hammersley, 2018; Walsh and Seale, 2018). The variation and contention in the use of the term 'ethnography', and the many definitions of 'ethnographic approaches', make it important to provide detail and clarity when specifying the key principles informing this aspect of my design (Hammersley, 2006; Parker-Jenkins, 2018; Walford, 2018).

This section therefore critically reviews some of the key theoretical foundations and characteristics of ethnography and outlines the diversity of methodological approaches grouped under this term. It explains how the theoretical foundations of a number of ethnographic approaches have influenced my study and focuses on the reflexive, educational ethnographic approach that I developed within my case study methodology (Parker-Jenkins, 2018). Finally, it clarifies the epistemological underpinning for my choice of research design and positioning this in relation to my research aims and problem to provide a foundation for understanding of the methodological choices detailed in subsequent sections of this chapter.

One of the hallmarks of ethnographic approaches is that they are said to provide a 'description of people or cultures' (Denscombe, 2017, p. 80) through long-term immersion and participant observation in real-world settings. This allows the researcher to study 'people as they go about their every-day lives' (Buchbinder *et al*., 2006, p. 47). In addition to sustained researcher involvement in the field, such approaches are usually understood to involve intensive research of a group of people, or a particular setting, with emphasis on depth of analysis to develop detailed insights into aspects of their culture and every-day practices (Fielding, 2016). This draws attention to practices that are often so embedded and familiar to the group that they are no longer consciously aware of their significance (Madden, 2017).

Usually anthropologists using ethnographic approaches are tasked with making the strange familiar, but this is different in educational ethnographic approaches because most people are familiar with formal schooling. In education settings, it is therefore suggested that the

researcher's task is to make the familiar strange (Gordon, Holland and Lahelma, 2001). Gallagher and Fusco (2006, p. 302) suggest that 'the real power of ethnographic study, then, lies in observing and troubling such every-day practices, the ordinary and habitual moments in given cultures'. This description, emphasising the troubling of a group's every-day practices, pinpoints another distinctive characteristic of many forms of contemporary research involving ethnographic approaches.

Concern has been expressed that some contemporary researchers, claiming to use ethnographic approaches, may only visit a site of study sporadically or on a small number of occasions (Hammersley, 2006). It is suggested that this may not only limit data collection opportunities, but also risk significant change in behaviour by participants due to the unfamiliar presence of the researcher. In the case of my study, immersion in the field and sustained engagement with participants provided opportunities for me to gradually build relationships that supported critical dialogue which could support this 'troubling' as part of the analysis of their practices (Mills and Morton, 2013). This began with an initial series of visits to discuss the research with school leaders before any commitment was made to participation.

Sustained participant observation, combined with responsive opportunities to interview and discuss interpretation and analysis of data, provided opportunities to talk with participants about observations, challenging and unpicking problematic contradictions in my study. This meant that I was able to more sensitively judge when it might be most appropriate to highlight patterns and incongruences that I observed during analysis as we furthered the investigation (Swain, 2006; Madden, 2017). Participants became increasingly willing to share their explanations and understandings and to problematise or trouble their every-day experiences.

The Chicago School of Sociology introduced a more critical edge to the field in the 1960s, for the study of cultural groups in America (Fielding, 2016; Walsh and Seale, 2018). Their focus was on collecting detailed information intended to deconstruct patterns in the lives of participants relating to social engagement and power (Parker-Jenkins, 2018). While in the 1970s, Geertz (1973) introduced a focus on producing rich and think data for the explanation of what he referred to as 'webs of meaning'. Geertz's approach was a significant departure from the earlier positivist epistemological stance in ethnography. He considered ethnographic approaches to generate a distinctive type of knowledge, which he referred to as 'thick description' (Geertz, 1973; Walsh and Seale, 2018).

Particularly important to Geeetz's (1973) contribution was his suggestion that rather than attempting objective interpretation, his analysis and his reflexive interpretation made a valuable contribution to the research process. My study was designed to generate detailed and rich data from observation, interview and focus groups with teachers and children using my analysis and interpretation to craft codes and themes (Braun and Clarke, 2013). To an extent, I also engaged teachers in data analysis and interpretation during the individual debriefing and group review meetings that followed each data generation activity. This allowed me to gain even further insight into their webs of meaning from their perspectives and use their analysis and interpretation to co-construct meanings.

I decided to adopt the reflexive approach of scrapbook journaling to reflect on experiences in the field, which helped me to plan my next moves using our ongoing analysis of data to inform planning of further data generation opportunities (Braun and Clarke, 2019). Working over a relatively long timescale made negotiating flexible planning for data generation logistically feasible. It also accommodated logistical disruptions to my data generation schedule that were unfortunate, but that I had anticipated in a year-long study.

Ethnographic approaches to research have become increasingly popular internationally in the field of education. Mills and Morton (2013, p.2) suggest that 'If education is always risky, always unsettling, then ethnography is the perfect method to capture its dynamism and power'. My study focused on the ways in which pedagogical approaches were being developed and beliefs about intelligence as malleable were central to my research question. A combination of data generation methods, focused on perspective and involved interactions between the participants, provided the opportunity to consider what was happening from participant perspectives and to capture the dynamism and power of the situation.

In my study, these opportunities for developing socially constructed knowledge were designed to not only address 'what' was happening in the classroom, but also to shed light on how social realities were being generated, formed and sustained; how their beliefs were being built through social learning processes between teachers and children (Silverman, 2012). This created lenses that could help me to highlight the taken for granted and question the familiar while challenging my assumptions. Together we gradually built our understandings of significant features of the every-day pedagogical practices in my case study school (Mills and Morton, 2013).

*3.1.3 Contemporary ethnographic approaches*

During the historical development of ethnographic approaches, diverse influences have led to the formation of wide-ranging approaches grouped under the term of contemporary ethnography; from German folk psychology and culture theory to post-modernism, critical realism and feminism (Gordon, Holland and Lahelma, 2001; Hammersley, 2018). Within the development of these contemporary approaches, which have continued to break with the traditions of objective scientific enquiry, it is acknowledged that there is a genuinely interpretive and participatory part for the researcher to play in analysis (Walsh and Seale, 2018). This development has offered new perspectives on researcher subjectivity and the importance of how their biographies heighten the importance and value of researcher reflexivity (Angrosino, 2005; Mills and Morton, 2013).

Developing an understanding of the possible and multiple roles of 'self' in different ethnographic approaches helped me to identify the role that I intended to have within my study and consider forms of reflexive practice that would support this particularly in data generation, analysis and interpretation (Braun and Clarke, 2013). In addition to reflexive journaling, I engaged in collective approaches that included participant validation and analysis with participants and debriefing by peers and colleagues. This allowed multiple interpretations in coding and analysis processes to introduce different standpoints into the knowledge building process (Seale, 2018). This was valuable in determining the extent to

which data interpretation was reasonable, fair representations of the routines, norms and incongruences of the every-day social learning context. These processes helped me to identify and challenge my assumptions, acknowledging and reducing potential bias (Denscombe, 2017).

Another influence on my design and decision-making came from the theoretical foundations of Critical Ethnography, which is an approach that has been adopted in some education research studies. This approach has its theoretical foundations in critical theory (Gordon, Holland and Lahelma, 2001). My study was concerned with structure, agency and empowerment, as elements of the real-world school context. The sampling, data generation and analysis engage with the status of teachers and children; the self-regulation and autonomy of teachers and children within the school and their power to contribute to pedagogical development.

*3.1.4 Reflexive educational ethnographic approaches*

Within my case study methodology, I decided to adopt ethnographic approaches that were particularly informed by reflexive and educational forms of ethnography (Mills and Morton, 2013). These main influences were intended to support an iterative and responsive research design process with a focus on pedagogical practices that valued co-construction of meaning using different participant perspectives (Gordon, Holland and Lahelma, 2001). It was important to the quality of my research that approaches adopted were defined and were aligned to the research problem and aims (Hammersley, 2018). Savin-Baden and Howell Major (2013) suggest that making choices during the design and implementation is a significant aspect in the shaping of and operation of the role of researcher in qualitative studies. Emphasis is placed on the careful and conscious consideration of options at each 'choice moment' (p. 36) to heighten awareness of potential bias and create a structure within which consistency between choices that contributes to the congruence and robustness of the design.

In line with the reflexive processes of contemporary ethnographic approaches I pursued a recursive process of decision-making (Agar, 2004). More than a branching process, my choices were not only about what to do next, but were connected across and between different elements of the research. The flexible and responsive nature of my study created a recursive process; going backwards and forwards between the different aspects of the research design, implementation and reporting as the study evolved (Bogdan and Biklen, 2007; Walsh and Seale, 2018). I chose questions, methodology and methods that would address the research problem and open up ideas to problematise issues for investigation.

When writing this thesis I have also attempted to critically reflect on my role in knowledge production to mediate the effect of my personal characteristics, biography, conceptual frameworks and prejudices (Braun and Clarke 2013; Bettez, 2015), while establishing a double narrative within the representation that detailed the history of both construction and differences in analysis (Agar, 2004). Reporting these reflexive elements of my study design and process was a significant point of learning for me personally as a researcher, finding the choices involved in writing the thesis challenging as I attempted to communicate with clarity and authority about the findings while sharing the complexity of the processes (Wisker,

2015). To address these issues I restructured the writing of my thesis using Agar's (2004) five Fitness Landscape constraints as a framework to mediate the balance of these three areas throughout my writing of the thesis. This provided a structure that helped me to create a clear representation and evaluate how its boundary would connect with the subject, researcher and audience boundaries in the communication of the research process and findings.

*3.1.5 Quality in combined case study and ethnographic approaches*

Lincoln, Lynham and Guba (2017) argue that the lines between different paradigms and methodologies are sometimes drawn too tightly and that creative synthesis can carefully be developed to add to the power of the research to address the research problem. Bringing case study and ethnographic approaches together is identified as bringing different strengths to research design that may mitigate against potential limitations; utilising a range of dynamic and evolving methods that develop within a clearly bounded context in terms of both space and time (Fusch, Fusch and Ness, 2017). In this way the combination of case study and ethnographic approaches sets some initial boundaries for me as the researcher, beginning with a set of specified questions pertaining to school life (Gordon, Holland and Lahelma, 2001), while still allowing for the flexible and reflexive educational ethnographic approaches in developing a responsive and recursive design (Parker-Jenkins, 2018).

I began with the teachers and children as a unit of study, located within the school context, acknowledging the wider educational and political context. This provided a structure and focus to initiate the study, while employing ethnographic approaches then allowed the focus of the study to progressively evolve (Stake, 2010). For example, initially I had identified three explicit sub-questions to help me answer the research question within this context, however, once data generation and analysis had begun it became apparent that a fourth implicit sub-question was surfacing. Through analysis a question was evolving that focused directly on how the social aspects of pedagogical approaches add to the development of growth Mindset.

From the outset, quality criteria outlined by Braun and Clarke (2006) provided an initial framework to guide the ongoing evaluation of the quality and rigour of the overall qualitative research process (see Table 1).

| Process | Criteria |
|---|---|
| Transcription | 1. The data have been translated to an appropriate level of detail and the transcripts have been checked against the tapes for 'accuracy'. |
| Coding | 2. Each data item has been given equal attention in the coding process.<br>3. Themes have not been generated from a few vivid examples (an anecdotal approach) but instead the coding process has been thorough, inclusive and comprehensive.<br>4. All relevant data extracts for each theme have been collated.<br>5. Themes have been checked against each other and back to the original data set.<br>6. Themes are internally coherent, consistent and distinctive. |

| | |
|---|---|
| Analysis | 7. Data have been analysed – interpreted, made sense of – rather than just paraphrased or described.<br>8. Analysis and data match each other – the extracts illustrate analytical claims.<br>9. Analysis tells a convincing and well organised story about the data and topic.<br>10. A good balance between analytic narrative and illustrative extracts is provided. |
| Overall | 11. Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly. |
| Written Report | 12. The assumptions about, and specific approach to, Thematic Analysis are clearly explicated.<br>13. There is a good fit between what you claim you do and what you show you have done – i.e., described method and reported analysis are consistent.<br>14. The language and concepts used in the report are consistent with the epistemological position of the analysis.<br>15. The researcher is positioned as active in the research process; themes do not just 'emerge'. |

*Table. 1: Criteria for qualitative research from Braun and Clarke (2006, p. 96)*

While appearing to have a specific ordering, the criteria included in this framework (Table 1) are intended to be utilised in a recursive and iterative process (Braun and Clarke, 2006), appropriate to the nonlinear structures associated with the ethnographic approaches of my design. While I applied these criteria in an ongoing process of rigorous and systematic collaborative evaluation, at each stage of the research process reflexive decision-making informed the flexible and recursive movement between the criteria (Braun and Clarke, 2006).

Identifying one effective and generic set of criteria by which quality in qualitative research can be evaluated is strongly contested (Braun and Clarke, 2006; Hammersley, 2007; Twining *et al*., 2017). There are many examples of criteria for quality in ethnographic approaches discussed in the literature, some of which have been synthesised into lists of criteria for judging the quality of a study (Cohen, Manion and Morrison, 2018; Hammersley, 2018). For the purpose of my study, in addition to Braun and Clarke's (2006) criteria, I also identified criteria relevant to the reflexive educational ethnographic approaches adopted within my case study design. Walsh (2012) outlines three key criteria that he suggests are distinctive in ethnographic studies: The constant, iterative and informing interaction between different parts of the research process, combining methods that focus on social interaction in the field and the role of researcher as primary instrument in the research design, process and representation (Walsh and Seale, 2018).

### *3.1.6 Epistemological underpinning for research design*

The diversity in interpretation and definitions of ethnographic approaches made specifying my philosophical stance and the epistemological underpinning for my choice of research design important to the trustworthiness and dependability of the research (Hammersley, 2007; Savin-Baden and Howell Major, 2013; Twining *et al*., 2017). Developing awareness of my philosophical stance helped to inform the ongoing research design development and the quality and consistency of my researcher choices during the research process (Savin-Baden and Howell Major, 2013). In this way, I could use the beliefs and underlying assumptions

that I used to make sense of my work to consciously inform my methodological and values. This, in turn, informed my researcher perspectives and decision-making in relation to approaches and methods at different stages in the research. This process provided a framework to guide my actions and behaviours during implementation of my study.

While traditional ethnographic approaches are characteristically associated with a realist view of the world, in contemporary reflexive and educational approaches knowledge is more frequently understood as socially constructed and is socio-culturally and contextually bound (Walsh and Seale, 2018). My research design was influenced by these contemporary approaches for the description and analysis of every-day practices that have emerged out of constructionism. Knowledge in this context was recognised as being a product of researcher and participant understandings, with meaning made collectively by learning about the knowledge that we each held (Schuh and Barab, 2008; Savin-Baden and Howell Major, 2013).

The importance of making sense of social action in terms of the actors' social situation and attempts to understand the pedagogies being developed from the teachers' and children's point of view informed my methodological choices (O'Connell, 2017). I adopted a pluralist position, suggesting critical reflection on 'truths' as individuals construct shared experiences of them together (Stake, 2010; Savin-Baden and Howell Major, 2013). My aim was to better understand the local knowledge, or knowledges, created within the school culture of shared artefacts and actions and their shared meanings being constructed between the teachers and with the children as they actively engaged in the development of new pedagogies (Savin-Baden and Howell Major, 2013).

This methodological overview positions my research and articulates my epistemological and ontological perspectives to clarify my philosophical and methodological stance. It establishes how my research methodology is underpinned by a philosophy that values human experience in the social construction of pluralist ways of knowing; where multiple ways of knowing lead to multiple truths to build a web of significance that illuminates the ever-evolving processes of change within the school setting. Details of specific practical aspects of my approach are further developed in the following sections of this chapter, focusing the ethical, methodological and epistemological grounding for choices made in relation to the specific methods adopted in data generation and analysis.

## 3.2 Ethical considerations

This section includes details of the procedural aspects of the ethical approval process for my study, considers the regulatory processes involved in gaining ethical consent from the university's ethics committee and reflects on the ongoing process of ethical decision-making during the implementation of my research. Ethics can be defined as 'the moral philosophy or set of moral principles underpinning a project' (Aubrey *et al*., 2005, p. 156). This section discusses how the moral principles underpinning my research were enacted and the ethical considerations and decision-making processes that were ongoing throughout the research. It outlines both my 'procedural ethics' and how I maintained 'ethics in practice' (Guilleum and Gillam, 2004, p. 263) to provide an epistemological and philosophical foundation for my study.

While unpicking the problematic issue of concerns around the interpretation and implementation of Mindset Theory, it was important for me to make careful ethical decisions about how I would plan to generate data, conduct analysis and report information (Wang, 2013). I recognised that my choice of topic, involving the development of pedagogies that might influence children's beliefs about their capabilities, would need me to be sensitive to potentially complex ethical issues relating to power, influence and relationships.

### *3.2.1 Ethics in research design*

Decisions about the ethical underpinning of the research design would be important in influencing not only the kind of research I would do during the sustained research process, but also the kind of researcher I would become (Brooks, te Rielee and Maguire, 2016). I recognised from the outset that establishing and sustaining integrity in the research topic and design would be a core ethical issue (Stutchbury and Fox, 2009). To begin this process, I decided to use what Clough and Nutbrown (2012, p. 41) describe as the 'Goldilocks' principle. I avoided focusing my design around 'cold', meaningless questions, or 'hot' questions that might imply judgment or comparison of individuals with each other. Instead, framed my question to focus on developing characteristics of good practice. Rather than concentrating on whether an individual was doing something successfully or not, it focused on what people do and how they develop practice together in relation to Mindset Theory. This was not to avoid troubling the sometimes complex and messy aspects of practice that I was interested in (Greig, Taylor and MacKay, 2007), but was intended to take a positive, caring and collaborative stance to produce an ethical, critical and meaningful focus.

Choosing an appropriate methodology also brought with it responsibility, which required careful ethical consideration (Sikes, 2004; Mills and Morton, 2013). In my initial planning of a case study using ethnographic approaches, it was particularly important to consider the potentially difficult ethical and moral issues in the development of relations in the field (Wang, 2013). Before fieldwork even began, I needed to consider what the influence of power might be in the social research encounters that were involved in my design. The pilot and proposal writing process helped me to understand how critical it was to remain alert to the potential impact of my presence and the research process on my participants and

context (Sikes, 2004). They also provided a structure to guide consideration of wider ethical issues pertaining to development of an individual case study using reflexive educational ethnographic approaches (3.1.4).

One of the other key considerations for my research within a school setting was the reality of being critical in a political context (Silverman, 2012). My choice of topic invited participants to critically engage with and question policy and practice within a political environment. In my case study school, assumed autonomy had to be balanced with consideration and acknowledgement of accountabilities. With potential for new knowledge to contradict established thinking, it was important to make clear that possible challenges would be presented as a constructive, critical examination of practice. Ongoing, reflexive consideration of moral and ethical issues embedded in the every-day research activity of my study helped me to consider how potential power differentials in each relationship might create risk for participants or for me as the researcher.

*3.2.2 Ethical approval procedure*

My study was designed in accordance with the British Education Research Association's (BERA) Ethical Guidelines (BERA, 2018). The university's ethics committee approved a detailed ethical plan before research activity for the study began (Appendix A). Eventualities and possibilities for potential harm to the participants, researcher or other stakeholders were considered from the outset (Sikes, 2004; Mills and Morton, 2013). These were reviewed regularly during the process of data generation because of the iterative nature of the study (Denscombe, 2010; Hammersley, 2018). This provided initial structure for consideration of potential ethical issues, dilemmas and potential hazards that might occur in the reality of my research practice (Guilleum and Gillam, 2004).

In addition to non-maleficence, beneficence, risk and power it was also particularly important in a study involving the investigation of practice to consider dignity and respect for participants (Cohen, Manion and Morrison, 2018). The ethical approval procedure helped me to anticipate that both the research topic and methodological approach might require careful, professional representation of problematic and troubled findings relating to practice. I would need to be sensitive to any discomfort that participants might feel in the challenging of established 'truths'; a study of this nature might surface previously unconsidered beliefs and troublesome knowledge relating to the participants' teaching practices.

While the initial ethical approval procedures supported my endeavour to prevent any harmful effects of my research projects (Sikes, 2004; Ali and Kelly, 2018), I was also aware that there is sustained critical debate about limitations of standardised checklists of principles. This includes challenges to the value of their generalised nature and lack of relevance to context (Guilleum and Gillam, 2004; Hammersley, 2015; Brooks, te Rielee and Maguire, 2016). It was therefore important to consider how the specific nature of my research would generate situated ethical considerations and to acknowledge the importance

of ongoing decision-making during the study (Brooks, te Rielee and Maguire, 2016; Cohen, Manion and Morrison, 2018).

### *3.2.3 Ongoing process of ethical consideration*

There is a danger that the identification of ethical considerations can be understood to be a specific stage in the research process, rather than being embedded in research design as an ongoing concern (Guilleum and Gillam, 2004). I built in opportunities for reflexive, regulatory processes to be ongoing, using my personal ethics and collaborating with others to support my moral decision-making throughout the experience (Stutchbury and Fox, 2009; Ali and Kelly, 2018; Cohen, Manion and Morrison, 2018). The ethical plan submitted for approval to the university's ethics committee acted as a starting point for developing the ongoing reflexive ethical practice outlined in the remaining sections of this chapter (Guilleum and Gillam, 2004). This required continuous, critical scrutiny in terms of my own behaviours, concern for participants, data management and the context of my research activity.

A key consideration in my design was the challenges of an evolving, explanatory methodology, where ethical issues emerging during the research process may be nuanced and complex (Stutchbury and Fox, 2009; Braun and Clarke, 2013). In the complex context of a qualitative, ethnographic research approach, a procedural checklist is considered by some researchers to be restrictive (Miller and Boulton, 2007; Stutchbury and Fox, 2009; Hammersley, 2015; Brooks, te Rielee and Maguire, 2016).

An example of the need for both procedural and ongoing ethical consideration during my study was in my use of photographs (Ali, 2018). These photographs contained examples of artefacts that supported recall of observations (Bogdan and Biklen, 2007). They also provided a stimulus for discussion during individual teacher interviews (Harper, 2002), such as children's work, classroom resources, written feedback or systems for recording rewards. Out of respect for anonymity, it was stated from the outset that photographs would not include any images of participants' faces, names or other identifying features. However, taking and storing these images required rigorous, ongoing ethical analysis to ensure that, the backgrounds or details in the images did not make individuals or the school identifiable when viewed together.

In the real-world context of my case study school, it was important to consider ethical issues within the relational dynamics of the social setting. The uneven distribution of power within these dynamics would have ethical implications for participants, for stakeholders within the wider school community and for me as the researcher (Ali and Kelly, 2018). Specific concerns were identified as particularly relevant to my small-scale qualitative design, taking into account the multimethod data generation and ethnographic approaches that would involve teachers and children. These included sample selection, participant recruitment, gaining and sustaining informed consent and maintaining anonymity, which were highlighted as particularly important ethical considerations in both the 'procedural ethics' and sustained 'ethics in practice' of my study (Guilleum and Gillam, 2004, p. 263). Accounts of examples

involving specific decision-making processes contained within the relevant sections of this thesis.

At each stage during this ongoing ethical consideration process, it was important for me to be aware of my own ethical philosophy and to critically consider the role this might play in making decisions (Guilleum and Gillam, 2004). I therefore chose to adopt the use of a moral framework (Figure 1), which is designed to sharpen ethical awareness and support researchers in dealing with issues arising in the process of their research (Seedhouse, 2008; Stutchbury and Fox, 2009).

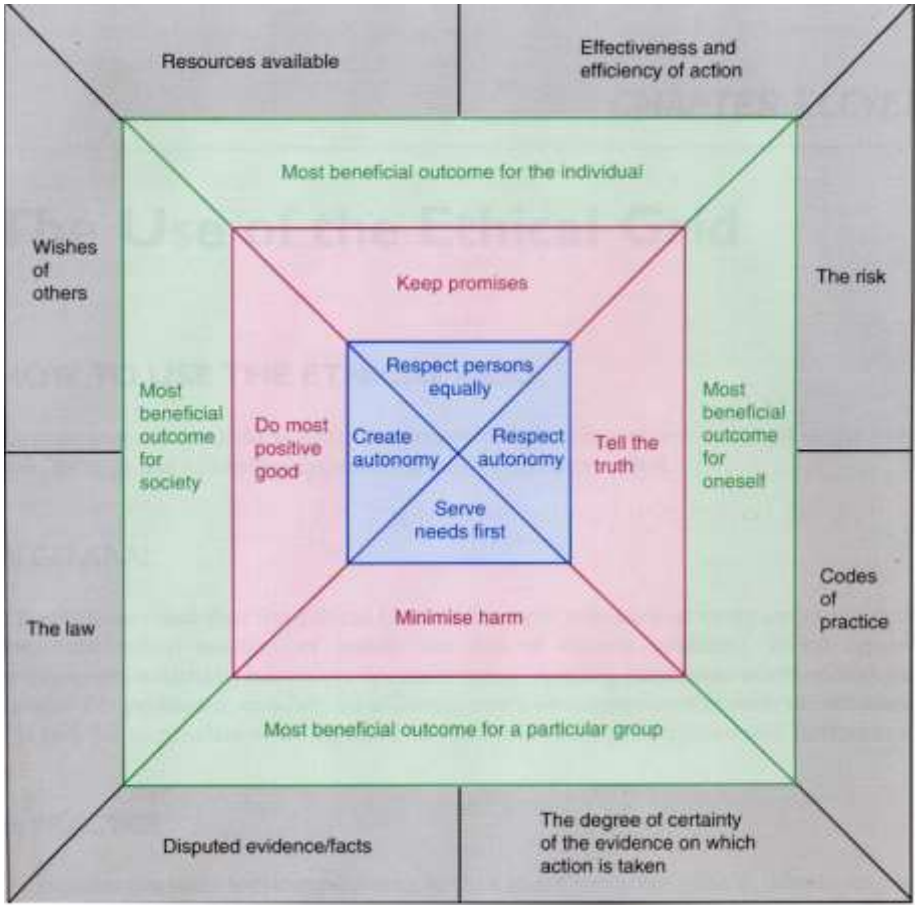



*Fig. 1: Seedhouse's Ethical Grid (2008, p. 164)*

The grid in Figure 1 provides a comprehensive structure for the practical consideration of ethical dilemmas, encouraging systematic thought to help discover 'unseen corners' and explore 'new avenues' (Seedhouse, 2008, p. 208). I followed a useful methodology provided by Stutchbury and Fox (2009), for the application of Seedhouse's (2008) Ethical Grid in education research. What is distinctive about their application of this framework, is that it supports comprehensive ethical analysis throughout the research process and is designed to be adapted and extended to apply to a specific research context. This provided a framework for analysis of what Guilleum and Gillam (2004) refer to as 'ethically important moments' to sharpen my awareness in relation to smaller-scale every-day ethical questions and dilemmas.

*3.2.4 Ethics in recording, transcription and storage of data*

Details of how data would be securely managed to respect confidentiality were outlined in the application for ethical approval and permission was specifically sort for audio recording and the use of photography. Recordings and images were made using the university's digital recording devices (Appendix A). Electronic data were stored securely on an encrypted device (BERA, 2018) while hard copy data, such as printed photographs, hand written field notes and my scrapbook journal, were stored on secure premises in a locked cabinet (Ali and Kelly, 2018; BERA, 2018). Use and storage of data during my study was aligned to the university's policy, the General Data Protection Regulation (2018) and the Data Protection Act (2018). Participants and those giving permission for participation, were informed that all data would be destroyed after completion of the study (Ali and Kelly, 2018). They were given detailed written information about proposed data generation methods and were invited to attend a presentation before giving written consent (3.2.5).

I decided that it would be pragmatic to use a transcription service for the teacher focus groups and interviews. This involved the consideration of careful selection, secure electronic transfer of data and the completion of an agreement for assurance of data storage and management (BERA, 2018). While this did save some time, I found that it was still necessary to go painstakingly through the detail of every transcript and recording, to check that they matched and to clarify specialist terminology. This was disappointing in terms of economy of time, but it was a useful and informative process, through which I developed much greater familiarity with the detail of the data (Braun and Clarke, 2006). Finding this unfolding process useful, fascinating and unexpectedly enjoyable, I decided to transcribe the remaining data myself.

*3.2.5 Sample selection*

A single school was selected purposefully as an information rich case and my data generation took place over a school year (Flyvbjerg, 2006; Gray, 2014). The school is a one-form entry primary school in a town in the North West of England. It was assessed at its most recent inspection as 'good' and has a proportion of disadvantaged pupils supported by the Pupil Premium similar to other schools benchmarked comparable with demographics nationally. The children attending the school come from the town itself and from surrounding villages and farms. At the time of the study, there were 192 children on roll and eight members of teaching staff.

A letter of invitation was sent to schools across a wide geographical area, with four criteria for participation specified and inviting expressions of interest. The schools expressing interest should have been engaged in a process of developing pedagogical approaches that encourage growth Mindset for a minimum of two years, be open and willing to share the highs and lows of this experience, and be able to dedicate time to working flexibly with the researcher. It was made clear in the letter of invitation that the research would involve two staff meetings, classroom observations, focus groups and interviews with teachers and children across the school year.

Four schools indicated an interest in participating in my study. The first was a small school in a rural setting, with mixed-age classes, while the second and third were situated in large cities and have multiple-form entry. I had worked with each of these settings on previous occasions, which informed my decision to work with the fourth school. This school had a mixed urban and rural catchment and offered greater scope for me to fully develop my researcher identity without the influence of previous collaboration (Ali and Kelly, 2018; BERA, 2018).

My case study was within a single school, so a key ethical consideration when recruiting participants was the possible influence of power relations in allowing teachers or children to decline or withdraw participation (Karnieli-Miller, Strier and Pessach, 2009). To reduce the risk of power differentials making it difficult for teachers to decline, I gave a short briefing to provide clarity about the purpose and design through written, informed consent was gained and the right to withdraw reviewed throughout the process (Denscombe, 2010; Ali and Kelly, 2018). Participants were given the opportunity to discuss and identify boundaries and the flexibility of the design could accommodate appropriate changes. While research literature suggested that teachers might sometimes feel able to say 'no' more easily to an outsider, I decided to keep this process of volunteering confidential to minimise any pressure the teachers might feel to participate (Brooks, te Rielee and Maguire, 2016).

All of the teachers consented to participation in the study, which offered an unexpected dilemma. I had to decide how many observations and interviews would be substantial enough to provide rich data for detailed 'thick description' and explanation (Geertz, 1994), whilst also being logistically manageable within the given timeframe (Parker-Jenkins, 2018; Walsh and Seale, 2018). The school is organised into three phases, so I decided to select teachers from across the range; the Early Years unit, the younger Key Stage One primary phase and the older Key Stage Two primary phase. This range included classes with children from three to eleven years of age.

I decided not to select the teacher who was teaching the oldest age group for observation because they were preparing for statutory national exams. This was a difficult decision because the potential pressure of the exam context might have been interesting for my study's focus on children's responses to challenge, difficulty and failure (Sun, 2015; Hooper, 2016, cited in Haimovitz and Dweck, 2017). While this opportunity made it tempting to take my study in a new direction and investigate the exam context, I decided to remain committed to my focus on every-day teaching practices.

The seven children participating in the focus group using participatory mapping were from the School Council, which is comprised of elected members from each year group in both of the primary phases. The head teacher confirmed that they had been selected by their peers for the council and represented a range of attainment relating to the national expectation for their age. The sample of children for this activity was not intended to be representative of the schools' population; in my multimethod approach it was one of a number of lenses through which different perspectives could contribute to knowledge production (Guilleum and Gillam, 2004; Braun and Clarke, 2013). This form of non-probability, purposeful

selection was suited to a small-scale study and intended to create a context where familiarity allowed for more confident and extended responses to questions (Teddie and Yu, 2007). These children were used to working in a cross phase group to share views and ideas about practices within the case study school.

Using the small and established School Council group still presented some possible limitations for my focus group with children (Twining *et al*., 2017). A group voted for by other children might naturally comprise of more confident or socially competent children. However, possible social confidence and competence, combined with the familiarity of the group, also had the potential to elicit greater detail in contributions to dialogue and the co-construction of knowledge incorporating children's own views and meanings (Frazer *et al*., 2004). While this could be perceived to be an advantage, it was also important during data generation and analysis to consider how familiarity and any established perceptions of status within the group might impact upon contributions to knowledge creation (Chiu and Kuo, 2010).

## 3.3 Data generation methods

### *3.3.1 Overview of five methods*

This section provides an overview of how multiple data generation methods were responsively sequenced using ongoing analysis to inform decision-making (Bogdan and Biklen, 2007; Walsh and Seale, 2018). Each of the data generation methods, the analysis of data and the ongoing relationship with the research literature iteratively supported my investigation of the characteristics of a social model of pedagogy informed by Mindset Theory in my case study school.

Data generation took place over a period of three school terms and utilised the lenses of the research literature, the teacher, the child and the researcher to reflect on practice (Brookfield, 2017). I combined five methods appropriate to a case study; an initial teacher focus group, researcher participant observation, individual teacher interviews, a focus group with children using a participatory mapping technique and a final teacher focus group. Following my preliminary visits, I completed twelve full days of participatory observation combined with occasional, shorter observation and review visits throughout the year. I also conducted four one-hour teacher interviews, a one-hour focus group with children and two focus group staff meetings.

Participatory observation, while time consuming (Mills and Morton, 2013; Parker-Jenkins, 2018), was combined with other methods to provide understanding of how the culture of the school and the shared wisdom of the school community relate to each other and the development of collective beliefs and practices. Focus groups and interviews were combined with these observations to provide opportunities to expand on specific aspects of data and elicit the perspectives of the teachers and children in a two-way, open conversational approach (Kvale and Brinkmann, 2009; Collins, Doherty-Sneddon and Doherty, 2014).

A dual metaphor of a miner and a traveler is used by Kvale to explain different researcher approaches to interview (Kvale, 1996; Kvale and Brinkmann, 2009). This metaphor describes differing intentions that researchers may have; one of a miner cutting in with the intention of extricating specific knowledge or that of a traveller who journeys alongside participants to gain understanding of their experiences. This image of the traveller reflected my intention during interviews and across my other data generation methods. Rather than mining for specific information, I asked initial questions that encouraged participants to expand on what I had observed and what they said. This was particularly important to my focus group with children, where a small number of planned questions were designed to stimulate conversations to unpick in greater detail what they think and know (Elton-Chalcraft, 2011).

Methods were selected that involved participants in dialogue and analysis of practice, including situated encounters (Slembrouck and Hall, 2011; Mills and Morton, 2013) to bring together different perspectives to answer the research questions. In a flexible and iterative process of data generation, analysis and continued reading, the individual teacher interviews took place during each period of observation with the relevant class teacher. This immersion

and responsive planning of data generation over time allowed me to capture significant events with immediacy and to elicit both atypical and typical aspects of every-day practices (Parker-Jenkins, 2018). Systematic data generation and inductive analysis allowed themes and findings to be inferred cumulatively from the data during the research process so the study could progressively develop and evolve (Stake, 2010; Hamilton and Corbett-Whittier, 2013; Yanzin, 2015).

### *3.3.2 Method 1: Initial teacher focus group using process mapping*

A teacher focus group, using a process mapping activity, investigated aspects of the research question that related to teachers' practices and their understanding of intelligence. This focus group took place during a routine staff meeting at the end of the school day (Jacques and Buckles, 2013). Process mapping is a collaborative activity where participants identified significant practices and their aims and then selected which they considered to be most important. All eight of the teaching staff contributed to this element of the data generation, which stimulated an evaluative dialogue about practices and priorities. To initiate my investigation of the characteristics of a social model for developing growth Mindset, this initial focus group focused on how the teachers understand intelligence and how they relate this to their every-day practices. It also addressed the aspect of my research question concerned with the ways in which teachers strive to develop children's conception of intelligence as malleable in the real-world context of the case study school.

Each teacher was asked to individually record every-day teaching practices that they consider develop or sustain growth Mindset. They wrote each response on a separate post-it and then shared and explained the significance of the practices that they had identified. As a group, they combined their responses to create and name categories of their own devising (Blake and Varney, 2004). They were given an opportunity to add additional examples from practice to the categories. Finally, they made an analysis of the practices in relation to frequency and impact (Hattie, 2012) using a systematic procedure to map them together on a large grid. On the grid's vertical axis they mapped them against a continuum to define perception of impact, and along the grid's horizontal axis to record their perception of the frequency of the activity (Robson, 2011). Photographs were taken of their responses for my future recall (Bogdan and Biklen, 2007), but it was the process of ideas generation, explanation and decision-making that was important to creating rich data. Dialogue was recorded for analysis and examples from transcripts are included in the Findings and Analysis chapter of this thesis (Chapter 4) to illustrate how data have been interpreted.

My preliminary visits to the setting provided an opportunity for adults and children to become familiar with my presence around the school before this first focus group activity (Bryman, 2015; Cohen, Manion and Morrison, 2018). During this time, I engaged in every-day social dialogue with teachers and children outside the area of research (Rutterford, 2012; Cohen, Manion and Morrison, 2018). The relatively long-term process of data generation also provided time to build familiarity to minimize awareness of the investigation and researcher presence leading to changes in use of language and behavior, particularly associated with focus groups (Atkinson, 2006; Hammersley, 2018). It is argued that it is

unrealistic to believe it possible to remove the influence of the researcher on knowledge production, which is sometimes referred to as the 'Hawthorne effect' (Agar, 2004). I decided that it would be useful to identify and acknowledge this as a possibility, include purposeful activities in my research design to try to reduce negative influences and to be sensitive to potential impact during my analysis.

The initial recording of individual ideas on post-its was designed to help to reduce the risk of this social aspect of the focus group method leading to pressure to form group consensus, or participants being drawn into 'groupthink' where they may be unconsciously influenced by the pressure of consensus (Fusch, Fusch and Ness, 2017, p 932). The social construction of knowledge through the dialogue in this method was intentionally aligned to my epistemology; allowing understanding of the social context to be informed by way its members make sense of it (Walsh and Seale, 2018). This method also valued the contribution of multiple interpretations derived from participants' different perspectives and realities (Cohen, Manion and Morrison, 2018).

To reduce problems associated with another potential limitation of the focus group approach, I provided a set of five prompts for the participants to keep the discussion constructively aligned to the research questions (Appendix B). These prompts were designed to sustain the focus of the dialogue on the research questions while allowing the group lead and control the process (Denscombe, 2010). The teachers were provided with a copy of the prompts and invited to share responsibility for facilitation of the dialogue. Participant checking was built into this focus group, providing opportunities to clarify meaning to support the trustworthiness of the data (Lankshear and Knobel, 2004; Nowell *et al.,* 2017). In my schedule for the focus groups, I reminded the group of the need to respect confidentiality for each other and acknowledged the complexities of anonymity and disclosure in this context (Walford, 2018). During the process of data generation, members of the group would be aware that they could recall each other's individual contributions and I considered the influence this might have had on their responses during my analysis.

### *3.3.3 Method 2: Researcher participatory observation*

Following the initial teacher focus group, four of the teachers were observed in the classroom and interviewed individually, with this sample selection based on a distribution of volunteers from across class age group phases (3.2.5). As with the focus group, preliminary classroom visits helped to build familiarity and rapport to make my presence in school an accepted norm before participant observation sessions began (Hammersley, 2006; Cohen, Manion and Morrison, 2018). The intention was that, over time, while the teachers and children were aware of the purpose of my visits, I would become less obtrusive as they became used to having me there (Bryman, 2015). The participant observer role is interpreted in many different ways, from complete observation to complete participation (Mills and Morton, 2013; Hammersley and Atkinson, 2019). To create minimal disruption to routine, I adopted a similar role and routine to other adults working in the classroom.

When I spent full days in the classroom, I arrived when other staff arrived, helped to set up for the day, supported learning, had lunch with staff and stayed to talk about the day with the teacher and teaching assistant. Spending a sustained length of time in the field required

ethical sensitivity in terms of avoiding invasion of privacy or intrusion for teachers and children (Hammersley, 2015). I was invited to use the staffroom as a social and working space and spent time in the playground talking to children. This offered the opportunity to ease communication and develop more natural opportunities for open dialogue, but again required sensitive management and I paid attention to trying to achieve a balance between developing familiarity and preserving participants' privacy.

My observations were informed by my research question and focused on characteristics of a social model for developing growth Mindset and the processes and conditions for its development within my case study school. Participatory observation generated full field notes of incidents, interactions, discussion, initial ideas for interpretation during observations. Where possible, field notes were recorded immediately in a small notebook to reduce loss of accuracy through delay in recall (Mills and Morton, 2013). My notebook fitted into my pocket but as a 'participant' observer it was not always possible to make notes immediately, for example when participating as umpire for a game of rounders on the playing field or making repeating pattern prints in finger painting.

Where making an immediate record was not appropriate, mental notes and jotted notes were recorded in the notebook format as soon as possible and further full field notes were then recorded to amplify the notes collected during the day (Bryman, 2015). Photographs were taken as a visual record of resources in the physical environment to simplify collection of information and to support recall and reflection in analysis (Bogdan and Biklen, 2007). They were used with the field notes as a stimulus for reflexive journaling in a scrap-book format (Walsh and Seale, 2018). I ring-fenced time following each observation to make sure notes were legible and to expand on any abbreviations and ideas. Extracts from these field notes and journal are included in the Findings and Analysis chapter of this thesis.

As part of the ongoing process of ethical consideration, I kept returning to consultation and remained aware that perspectives, relationships and sensibilities alter with time and reflection (Sikes, 2004). However, there is a danger in this type of iterative, multimethod approach that the volume of field notes and other data can overwhelm the researcher (Etherington, 2004). Maintaining a scrapbook journal approach that kept hard copy data items together supported reflection and helped me to create order in what was sometimes a problematic and contradictory process.

Ethnography in education is described as distinctive in relation to researcher position because most people have been shaped in some way by their experiences of and with formal schooling (Mills and Morton, 2013). Using ethnographic approaches required me to maintain an awareness of the part my own biography and history would play in this study; what they might contribute to the research and the challenges that their influence might also bring (Denscombe, 2017). Experience of formal schooling as a child, teacher, leader, advisor and teacher educator, that included over twenty-five years of classroom observation, would be used as an active and constructive part of my role. Nevertheless, it was still important to minimise the risk of pre-conceptions and assumptions, developed through this experience, to avoid 'blindspots' in the dialogue of data generation and analysis (English, 2016; Braun and Clarke, 2019).

*3.3.4 Method 3: Teacher individual interviews*

Semi-structured interviews with teachers took place during the observation period (Bogdan and Biklen, 2007; Kvale and Brinkmann, 2009). These were conducted with the teachers who had been observed and were included to provide an opportunity to develop more detailed understanding of practices and perspectives (Gray, 2014). This form of interview was included in my design to explore a level of complexity and depth that a survey based approach might not afford (Byrne, 2018). I was aware that the flexibility and detail that it would provide would involve a time-consuming process, in terms of conducting the interviews, transcription and analysis (Braun and Clarke, 2013). Having committed to using ethnographic approaches, this was a challenge that realised I would have to manage in terms of organising my time and space when not in the field.

While providing rich and detailed data that allowed participants to use their own language and explanations (Byrne, 2018), I was also aware that using semi-structured interviews would also be time consuming for the teachers in my case study school. I was concerned that it might also be difficult to organise timings and space that would be convenient to the teachers (Braun and Clarke, 2013; Cohen, Manion and Morrison, 2018). After discussing this at the initial focus group, the school provided time for each teacher who volunteered to attend the interviews and organized a room where they could be recorded without interruption. They decided to use the same meeting space that teachers would normally use when meeting to talk about their observations of each other, so that the interviews would mirror the usual processes following professional observations.

Digital audio and visual data capture was powerful in allowing me to focus on eliciting detailed responses from participants during the process, in enhancing the accuracy of recall and in helping me to become sensitive to some of the nuances in participant responses (Cohen, Manion and Morrison, 2018). In interviews and focus groups, with teachers and children, using audio recording seemed to be a less intrusive option than video in terms of influencing participant behaviour. I found audio capture particularly valuable because I was able to listen and re-listen to responses, for example whilst driving to and from the school, and familiarise myself with the data even prior to transcription (Braun and Clarke, 2006).

The interview was themed by two key questions that each teacher was asked; ‘Can you tell me about the different ways that you help children to understand their own learning?’ and ‘What is important to you as a teacher when you plan learning for the children that you teach?’. These questions were chosen to elicit responses that would give opportunities for teachers to talk about the characteristics of a social model for developing growth Mindset and the processes and conditions for its development within a case study primary school, without asking directly about Mindset Theory or intelligence. They were intended to initiate and stimulate conversations that would provide detailed explanations about pedagogical approaches (Kvale and Brinkmann, 2009; Walsh and Seale, 2018). I wanted to find out how much the teachers decided to talk about Mindset and related pedagogy without direct questioning.

This semi-structured approach allowed the key questions to be supplemented with responsive questions that were designed to probe for further explanation (Braun and Clarke, 2013; Phellas, Bloch and Seale, 2012). Exploratory sub-questions were planned, but the intention was to use the two key questions with extracts from field notes and the journal to generate conversation and only to use sub-questions as prompts if required (Kvale and Brinkmann, 2009; Cohen, Manion and Morrison, 2018). This process allow me to pose emergent questions and for issues and questions to be raised by the teacher. This was followed by an opportunity for questions to be raised by teachers in a two-way, open conversational approach (Kvale and Brinkmann, 2009; Collins, Doherty-Sneddon and Doherty, 2014). In this way, participants were given opportunities to expand on their thinking, experiences and understandings, while I was also able to respond to new themes where appropriate (Gray, 2014; Braun and Clarke, 2019).

During the interviews, I also used the digital photographs of artefacts that I had taken during participant observation in their classroom to stimulate teacher responses in interviews (Harper, 2002; Clark-Ibáñez, 2004; Ali, 2018). Initially, I had taken them as a prompt for my own recall when journaling, but realised that it would be interesting to find out what the teachers' views and conceptions might be of the artefacts I had chosen to photograph (Wellington, 2015). The photographs had become a cultural artefact that stimulated a great deal of reflection for me so I decided to use them to encourage responses from teachers at interview (Byrne, 2018). In this way the images moved from being data to being a stimulus for generating data through photo-elicitation (Harper, 2002; Bogdan and Biklen, 2007).

Harper describes photo-elicitation and being 'the simple idea of inserting a photo into a research interview' (Harper, 2002, p. 13). However, while inserting them into the process may have be simple, the photographs were able to capture a moment within a flow of events (Bogdan and Biklen, 2007) that the teacher may not have seen, or been aware of, bringing an interesting temporal and special dynamic into the troubling of the every-day artifacts from their classroom. Teachers could see objects that were part of their taken-for-granted every-day life framed as relevant to answering the research question. While they were in some ways a visual inventory of artefacts, the photographs also represented something of my subjective decision-making and framing process (Harper, 2002). Although they had not been chosen with the purpose of eliciting responses from the teachers (Ali, 2018), and were part of my own image based record of events, they became valuable in promoting discussion during the interviews (Wellington, 2015).

It may have been the simplicity of the every-day artefacts in the images that was powerful in 'breaking the frame' (Harper, 2002, p. 16) and provoking a strongly reflective stance from the teachers. It could also be the relevance they had to the teachers' professional, lived experience and decision-making processes. Barthes (1993) suggested that photographs have what he referred to as 'punctum', which he defined as a sensory and subjective quality that impacts on the person viewing the photograph. Where the content of the photograph that is personally relevant to the viewer, he suggested it may carry a powerfully subjective meaning. During my interviews, the photographs elicited particularly thoughtful and detailed responses from participants in relation to familiar every-day practices and

encouraged them to identify contradictions. This connection encouraged them to open up to trouble every-day accepted practices and they provide extended, focused responses to these images with little prompting.

*3.3.5 Method 4: Children's focus group using participatory mapping*

Participatory mapping is an approach to collecting, interpreting and analysing data using representational objects or images (Jacques and Buckles, 2013). In this case, children were asked to create a collaborative image in response to questions about intelligence and learning. The seven children contributing to the data generation focus group during this study were from the School Council. This method was included to add their voice to the study, particularly providing insight and understanding required to answer aspects of the research question relating to children's perceptions of intelligence and how they relate this to their every-day experiences in school (Bell and Opie, 2002). My study sought to hear the unique perspectives of children, involving them as active agents in their contributions to knowledge developed through my research (Ruscoe, Barblett and Barratt-Pugh, 2018). This participant generated, visual method was designed to empower the children's voice, slow down the observation process and provide an enhanced focus. The children's graphical elicitation provided insights into past and present practices (Prosser and Loxley, 2010). It also helped to avoid bias that perceived social desirability might have on responses to direct questioning about intelligence.

Guidelines from the British Education Research Association (BERA, 2018) for working with children in research were adhered to rigorously. This was intended to minimise risk of harm or discomfort for child participants. Children are considered to be potentially vulnerable in the research process due to their age, which has implications for their participation and consent for the use of data (Denscombe, 2017; Ali and Kelly, 2018). This study starts from a position of assuming competence and knowledge (Thomson, 2009; Ali and Kelly; 2018), but recognises the need to adapt methods for seeking consent to accommodate the children's level of understanding, reasoning and language acquisition.

A consent and information sheet for parents and carers was supported with an optional meeting to allay any anxiety or concerns about the research process or their child's involvement. Information was given in writing and verbally, and the children had the option to ask questions about the study and the research activities and processes. The right to withdraw was explained clearly and participants were assured that the option to withdraw would be confidential, so that the influence of power relations and coercion was minimised. Children's ongoing informed consent as research participants was a particularly important ethical consideration throughout my study, to respect their individual autonomy while safeguarding their rights as participants (Ali and Kelly, 2018).

As a group, the children from the School Council shared a piece of flip chart paper and a range of coloured pens. They were invited to create a shared image in response to questions focusing on their understanding of intelligence (Dweck, 2006; 2017). These questions focused on what intelligence is, if people are born intelligent, what learning is and what

makes learning better. They added to the image each time a question was asked and were invited to discuss their ideas as they recorded them. Through the production, organisation and interpretation of images this data generation activity investigated the meaning that children attribute to the practices in school (Prosser and Loxley, 2010). This provided me with an opportunity to listen, develop an understanding of their meanings and engage with children's own cultures of communication as they actively participated. It sought to learn from the children as experts in their own learning and beliefs and drew on their lived experiences of every-day practices (Christiensen, 2010).

Visual data were used in a number of ways during my study as primary data and as a stimulus for dialogue, including enhancement of researcher recall and as stimuli in teacher interview (Wellington, 2015). The children's production of visual data reflected their conceptions of intelligence and learning for analysis (Gilbert and Stoneman, 2016). Creating images enabled the children to construct information together and to talk about their beliefs and emotions (Thomson, 2009). Drawing diagrams is thought not only to encourage children to become creatively involved in the research process (Ali, 2018), but also to encourage more abstract talk and thinking (Rose, 2016). Participatory methods, visual stimuli and group dialogue were designed to support engagement and reduce the power differential possible in this encounter (Flewitt, 2005; Crivello, Camfield and Woodhead, 2009; Ali, 2018).

*3.3.6 Method 5: Final teacher focus group*

The final stage in the data generation was another focus group involving all eight of the teaching staff, which took place during a one and a half hour staff meeting. I facilitated this focus group using coded samples of data generated through previous methods and presented key aspects of my analysis, inviting the group to respond to the emerging findings. The combination of the previous four data generation methods had been selected as suitable for the close investigation of the interrelationship of members of the school community, communications and shared activities in their practice. My multimethod approach had generated a huge amount of data for analysis (Edmond, 2005) which could be considered to be a key strength in a case study using ethnographic approaches, but was also daunting when it came to deciding what to present. This final method was informed by a research development workshop approach (Engeström, 2011), bringing together the data previously generated and analysed. I decided to present written examples of data and interpretation with a draft interim report and a copy of the research question and sub-questions.

I then let the teachers discuss these items, with minimal interruption, to support the further co-creation of robust knowledge (Gray, 2014). The influence of the researcher's disciplinary sympathies or their interests or motives on facilitation of the group dialogue can be a criticism of focus groups (Hitchcock and Hughes, 1995). The characteristics of the researcher, including beliefs and values, might prevent access to the perspectives of their participants. The focus for discussion was clearly defined by the research questions and interactions between the teachers during the discussion were of value to the generation of data about their shared beliefs and collective understanding (Bryman, 2015). To reduce the

effect my own perceptions, values and beliefs might have, I restricted my input to a brief introduction. I interjected to refocus the dialogue onto the research questions, but by this stage the teachers were so involved in the research process that they led and controlled the focus group process with very little need for researcher facilitation (Denscombe, 2010).

This final focus group was also intended to provide a further opportunity to understand the ways in which the staff team make sense of the phenomenon of Mindset Theory (Bryman, 2015). It was designed to acknowledge the significance of the interactions and responses of group members as they discussed the issue and their perceptions in depth. This provided another opportunity for consultation and for different perspectives and opinions to help interrogate the data. In this way, participants once again brought their biographies and values to my study as together their 'selectivity, perception, background, values and inductive processes, frames and paradigms' continued to contribute to the shape of the research through this last method (McCormack and James, 1988, p. 191).

### *3.3.7 Multimethod data generation summary*

Within each data generation method, and across the whole study, my iterative research process allowed for progressive focusing (Stake, 2010; Yanzin, 2015). I began each method with a wide focus, then data generation and analysis allowed progressive focusing to establish a narrower focus as the dynamics of the situation unfolded. The iterative nature of my study maintained the emphasis on the initial purpose of contributing to understanding of every-day teaching practices and principles that support the embedded and sustained development of Mindsets in a social learning context. However, as I found out more about the participants and practices in my case study school I could be sensitive to the emergent situation and my study evolved (Light *et al*. 1990).

The real-world context of my study allowed the generation of in-depth understanding that could inform future practice and policy development within the school (Simons, 2009). Findings and my analysis are shared in the next chapter of this thesis, to provide a lens through which other schools may also choose to reflect on their own practice (Maxwell, 1992; Yin, 2017). My multimethod data generation provided extensive data, representing many different perspectives that were then progressively focused within the iterative analysis of this study. Through incisive theoretical analysis and reasoning, data generated through this approach are consolidated in the following chapters of this thesis.

## 3.4 Overview of approach to qualitative Thematic Analysis

Thematic Analysis is a qualitative research method that seeks out repeated patterns of meaning across data to answer a research question (Braun and Clarke, 2006; Nowell *et al*., 2017). It is described as a theoretically flexible approach to analysis because it is not wedded to a particular epistemology or methodological framework. It can therefore be adapted to work with different methodologies to help to answer a variety of types of question within a range of research paradigms (Braun and Clarke, 2006; Nowell *et al*., 2017). This adaptability is considered to be an advantage in the application of Thematic Analysis (Braun and Clarke, 2013). However, there is also some contention about whether Thematic Analysis should be considered to be a process within other methods of analysis, such as Grounded Theory or Discourse Analysis, or if it is a method in its own right (King, 2004; Braun and Clarke, 2006; 2013; Nowell *et al*., 2017). In light of this, I decided to create a clear structure for the use of Thematic Analysis within my study to establish how it would be applied as a rigorous and comprehensive method in its own right.

In my study, Thematic Analysis was given a rigorous structure using a process that is explained in the following sections of this chapter. This structure was adopted for the practical application of the method, adapting the approach to answer the specific research questions addressed in this context. Analysis was an ongoing and iterative feature of my study, which informed the development of the research process (Gibson, 2010; Wisker, 2015). In this chapter, detailed description of the practical analysis process provides transparency and substance to support the evaluation of the approach as a full and rigorous method in this context (Braun and Clarke, 2006).

### *3.4.1 Details of the hybrid model/adaptation of Thematic Analysis*

The specific model of Thematic Analysis applied in my study initially used a structured six-phase process outlined by Braun and Clarke (2006) (Table 2). While this supported systematic and thorough analysis, it also allowed for a recursive, non-linear process with opportunities to move backwards and forwards through the phases during inductive analysis.

| Phase | Description of the process |
|---|---|
| 1 Familiarising yourself with the data | Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas. |
| 2 Generating initial codes | Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code. |
| 3 Searching for themes | Collating codes into potential themes, gathering all data relevant to each potential theme. |
| 4 Reviewing themes | Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis. |
| 5 Defining and naming themes | Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme |
| 6 Producing the report | The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of extracts, relating back on the analysis of the research question and literature, producing a scholarly report of the analysis |

*Table. 2: Braun and Clarke (2006, p. 87) six phases of Thematic Analysis*

The six-phases outlined in Table 2 were then extended into a hybrid approach that included inductive and deductive reasoning. While Braun and Clarke (2013; 2017) advocate their approach to Thematic Analysis as appropriate to inductive and deductive analysis, they are less clear about how a theoretical framework for deductive analysis should be introduced into a hybrid process. This aspect of the design was therefore influenced by an approach suggested by Fereday and Muir-Cochrane (2006). In their hybrid, codes and themes are first generated from the data, followed by the application of codes using a theoretical framework informed by research literature. In my study this combination was designed to ensure that, while the analysis of the every-day practices was driven by the data, relationships could be established between codes from inductive reasoning and the detail of specific relevant frameworks, such as the learner characteristics presented in Dweck's (2006; 2017) Mindset Theory.

Crafting codes was an active part of my researcher role and was acknowledged as being important in my research design (Braun and Clarke, 2016). Participant involvement at each stage of the analysis also encouraged me to challenge my researcher assumptions (Rivas, 2018). This allowed me to develop unpredicted insights and learn from the research participants' contributions. We separately coded raw data from the transcript and we compared our coding to support a reflexive approach to interpretation of data. This activity was repeated at different stages of analysis to include open coding, refinement of codes and sub-codes and development of an index of themes. They acted as critical friends (Biggs and Tang, 2011; Rivas, 2018) to challenge my assumptions.

Rather than narrowing the analytic field of vision, or just focusing on pre-specified aspects of the data, the hybrid approach enhanced analysis by sensitising me to particular aspects of the data (Tuckett, 2005). The combination of approaches in the two stage hybrid approach allowed for rich and detailed description of the data overall, while also providing a detailed focus on aspects specifically relevant to answering the study's overarching research question (Braun and Clarke, 2006). First, it supported the investigation of the characteristics of the school's model for developing growth Mindset and then compared them with selected frameworks from established research literature.

*3.4.2 Inductive reasoning approach to analysis*

The inductive reasoning 'bottom up' approach to analysis was applied iteratively during data generation process (Braun and Clarke, 2006; Fereday and Muir-Cochrane, 2006). I gained initial familiarisation with the data by being involved in the data generation process, listening to recordings, reviewing images and reading the transcriptions of each data item repeatedly (Braun and Clarke, 2006). During this process, I checked the clarity of the transcriptions from multiple recording devices, particularly in relation to interruption and overlapping talk. Further familiarisation was developed during the ongoing coding and reviewing of each data set, applying codes as they were established across all data to critically appraise and develop themes and patterns (Thorne, 2016). In this way, the inductive reasoning 'bottom-up' approach was used to develop codes, sub-codes and themes from the data (Braun and Clarke, 2013).

During this process of analysis, codes underwent an ongoing comparison to develop and define themes (Holton, 2010). This was an iterative process that involved memo-writing to organise and then conceptualise findings through discursive writing; continually editing and re-editing the codes and themes as they developed (Lempert, 2010; Braun and Clarke, 2013). Cross-checking codes from different data generation methods, using memo-writing, let the codes and their meanings evolve as new data was generated (Gray, 2014). Codes were re-defined, sub-codes were established and the relationship between them was logged throughout the process of analysis. Relationships established between data sets began this formation of themes, which developed gradually to define overarching themes that consisted of closely related sub-themes (Thorne, 2016). This approach allowed the codes, sub-codes and themes to remain closely connected to all of the data, letting it inform the ongoing development of the literature review (Bogdan and Biklen, 2007; Alhojailan, 2012; Wisker, 2015).

Analysis procedure for method 1: Initial teacher focus group using participatory mapping

Teacher 'process mapping' during the initial focus group generated a record of every-day practices identified by participants as helping to develop growth Mindset learner characteristics. An audio recording of the teachers' dialogue, explaining and evaluating each of the approaches that they identified, was transcribed and analysed. This 'bottom up' inductive reasoning, using computer assisted qualitative data analysis, allowed the criteria to evolve sequentially as data was generated (Gray, 2014). First teachers identified and categorised every-day practices that they considered encourage and sustain growth Mindset, then they provided a detailed evaluation of each category. This led to the development of codes that pinpointed relationships between their practices (McHale, 2004). This self-report allowed the participants to identify a wide range of activity that they perceived to be relevant to the development of growth Mindset, which would be considered alongside other sources of data.

Analysis procedure for method 2: Researcher participatory observation

Observations were interspersed with other data generation methods as my study progressed. Field notes, made from my perspective as researcher, were intended to complement the other data generation methods that were more reliant on self-reporting (Gray, 2014). They were captured in a number of small notebooks, designed to be unobtrusive in the observation process, which were then collated in a field 'scrapbook' that was analysed in hard copy. These observation records provided the opportunity for detailed analysis of the specific areas of interest identified by the teachers during data generation method one. They included areas of activity that the teachers had identified as helping to develop children's conceptualisation of intelligence as malleable and/or the characteristics of growth Mindset. However, they were not limited to these areas and included many other distinctive features of the every-day social and physical learning environment. It was important to look beyond what was already recognised, to see what had not yet been noticed.

Hand-written data required systematic analysis that could mirror the electronic system's detailed comparison of data and ensure that the electronic analysis and hard copy analysis

were integrated. Cross-checking codes from field notes with those from other methods, using hard copy annotation and memo-writing, let the codes and their meanings continue to evolve (Gray, 2014). This was time consuming but the format of the field notes was important to the research process; using the electronic system to make analysis of the data had not been efficient where relationships between notes, photographs, sketches and annotations were important.

Analysis procedure for method 3: Teacher individual interviews

Individual interviews with teachers who had been involved in the participatory observation activity focused on their own subjective experience and interpretation (Walsh and Seale, 2018); their understanding of intelligence and the way they perceive they work to help develop children's conceptualisation of intelligence as malleable. Transcripts of audio recordings of the interviews were added to existing data using the computer assisted qualitative data analysis tool. Codes from each new data generation method were applied and compared across all of the data using the same index (Gray, 2014). Further inductive reasoning and comparison of codes was developed with participants and colleagues acting as critical friends. These interviews provided an opportunity for shared analysis of the observation field notes and photographs. The philosophical idea of multiple realities was acknowledged in participatory approaches within this research design, giving credibility to shared analysis, participant validation and peer debriefing (Braun and Clarke, 2013; Rivas, 2018).

Analysis procedure for method 4: Children's focus group using participatory mapping

Child participatory mapping during this focus group produced two items for analysis that focused on children's understanding of intelligence and how they relate it to their every-day experiences of learning. This activity generated a shared image, created by the children in response to four questions about intelligence and learning (Dweck, 2006; 2017). This underwent an ethnographic content analysis, focusing first on the occurrence of features within the image, then the variety of images and meaning that the children gave to them.

*Fig. 2: Image created by children in focus group using participatory mapping*

Meanings were accessed through the children's conversation as they created the images (Prosser and Loxley, 2010), with a focused transcript from an audio recording of the children's responses allowing coding to continue to be driven by the data. It was possible to extract and load sections of the whole image in Figure 2 into the computer assisted qualitative data analysis software for coding. A selection of these extracts are included in the Findings and Analysis chapter of this thesis (Chapter 4). It was important that during the inductive reasoning 'bottom up' analysis, there was sustained comparison of the data between items.

I had underestimated how complex this data generation method would be in terms of analysis. Not only did the children bring their cultural understanding in their decision-making as the creators of the images, visual data can be read in many different ways creating what is described as a 'slipperiness' in their analysis (Thomson, 2009, p. 10). As with words, visual data contain manifest, surface meanings and latent, hidden meanings (Braun and Clarke, 2013). This generated a large amount of multi-layered information for analysis and interpretation (Gilbert and Stoneman, 2016). This was problematic in terms of physical storage and arrangements for analysis, and offered a new challenge in relation to the selection of representative or illustrative visual examples.

Analysis procedure for method 5: Final teacher focus group

This final method, informed by a research development workshop approach (Engeström, 2011), brought together the data previously generated and analysed. I facilitated the focus group using coded samples of data generated through previous methods and then by presenting my analysis and inviting the group to respond to my interpretation (Braun and Clarke, 2013; Rivas, 2018). This teacher focus group provided a synthesis of analysis from previous data generation methods. Transcription of the discussion was analysed paying attention to the range of opinions, nuances in choice of language and the dynamics between participants. However, despite using multiple recording devices the quantity of data generated provided a challenge in the transcription. Each recording was transcribed and carefully compared for clarification, particularly where individuals spoke at the same time.

### *3.4.3 Deductive reasoning in analysis to complete the hybrid*

Following the inductive reasoning 'bottom up' approach, the next stage of the analysis process introduced the 'top down' deductive reasoning approach. This used a theoretical framework informed by selected research literature (Table 3). This framework combined three elements relating to Mindsets and relevant to my research question; the characteristics of learners suggested in Dweck's (2006; 2017) model of Mindset Theory, change processes for scaling-up pedagogies designed to develop Mindset Theory as a whole-school approach and teacher professional learning. This was not designed to find new evidence of Mindset Theory in the data, but to consider how codes within my inductive themes mapped against the detail of Dweck's (2006) theoretical model and established research literature relating to Mindset Theory and change in schools.

| | |
|---|---|
| **Mindset:** Teachers and learners articulate their beliefs about intelligence and their response to difficulty, setbacks and challenge (Dweck 2006; 2017). | |
| Talk about Beliefs | Explain knowledge and beliefs that relate to Mindset Theory |
| Observable Characteristics | Learner and teacher characteristics associated with Dweck's (2006; 2017) model of Mindset Theory including responses to difficulty, setbacks, challenge and the success of others. |
| **Scaling Up:** Areas suggested as important for research and development relating to scaling Mindsets responsibly as they are established across the school community (Yeager *et al.*, 2013) | |
| Every-day Practices | Expanding the toolkit of every-day practices that instil growth Mindsets. |
| Underpinning Principles | Understanding how to maximise the effects of a Mindset Intervention. |
| Assessment | Developing assessments and evaluation criteria that allow more rapid learning from practice. |
| **Negotiate Learning:** How practices relating to Mindset are being developed and established across the school community (Wenger, 1999) | |
| Mutual Engagement | The ability to engage with other members and respond in kind to their actions, and thus the ability to establish relationships in which this mutually is the basis for an identity of participation. |
| Joint Enterprise | An ability to understand the enterprise of the community of practice deeply enough to take some responsibility for it and contribute to its pursuit and its ongoing negotiation by the community. |
| Shared Repertoire | The ability to make use of the repertoire of practice to engage in it. This requires enough participation (personal or vicarious) in the history of a practice to recognise in the elements of its repertoire. Then it requires the ability- both the capability and legitimacy – to make this history newly meaningful. |

*Table. 3: Theoretical framework adapted from Dweck (2006; 2017), Yeager et al. (2013) and Wenger (1999)*

Codes from the 'top down' theoretical framework in Table 3 were applied systematically across all of the data and then mapped against codes generated through the inductive reasoning approach using computer assisted qualitative data analysis. Combining these approaches was designed to ensure that, while the analysis of the every-day practices was driven by the data from inductive reasoning, it could be specifically related to the different learner characteristics presented in Dweck's (2006) model and processes of change.

The aspect of this theoretical framework that identified learner characteristics relating to Mindset Theory included codes that focused on an individual's response to success and failure; particularly relating to challenge, obstacles, effort, critical feedback and the success of others (Dweck, 2006; Haimovitz and Dweck, 2017). This helped me to analyse where weight was given to particular aspects of the theory, or where there were gaps in evidenced development of the theory as it was put into practice. The hybrid approach provided a

structured and systematic way of identifying similarities and differences between the learner characteristics focused on in my case study school and those articulated in Dweck's (2006) model.

The hybrid of inductive and deductive reasoning contributed to the synthesis of findings and to answering the research questions. Comparison at code level was designed to identify where there were patterns and relationships between the occurrences, not to combine or merge codes from the approaches. I had first explored what the data had to offer, then imposed specific structures relevant to the research questions and used synthesis to answer the research questions fully (Fereday and Muir-Cochrane, 2006). Relationships between aspects of the data began to establish a theory about what was happening in the case study school, how this related to Dweck's (2006) model of Mindset Theory and what key processes of change that were supporting the development of pedagogical approaches in this context. This hybrid provided an opportunity to examine carefully how this related to specific aspects of existing research literature (Koch, 1994; King, 2004; Braun and Clarke, 2006; Nowell *et al.,* 2017).

Multiple approaches to data generation and analysis reflected the complex and diffuse phenomenon of the mobilisation of Mindset Theory in a real-world school setting (Tobin and Begley, 2004). A hybrid approach to analysis enhanced the research process by creating a systematic trail that provided thick and detailed description of the every-day norms of the case study school that could embrace unexpected features of the data and consider the different perspectives and perceptions of teachers and children. It allowed a focus on how the propositions of research literature were reflected in the real experiences of teachers and children as teaching that is informed by Mindset Theory is developed in their context (Koch, 1994; King, 2004; Braun and Clarke, 2006; Nowell *et al.,* 2017). Qualitative Thematic Analysis was used to summarise key features of the large data, providing a structured method that allowed a clear and organized account to be communicated (Malterud, 2001; Agar, 2004; King, 2004).

# 4 Findings and Analysis

This chapter weaves together information from the range of data generated and is informed by the hybrid of inductive and deductive analysis to provide a picture of what was happening in the every-day learning environment of the case study school (3.4.1). This is crafted from the different experiences and perspectives of teachers, children and researcher (Braun and Clarke, 2013). It identifies characteristics of the social and physical learning environment that participants and researcher perceived to be conducive to supporting the development of a social model of pedagogy informed by Mindset Theory. Illustrative extracts from the extensive data generated during my study are provided to clarify how it has been interpreted and to highlight nuances that became apparent during the development of each theme. This involved working with participants to establish more literal, semantic interpretations and to consider possible implicit, latent meanings.

Within the reporting of my findings and analysis, pseudonyms are used for participants so their individual responses are more relatable to context. Care was taken to select names that would reduce the risk of identification of individuals or of the setting. However, when ethical consideration was given to accounting for the specific ages of children, I decided that this could make individuals identifiable within my narrative, so they are assigned as 'Early Years' aged 3-5, 'Key Stage One' aged 5-7, 'Lower Key Stage Two' aged 7-9 and 'Upper Key Stage Two' aged 9-11. Extracts from original field notes are included and within these extracts italics are used for researcher emphasis, originally recorded in the field using underlining. Where photographs were the stimulus for a teacher response or researcher field notes, they are also embedded in the text.

## 4.1 Community

The 'Community' theme focuses on key features of the learning environment identified in my analysis as relating to social and emotional learner needs. This theme identifies ways in which the teachers and children work together to develop skills of collaboration and establish support structures to build trust and encourage children to take risks in learning as teachers develop a pedagogy informed by Mindset Theory. Related codes are frequent, with examples permeating across all sources of data. This section also highlights some of the more problematic aspects of the process of developing beliefs and behaviours associated with these skills and includes three interrelated sub-themes of Build Trust, Value Contributions and Share Responsibility (Appendix D).

### *4.1.1 Build Trust*

One of the first things that stood out in the initial stages of my analysis was the use of language associating difficulty with support for each other. Codes associated with this use of language developed into part of the 'Build Trust' sub-theme within the 'Community' theme. The teachers and children used the terms 'risky' and 'taking risks' when learning was what they described as 'tricky' or 'difficult'. Across data 'risk' was referred to directly on many occasions and associated with 'help' and 'helping each other'. Although, themes have not been generated through frequency of coded items, it interesting to observe where some codes proliferate across the data and therefore infer a cultural norm. Opportunities to 'actively seek help' were often associated with risk and overcoming difficulty in dialogue between teachers and children:

> 'If I can't do something I can look at it with [teacher] and make mistakes into learning. But I have to practise and listen and try new things… That's me practising [long pause]. That's me, that's [teacher] looking at mistakes with me. '

Child, LKS2

During the focus group, the children explained that if they took a risk and tried difficult or new activities they would be supported, whether they were initially successful or not. The choice of the word 'with' in this extract from a child's reflection during the focus group is also illustrative of children's use of language that inferred that they perceived relationships with their teachers as collaborative. The children also explained that other children would support and encourage them if they took risks in their learning and made mistakes. Their use of common terms and phrases in their explanations, suggested that this was a dialogue

that was familiar. Analysis of observations revealed that teachers regularly reminded children of resources and strategies that they could use to support each other. They made explicit links between children providing mutual support and overcoming difficulties to 'improve learning'. This created an apparently powerful discourse in the empirical data that established a strong cultural message in relation to risk taking and mutual support.

During the focus group, teachers talked with each other about instances where opportunities for collaboration and support had created problems when children deferred to each other's academic or social power in the group:

> 'They missed opportunities to learn from others because they don't think they will know as much or they dominate the discussion and ignore other people's ideas – really important to be aware of because they can miss something useful. We teach them to give each one a voice in turn but have to keep an eye on some. Giving them responsibility for using an idea from each person – or that they pass something round – then that's easy to see.'
>
> Greg, Teacher KS2

To try to reduce this uncritical deferral, resulting from perceived status, the teachers talked about the need to monitor and mediate group work, particularly when children engaged in difficult or challenging activities. However, in some situations they explained how this can become problematic because of dependence and could actually lead to behaviours of avoidance or helplessness. They also explained the ways in which they strive to provide experiences where children can learn to rely on one another without becoming over dependent:

> ' We give them 'support structures' [...] By planning regular paired and group work and showing them how to help each other. And they see us do it, and we don't just give an answer, then they expect to help each other but not just give an answer.'
>
> Pam, Teacher KS1

Observations revealed a wide range of questions that children were given by teachers as 'support structures' to scaffold their conversations. During the final teacher focus group, the teachers sorted and categorised the questions from the observation data. It became apparent that, while there were some very directive outliers, they often started with different ways of questioning what the problem was, such as 'Have you gone back to look at where you when wrong?' or 'Can you explain what has gone wrong?' and then moved on to questions that encouraged them to generate and evaluate different solutions. As they created the categories, the teachers discussed how these structures engendered a sense of trust because children could actively help each other to solve problems.

The language used in talking about risk, support and problems or mistakes appeared to encourage children to be open about how they make and use the mistakes and to evaluate

whether they are useful. In children's talk, they expressed in many different ways how errors and correction are valued as a resource to improve learning. In an example of this, during the participant mapping focus group activity children explained how they use mistakes:

> Child X: When you get it right it's good, but sometimes you get it wrong first. You have to tell yourself you will get it right so the sad feelings go away. The sad feelings mix up your brain.
>
> Child Y: Sometimes you just try different ways but sometimes you get it completely wrong like doing the wrong thing completely wrong. I changed my mind [points at correction] that's not wrong. [long pause] It is wrong but not wrong like '5 add 5 is 2'. That's wrong.
>
> Child X: When you get it wrong it's - it's like signposts telling you what not to do.
>
> Child Y: And you need to check it…
>
> Child X: It feels better when you use it. We knew this one couldn't be in it [points at image from food chain activity] but we didn't know what that one was so we put it there. It was wrong. We knew the others were right so we could work out that one was wrong.
>
> Children, KS2

This extract was selected to represent the way children's dialogue does not dismiss mistakes as unimportant, but re-frames them as useful. It is illustrative of how children and teachers talked about a relationship between mistakes, or getting things 'wrong', and successful outcomes using their own explanations and building on each other's ideas. However, this was not always smooth sailing, in spite of teachers' efforts to develop a culture of trust and mutual support; there were still times when children found making mistakes frustrating or even overwhelming. For example, in my field notes I recorded how one child in the Early Years unit drew a picture of a ballerina and when she tried to rub it out, she was distraught to find that she has mistakenly used a permanent marker on the small whiteboard. No kind attempts at reassurance from teachers or children about the value of mistakes could ameliorate her emotional response to the embarrassment.

In the initial focus group, teachers explained the importance of teaching children to use mistakes and value the relationship between success and failure as part of one process and how making active use of mistakes helps achieve learning goals. In a handwriting lesson, I observed the teacher explaining that the children had 'allowable mistakes', where each child had an allowance of mistakes; a maximum number that they could make in the piece of work. The children had to help each other to find and correct mistakes before sharing their work with the teacher:

> ‘It’s so they see them as different parts of one process...
> I’d done that the previous couple of weeks because some of them their handwriting’s coming on beautifully but then they’re coming to me and they’ve got mistakes which they’ve failed to self-correct themselves or spot it before I’m checking it so it’s just getting them to self-assess themselves and really look carefully for those fine details really.’
>
> Pete, Teacher KS1

As my study progressed, analysis suggested that this teaching approach developed into a ‘mistakes allowance’ activity where in different lessons individuals or groups were allocated a number of mistakes to find and improve. This explicitly focused the children’s attention on finding the mistakes and using them for improvement. It is also illustrative of ways in which teachers included the identification and use of mistakes into the structure of every-day learning activities to provide opportunities for children to adopt and reflect on learner characteristics associated with growth Mindset. Being open about the role of mistakes and giving them a positive value in problem-solving, were part of every-day classroom learning activities.

*4.1.2 Value Contributions*

As analysis developed, working together in a variety of grouping structures became an important aspect of the second ‘Value Contributions’ sub-theme within the ‘Community’ theme. This developed from codes associated with opportunities for children to interact with a variety of peers in whole-class, small-group, paired and individual arrangements involving a range of physical structures. A combination of these arrangements was observed in each class and the layout of the classroom changed regularly, so children had become confident in moving furniture to organise and re-organise the space. This extract from my journal reflects on my anticipation of chaos, which was countered by swift and smooth movement:

> One child suggested putting chairs in a circle for the meeting. They moved the tables to one side and created a circle of chairs for the whole-class discussion. In the different [lessons] during this week tables have been clustered for groups of four and six, they were organised in rows and horse-shoe formation for paired work and on a number of occasions had been moved in this way to create a large carpet area or space for a whole-class circle of chairs.
>
> Field Notes, Day 8

This extract was also indicative of how the children were able to offer suggestions of grouping arrangements, such as the circle, that were appropriate to the learning. In interview data one of the teachers explained that, what she referred to as ‘fluid’ grouping was something introduced with the intention of children experiencing challenge and managing responses to mistakes and failure with many different children. However, analysis suggests that, although movement was swift, on some occasions there were problems

particularly associated with 'time' taken to negotiate these arrangements. This was the case where new organisational arrangements were used.

Working in lots of different grouping arrangements provided a structure where the children can develop communication across the class group and I was intrigued by their response when invited to select their own small groups:

> 'And some of them have learnt 'well so and so's my friend but I won't get anything done if I'm with them' but they get it done and go with them so they're thinking wisely about that depending on what the task is [...] but then there were still children that day - when I've said 'groups of three' or 'four or five' - and then there was a couple that stayed on their own; they didn't want to be with anyone else. The smallest group is one…'
>
> Sue, Teacher KS2

This extract is from a whole-class lesson where children were asked to contribute to a review of the school's mission statement. It explains how I observed children typically respond when given the opportunity to self-select groups. Rather than gravitating towards friendship groups, the majority of children moved into groups with children who were near to them. However, problems associated with this included children having the skill, will and confidence to make appropriate choices. When we debriefed the observation the class teacher explained that most children had learned through previous evaluation of less successful experiences decisions are important to their learning processes and outcomes. She also pointed out that while she was proud of their self-direction and regulation, this was what she referred to as 'pay off' for an investment in time that the staff team had 'trusted' in together.

At the final focus group, in shared analysis teachers discussed this pattern of behaviour across the school and identified the need to mitigate against children making intentional and unintentional inappropriate choices. Pete explained that he manages this process gradually to ensure that the children are focused and productive:

> 'Their sort of self-regulation in this so it's about self-management… Yeah it is a lot more, we'll choose the groups but then, after Christmastime, when they've settled a bit, we'll give them that responsibility and say 'well I choose the threes now but if you think you can choose your three sensibly and get on sensibly …' and give them that independence which they like as well.'
>
> Pete, Teacher KS1

His explanation reflected the ways in which teachers had monitored group work during observations the ways in which they intervened or might change the grouping if children did not manage their interactions productively. Children were encouraged to reflect together on both appropriate and inappropriate grouping choices and how they impacted on learning. I was also interested in Pete's reference to Christmas in the extract and the emphasis

teachers placed on developing group work skills being a year-round process, with the importance of sustaining the investment made at the beginning of the year. In the final focus group the teachers talked about this as an ongoing process that takes time and nurturing throughout the year and has to respond to social dynamic change within the class. It was clear from their explanations that teachers did not see this as a simple or linear process. Sue reflected on the process of maintaining trusting relationships within her class, saying 'We have to keep going back to it and working on it all the time. It changes all the time. That job is never done!'.

In their focus group, children explained how groupings were designed to be appropriate to the specific learning activity and to the needs of the group, rather than just for classroom logistical management:

> 'It depends who we need to be with and what we're learning. We might not need the same things or we might sometimes. It makes more learning. Gets it better. If I am with the same all the time I will only learn what they learn.'
>
> Child, UKS2

This focus on 'learning' is indicative of teachers' emphasis on this when they consider groupings. The priority was explained as being 'to learn' and grouping arrangements were explained explicitly during lessons as being a process that will increase productivity or enhance outcomes:

> 'Well there's a big drive all the time, we keep reminding them 'What do we come to school to do?' and their answer is 'We come to school to learn'. So they know that there shouldn't be barriers to that based on groupings or whoever, they still need to get on with the learning whoever they're working with.'
>
> Pam, Teacher KS1

My analysis identified a wide range of strategies instigated by teachers to encourage children to both 'support' and 'value' each other's contributions in group learning. Examples recorded as often occurring in observations included giving resources to different members of the group for a shared task, the use of multiple pens for a shared written task and the group actively monitoring that each member takes a turn systematically around the group to arrange resources. Teachers were observed to mitigate against problems of task avoidance in group work with these structured processes to ensure that children were involved and contributed. They distributed tasks among group members and required turn talking and reporting-back in tasks, and they encouraged children to adopt these strategies when planning their own group work. They not only provided practical strategies to help mediate involvement but recognised the need to identify the cause of avoidance behaviour to be able to address it effectively. From observation data, I realised that what made this apparently quite straightforward strategy particularly complex was that children may or may not be

conscious of avoidance or the reasons for it. Codes indicated where I thought there might be 'conscious' and 'unconscious' avoidance, but in shared analysis the teachers and I agreed that this was very difficult to assess. The best insights came from what the children were willing to share, but this would still be laden with social bias and influenced by conventions and power relationships.

While observing in the KS1 class I joined in with a 'penguin drama' where children contributed to a shared product:

> Freeze frame activity based on the Oliver Jeffers' 'Lost and Found'. The teacher split the story between pairs – there was a different kind of risk involved in that but everyone got up and did their freeze frame, and they went systematically through to tell the story. Because it was divided up, everyone needed to participate or the story would have not been complete. Everyone had a role to play in the learning. Supportive facial expression and affirming nods and smiles.
>
> Field Notes, Day 12

In the spirit of participation and shared responsibility, adults were included in the drama and I took my turn at performing a scene from the story with a partner. This extract from the record of the drama in my field notes, illustrates the way in which analysis of observation data identified that activities were often designed to require participation and contributions from every member of the group. Codes also developed that identified occasions where children were explicitly encouraged to 'reflect on' and 'critically evaluate' these experiences and their 'individual contributions' as a structured part of the lesson. Using software to manage the memo-writing process I noted in my analysis that on some occasions reflections and evaluation had an 'intentionally planned' focus, while on other occasions they were 'responsive' to the context.

I was also interested to note that teachers also taught skills and conventions of disagreement to encourage children to make critical contributions to dialogue. The language and strategies modelled in the environment encouraged children to present opposing ideas, but during reflections children were given structured tasks that built on each other's ideas but also offered opposing or alternative ideas while still valuing the contribution:

> 'Well we can say something like 'I've got a different idea' or 'I'm not sure about that' [uses positive tone and expression] if we're not sure…

> Sometimes we just try it anyway if not everyone always agrees but we work out, if we can do, what the best way is.'
>
> Child, KS1

What I found fascinating was that in practice my analysis identified that the 'structured' and very 'deliberative' use of phrases of disagreement seemed to made criticism easier to accept. Analysis suggested the most effective options for actually critically considering different options generated multiple ideas for a group to evaluate collectively rather than analysing one person's idea. Analysis of observations also highlighted that teachers regularly talked about being 'supportive' and 'constructive', and about the possible consequences of their reactions to each other, just before these reflections and evaluations. Children were reminded about how their responses to other children's contributions may impact on their feelings and willingness to participate.

*4.1.3 Share Responsibility*

The third sub-theme within the 'Community' theme is 'Share Responsibility', which is underpinned by shared purpose, with teachers and children using the phrases 'we are here to learn' and 'it's about effective learning' on many occasions across the data. Again, the strength of the plural in this discourse inferred a shared responsibility between teachers and children for learning:

> 'We are here to learn. Together. You are my box of crayons and each of you is unique. You all have something special about you and to be the best you need each other.'
>
> Pete, Teacher KS1

This extract from Pete's observation on 'moving up day', when he met his new class in preparation for the following school year, was illustrative of how shared purpose was made explicit to children through teachers' talk. In this example, Pete used a metaphor from the book he read with the class. He likened the class to the box of crayons from the story and put emphasis on each individual child being part of the 'whole'. This was typical of talk observed embedded in teaching to create a sense of belonging and social responsibility for learning.

Another 'time' related code that became part of the Community theme suggested a pattern in the data focused on the way that children were 'given time' for individual and shared evaluation of practical strategies that they chose and the decisions that they made in their learning. Children were required to justify reasoned and informed decisions about their contribution to learning. Children were encouraged to reflect on the consequences of their contributions and make changes:

> Child A: Go through them again.
> Child B: One by one [picks up unused cards]?
> Child C: We don't need to go through them one by one.

Child A: We need to look at them all again and need one more.
Child B: We didn't spread them out and look at them all.
Child C: OK [spreads the cards across the table]
Child B: That one – what is it?
Child C: Don't know…
Child A: It looks like a predator – look… eyes.
Child B: OK let's put it there and see if it works.

Children, LKS2

On several occasions in my reflections, I noted how this was 'not rushed' and was 'given time'. As in this extract, from my observation in Sue's class, when the strategy that the children were using to organise a food chain was not working they are able to suggest an alternative. They were encouraged to 'talk thinking aloud', which for many had become habit. As in the extract above, analysis identified that, in groups and pairs, the review of learning strategies and suggesting alternative approaches had become embedded in some children's talk about learning. Before being asked, they provided justifications for decisions and actions that they had taken as individuals or as a group. Re-phrasing and explaining detail, they used their own child-like expressions to reflect on their decision-making processes. Their explanations were clear and they used a natural and shared language that engendered a visible accountability to each other.

During shared analysis of transcript extracts teachers also became aware of the frequent use of plural personal pronouns, such as 'we' and 'our'. This was particularly associated in the data with times when teachers or children shared, explained and justified their reflections on learning.

The teacher said 'What are *you* doing?' to the individual child and the child said '*We* are working out who is doing what so *we* can plan it. I'm writing' and showed the teacher that they had the pen.

Field Notes, Day 6

Greg: *We* do that don't *we*?
Joanne: I think *we* have but *we* do less of it now. It's high impact so *we* should do more but perhaps if *we* do too much it won't have as much impact.

Initial Teacher Focus Group

These extracts are typical of the way that individuals gave collective responses to questions. 'We' was used variously to mean teachers-with-teachers, teachers-with-children or children-with-children, which implied and communicated a shared responsibility or ownership. In some instances, this even happened when individual personal pronouns were used in questions directed to an individual. This was particularly evident in individual teacher interviews. My analysis raised the question of whether teachers sometimes used this subconsciously to position themselves, identifying themselves as part of the learning group

when working things out together 'with' children. It implied a collective mode, changing 'you will try' to 'we will try' and suggesting that learning is a shared endeavour.

*4.1.4 Community Summary*

Through my analysis it became apparent that aspects of the learning environment are designed to support the development and maintenance of productive and trusting relationships. Teachers purposefully establish a sense of support and connection between members of the classroom community. They identify how this encourages children to take risks in their learning and is cultivated through planned activities that encourage children to give and receive support as they establish a positive relationship between mistakes and success. However, they explain the importance in these processes of adopting practical approaches to avoid over dependence and to guard against children deferring to each other because of perceived social or academic status.

While direction and instruction are necessary, children are used to being grouped in different ways and move quickly into different groupings and teachers are used to managing the transitions and logistics of different grouping arrangements. This is a time consuming strategy to develop, but teachers suggest that facing challenge and failure with a wide range of peers enhances opportunities to build strategy that supports growth Mindset. Teachers establish with the children a shared purpose and encourage them to take responsibility for their own contributions to learning and for the learning of others. This involves the children in making decisions and taking responsibility for the outcomes and being responsible to themselves and to the community. As they build trust, value contributions and share responsibility they teachers and children develop community and practical strategies to collaborate as they face setbacks challenges and difficulty together.

## 4.2 Metacognition

The 'Metacognition' theme focuses on key features of the learning environment that support learners in monitoring and controlling their knowledge, emotions and actions. Related codes appear in all data sources and are particularly prominent in the focus group data generation with children and in teacher interviews. This involves three important sub-themes: Teach Learning, Construct Meaning and Recognise Complexity (Appendix D). While codes within the Metacognition theme related to skills developed to help individuals, as analysis developed, they also related to social metacognition and members of the classroom community helping to monitor and control each other's knowledge, emotions and actions.

*4.2.1 Teach Learning*

My analysis suggested that teaching about Mindset Theory happened throughout the year when data generation took place, and was usually 'integrated' into every-day curriculum subject teaching. However, on some occasions the focus was renewed and strengthened with what were coded as 'discrete' sessions where Mindset Theory was the focus of learning. Analysis suggested that this process was mirrored in classrooms across the school. At the beginning of each school year, a number of activities were used to re-establish ideas through

whole-school, whole-class, small-group and individual activities. Children had opportunities to internalise the knowledge and understanding and were observed explaining it to each other.

Teachers used dialogue and observation to encourage the children to share their understanding of intelligence and Mindset Theory. In the initial teacher focus group they talked about how problems with these interactions seemed to be a catalyst for learning but that being given what they perceived to be socially desirable responses could also inhibit this approach:

> Greg: Sometimes they say what they think you want to hear...
> Joanne: ...but now I think we can often tell because it sounds like they are repeating things they have heard.
> Pam: Yeah...
> Joanne: It is part of the process they have to experiment with language and in early stages or if they are uncertain – reverting to safe ground is a strategy that some of them use.
> Pam: We don't just use one thing they say and tick the Mindset box, it's too complicated for that and it's a lot of information in different situations that gives a full picture – but that it can change.
> Greg: We just have to watch that as we are connecting it all together we don't just filter what fits.
>
> Initial Teacher Focus Group

This explanation is representative of how my analysis of data items generated with teachers identified that they used observation of real social learning situations to increase opportunities for more accurate and detailed assessment of thinking processes to reveal attitudes, values and beliefs. They explained how observing children's dialogue allows teachers to identify consistencies and inconsistencies between espoused beliefs and behaviours or actions. Combining self-report with regular observation of social learning generates a deeper and more holistic picture of children's beliefs. While I had expected teachers to challenge incongruence between children's behaviours and growth Mindset, I was surprised when analysis began to suggest that they also challenge congruent behaviours. In teacher interviews, all four of the teachers explained that incongruence is more obvious, but that fixed beliefs masked by assumed congruence are just as important to understand and give a more nuanced understanding of the complexity of beliefs about intelligence.

My analysis suggests that having core learner characteristics as a focus for assessment and the evaluation of learning increased the visibility of Mindset Theory in all areas of the school and created opportunities to identify and challenge misconceptions. In observations and in the focus group activity, children were able to elaborate on the detail of learner characteristics and did not mechanistically repeating the same set phrases but could explore ideas in depth drawing on their own experiences. Although the school development plan provided an overarching Mindset Theory themed focus, through shared analysis teachers

identified that they could explain specific, observable behaviours associated with these learner characteristics, but that this tacit knowledge had not been recorded.

Another aspect of the Teach Learning sub-theme within Metacognition was how teachers identify the importance of the quality of initial professional learning input and sustained professional dialogue:

> 'On the training it seemed to be more about us – things that you don't like; skills you don't think you're very good at; why don't you think you're very good at them? Then we brought that back and worked out, well, how to make it work here. We took from it what was relevant to our children, trying out ideas in our own classrooms at first... Now we have a broad Mindset idea or concept we agree for the development plan.'
>
> Craig, Teacher EY

In the focus group, the teachers explained how most of the existing teaching team had attended an in-service professional learning day to initiate their focus on learner beliefs and behaviours and run by an expert in the field. In interviews, teachers had different recollections of detail of the day, but they all remembered it as an experiential training followed by planning for implementation back at school. They had commented on having looked for 'tips for the classroom', 'things that would work' and 'ways of doing it'. Analysis also raised the question of the influential the introduction to 'false' growth Mindset in this introductory professional learning day had been in encouraging the teachers to challenge simple observations to look at the 'detail of behaviours'.

In addition to developing the learning from this initial Mindset professional learning day, individual staff talked about further training they considered relevant to specific aspects of Mindset Theory or related learner characteristics. During my data generation period, teachers collaborated on planning and used peer observation and feedback throughout the year for sustained professional dialogue about learner thinking processes when practically developing beliefs and behaviours. This collaborative activity provided opportunities to discuss and critically challenge the ways they develop pedagogy to support the development of growth Mindset.

*4.2.2 Construct Meaning*

An important aspect of the Construct Meaning sub-theme of Metacognition is how teachers and children co-construct understanding of Mindset Theory. During my observations, they shared and developed their understanding of factors relating to Mindset Theory with a focus on improving learning, supporting progress and impacting on achievement:

> Child A: That's it – when you work hard you get intelligent.
> Child B: Like practise...
> Child A: Not just practise – picking hard things to practise.
> Child B: Trying different ideas... methods...

Child C: Don't just do the easy ones try the hard ones.
Child B: You've got to think you can and do something... Sometimes it gets harder and sometimes you're in the Pit of Doom then sometimes you can help someone else out.
Child A: Look at how someone is doing it – ask them [points at another child's whiteboard]
Child B: That's copying.
Child A: [shakes head vigorously] If they explain it – it's learning.

Children, L&UKS2

As in this extract, in other observations children articulated and built their knowledge and understanding of Mindset Theory together. This extract is also typical of the ways in which teachers and children reflected on and discuss their beliefs about learning as non-linear processes. In observations, interviews and focus groups they talked about the complexity of learning processes and some of the problematic aspects of their experiences. My analysis suggested that this included talking about their 'efficacy' and 'practical control' over their thinking and learning processes.

In the initial focus group, the teachers identified a problem of balancing oversimplification of theory with confusing complexity when talking about beliefs about intelligence and learning. To try to reduce this, they explained that they pay particular attention to the accuracy of interpretation of key underpinning concepts when assessing classroom talk. When explaining to children how the brain works and the psychology of learning, analysis suggested that teachers felt it was important to try to 'keep it simple' while avoiding misinterpretation:

Child F: Everyone can be intelligent if they work hard enough.
Child C: Apart from babies…
Child F: My cousin who's 3, he doesn't know very much but he's getting better at things.
Child C: His brain is getting bigger – like this [points back at picture]…
Child F: He is getting his brain stronger so that when he is bigger he can be intelligent.
Child D: He must be intelligent now if he's getting better at things. His brain is getting better at things already.

Children, KS1 and UKS2

During shared analysis, teachers explained that listening to children co-constructing and sharing understanding, in structured whole-class, group or paired activities, provided opportunities to monitor and assess the accuracy of their interpretation and for children to moderate for each other. Dialogue that evaluates learning and focuses on specific learning processes and learner characteristics was used to assess, support and correct interpretation.

Children talked about their own learning processes and learner characteristics. My analysis identified that they did this through a combination of examples and explanations based on their own learning experiences and the experiences of their peers:

> Interviewer: Right, next question: What makes you feel clever?
> Child A: When you get better at stuff.
> Interviewer: When you get better at stuff? How do you mean?
> Child A: Like when you're practicing and you notice you can do things [pause] better. You start getting things right.
> Child B: In maths you might be practicing and you might like get 5 out of ten then practise and get ten out of ten or something. You have to practise really hard - I can do 9x9…
> Child C: You improve. Like spelling too. I got 4 out of 10 then I practised and I got more right.
> Child A: Reading… and learning new things…
> Child D: Getting everything right – tick, tick, tick, tick tick – a swarm of ticks? Do you get it? Like a swarm of ticks? [laughter]
>
> 
>
> Child B: Doing sums…
> Child C: What makes you feel clever [to the other children]?
> Child B: P.E. when I'm doing netball and stuff and I do something right.

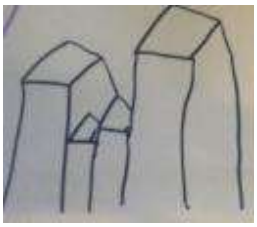
Children, LKS2

In this way, children used their own experiences to co-construct understanding of learning through dialogue. They had 'explicit' teaching about processes and characteristics, opportunities within the curriculum to 'put into practice' what they had learned, and then structured and scaffolded opportunities to reflect on these experiences. Analysis suggests that they built their own personal and shared repertoire of strategies for learning in this way. This alerted me to the possibility that they may internalise their knowledge and understanding of the concepts underpinning these strategies by explaining them to others. They were able to articulate their understanding of learning as it developed, using their own choice of words. This in turn provided opportunities for them to socially construct their understanding using real examples in context.

*4.2.3 Recognise Complexity*

Using experience to understand the complexity of beliefs is an important aspect of the sub-theme of 'Recognise Complexity' within the 'Metacognition' theme:

> Interviewer: Can you tell be about what these are?



Child A: Bar charts for intelligence.
Interviewer: Could you tell me just a little bit more about that?
Child A: You know how charts rate things? It's rating intelligence. Different bars for different things.
Interviewer: So what's that one?
Child A: It's... I don't know. How I am in different things. That's maths and that's reading growing… [pause] They're 3D like the charts on the computer.

Child, LKS2

This extract from the focus group illustrated ways in which children talked about having different amounts of intelligence in different domains. Here the child referred to curriculum areas as different domains and intelligence being different in each area.

> 'It has a really negative impact on him and he not only gives up but gets upset with himself. I try not to just remind him of what he can do well – tempting but reinforces it.'
>
> Greg, Teacher KS2

Sue explained in the focus group that she felt that for some children these differences trigger negative emotions and fixed beliefs that impact on learner characteristics and behaviours in areas beyond cognitive domains. During my data generation and analysis it became apparent that teachers observed children in different curriculum and social contexts, which were coded as 'domains', to observe their different responses.

Another important aspect of Recognise Complexity within this theme is how my analysis suggested teachers and children demonstrated 'awareness' that different experiences can act as 'triggers' for beliefs that create barriers to learning for individuals. Teachers talked with children about possible conflicts and contradictions that might occur in the development of beliefs about their personal capability:

> 'We try to get to know what starts this off. It's knowing it's there and we can - do something - with people there for us. Sometimes we need someone else to help get things clear and... [pause] I take the temperature, on the day and in the moment. You have to read it carefully.'
>
> Joe, Teacher KS2

This extract is typical of teachers' talk about how children may not understand or be aware of how external factors impact on their skills of emotional management. Analysis of observation suggested that children were supported to identify when triggers impact on their own learner behaviours and the behaviours of their peers. While teachers encouraged

children not to use triggers as an excuse for avoidance, and to build strategies to overcome them, they also explained that children in emotionally charged situations sometimes found it more difficult to access their repertoire of practical strategies for emotional management. This is illustrative of how my analysis suggests there was an emphasis in the school's pedagogy informed by Mindset Theory on children having a role to play in improving their own learning and the learning of others.

*4.2.4 Metacognition summary*

My analysis suggests that teachers teach children about Mindset Theory and learner characteristics for growth within the 'Teach Learning' sub-theme. They also articulate underpinning psychology of Mindset Theory in every-day classroom dialogue using examples in context. Teachers and children develop their knowledge of cognition and children are able to explain Mindset Theory reflecting on examples from their own experience. Teachers provide opportunities for children to reflect on and discuss their own experiences in relation to learner characteristics and Mindset Theory as they 'Construct Meaning' together. Children use their own experiences to construct understanding of associated learner characteristics through dialogue. They are able to articulate their understanding as it develops using their own choice of words.

Within the theme of Metacognition, the 'Recognise Complexity' sub-theme focuses on aspects of the learning environment that help children to develop an understanding of the complex and individual nature of learning and beliefs. It focuses on how reflecting on real and personal experiences provides opportunities to develop understanding of this complexity and how children can help each other to overcome barriers to learning. While teachers explain that in practice this can be problematic in social situations, they also suggest that engaging in the problematic issues raised by social complexity can contribute to nuanced understanding of developing beliefs and how they can influence and support each other. They discuss meaning and develop a shared vocabulary with children to understand the detail and complexity of problems associated with developing growth Mindset.

4.3 Challenge

The 'Challenge' theme focuses on distinctive features of the learning environment identified through my analysis as helping children to experience and understand challenge. This theme identifies ways in which children's perception of challenge is constructed purposefully and socially. In this section, I unravel the problems encountered with developing self-strategy to manage challenge and conflicting cultural messages about difficulty, failure and challenge. This theme includes three interrelated sub-themes: Plan Challenge, Create Choice and Model Behaviour (Appendix D). At the time of data generation there was a whole-school professional learning focus on challenge, which was reflected in the propensity of codes relating to this theme across all sources of data.

*4.3.1 Plan Challenge*

Within the theme of Challenge, the 'Plan Challenge' sub-theme focused on aspects of the learning environment where the design for learning created experiences of challenge. When asked about the practical approaches developed in the classroom to develop a learning environment that supports the development of growth Mindset, each of the teachers talked about planning using a detailed curriculum framework that focuses on challenge called 'The Challenge Curriculum'.

Image of 'Challenge Curriculum', Field Notes, Day 4

In the initial focus group, the teachers explained that this framework is adapted from a commercial resource, tailored by them to suit their setting and their children's interests. They change the themes, but maintain the underpinning principles of the framework, which uses enquiry questions to instigate learning opportunities. They also explained that the Challenge Curriculum was introduced following their engagement with Mindset Theory, to provide a framework that would help them to link curriculum content with experiences of challenge.

As part of this this curriculum, teachers and children devise questions for enquiry linked to the early years EYFS (2017) and primary National Curriculum (2014) frameworks. Patterns in observation data revealed that teachers across the school used the Challenge Curriculum to plan regular opportunities for children to tackle tasks where they experience difficulty, failure and challenge:

> ‘The Challenge Curriculum has helped... Just knowing – how to create a challenge - and together knowing we get the curriculum learning with the challenge. Having that structure helps with confidence that it is OK.
>
> Joanne, Teacher EY

> ‘I think providing the challenging activities, although they would have been there before, I wasn’t as conscious of it as I am now.
>
> Danielle, Teacher KS2

These extracts are illustrative of the ways that teachers explained, in focus groups and interviews, how introducing the Challenge Curriculum to support a pedagogy informed by Mindset Theory. As my analysis developed teachers references to ‘awareness’ of challenge and ‘real’ challenge were often coupled with reference to this curriculum framework. This suggested that this practical resource made teachers more conscious of integrating experiences of challenge into the curriculum. It also raised the question of how the teachers were defining ‘real’ in relation to challenge and why they perceived this to be important to the development of growth Mindset.

In a school developing practice informed by Mindset Theory, it was unsurprising that my analysis identified numerous different ways in which children were encouraged to talk together about the challenges that they engaged in, particularly as ‘challenge’ was a development plan focus. However, what I did find thought provoking during analysis was that it highlighted the ‘fluency’ with which the children were able to converse on this theme and the different ways that they were able to express their ideas and thinking.

Separate, related codes were gradually established to identify instances where the children used what appeared to be more formulaic sound-bites to reflect on experiences of challenge, coded as ‘Mindset mantras’ and more ‘natural expression’ where they used their own forms of expression. The ‘Mindset mantras’ mirrored phrases used regularly by the teachers and embedded in assessment materials or displayed on walls; such as ‘We can all learn from mistakes...’ or ‘I rose to the challenge...’. However, in transcripts of field notes and the children’s participatory mapping activity, analysis also revealed that children often used more natural and childlike expression when talking about challenge and difficulty:

> ‘Reading hard things. Choosing hard things… Hard books… I don’t always choose the very hard books - but I choose hard books that I can.’
>
> Child, KS1

> ‘I’ve got it. Grams – like reading grams and reading time. They are difficult and you have to practice them to be better and learn to do them well.’
>
> Child, LKS2

This use of language implied that children were developing enough ownership and control of concepts and vocabulary to be able attempt to have confidence to construct their own explanations of difficulty, failure and challenge. However, there were also occasions where my analysis suggested a lack of consistency between data relating to children’s use of language. For example, I was surprised by what seemed to be the striking incongruence in the use of the term ‘easy’. On one occasion, I was observing a group of higher attaining children tackling a mathematical challenge that they were finding very difficult. When asked directly about how ‘difficult’ the task was, one girl smiled and said that it was ‘easy’, when she was clearly struggling to solve the problem. The striking difference between this child’s response, where she seemed proud to claim ‘ease’, and the day-to-day discourse of the classroom made the dissonance of incidents like this stand out during my analysis.

I was intrigued by this and mentioned it to the class teacher, Sue, during the observation debrief. She highlighted an interesting issue in relation to conflicting cultural messages about difficulty and challenge. She explained that the girl who had described the task as ‘easy’ was relatively new to the KS2 class, and had joined after the beginning of the school year. She went on to explain that some children found the cultural shift in this use of language and understanding of challenge and difficulty problematic when they first joined the school; that it could take some time for them to feel comfortable talking about difficulty if their previous experiences had been very different. This increased my awareness, not only of the complexity of defining these concepts, but also of the possibility of different latent meanings that are associated with them for individuals. The dissonance in the use of the word ‘easy’ during the observation had initially seemed negative, but I began to wonder if it actually just highlighted the strength of an established cultural message in the case study school. It perhaps also underlined the natural role of incongruence that challenges thinking as cultural understanding and beliefs are developed. As I moved into the second class for observation and reflected more deeply on the data this focused my attention on how interpretation might vary across the school.

Another aspect of this Plan Challenge sub-theme, that became prominent during analysis, was the emphasis on children being taught practical strategies to help them to engage with challenge. They reflected on learner characteristics associated with Mindset Theory together to build strategies to manage the problems that they encountered. During the initial focus group, and then later in interviews, teachers explained a number of the strategies taught to help children engage with challenge. During observations, children were asked to recall strategies to help them to ‘tackle’ challenging activities that form the focus of their curriculum. Going back through the relevant data set concerned with strategies and challenge, I discovered that there was a range of different cueing strategies evident. Rather

than offering solutions, these strategies often seemed to 'signpost' children to recall practical strategies from their repertoire.

In most instances, analysis suggested that there was a relationship between these cueing strategies and children independently seeking a practical way to the tackle the challenges that they faced. I was particularly interested that teachers chose to recount several examples that repeated the phrase 'What you mean is you can't yet - you should try'. They did this on a number of occasions across focus group and interview data items, with similar intonation and placing emphasis on the word 'yet':

> '...if they can't we always say 'can't yet' and it's them realising that they might not even at the end of the session be able to fully be able to do the objective but if they've tried and they might fail along the way but the failure part again is an important part of the journey. [...] It's 'what you mean is you can't yet – you should try'... or 'we'll try' and then work on it together'...
>
> Pete, Teacher KS1

Pete's positive, optimistic positioning, which was also evident in the other teachers' recounts of this 'can't yet' strategy across focus groups and interviews, sparked my interest. This was not just because if the enthusiasm with which they related examples from different age groups, or the consensus in their talk about this during the focus group, but also because it raised questions in my mind about the impact that the use of such affirmations that might actually have on goal setting. I was interested to see how much substance this strategy had in influencing children's motivation and behaviours in every-day practice.

My interest in the teachers' explanations of the 'can't yet' strategy continued to grow because, while they had talked so enthusiastically and emphatically about it in the focus group and interviews, there were only two instances during the entire data generation period when I observed the use of this strategy. The first of these instances occurred almost two weeks into the participatory observations. I had anticipated that the use of 'can't yet' would be prevalent in classrooms, but by this point my analysis had identified an incongruence because there had been no instances where I had heard children say 'I can't', let alone hearing anyone saying '...what you mean is you can't yet...'. However, this was not as surprising as who said it when it did occur:

> 'I was surrounded by a small group of children in the Early Years outdoor space playing in the 'dough disco', all making their fingers dance to disco music in glitter-filled play-dough to improve their fine motor skills. One child asked me 'Do you want to race me round the track?' [...] I was wearing shoes that were not suitable for running and without thinking I said 'I can't do that'. She said 'You should try. Come on we'll stick together' and she offered me her hand and walked me around the track [...]. As we walked, she added '...See? You mean you can't *yet*?'.
>
> Field Notes, Day 7

She echoed the words, intonation and emphasis that the teachers used. What seemed important in this outlying occurrence was that, aged six, she was not only mirroring closely the phrase and expression used by teachers' in the focus group and first interview, but that she chose to employ the strategy to help a newcomer. The way she spoke suggested embedded familiarity, but this outlier seemed to be an echo from the past. While other cueing strategies were evident in the data, in shared analysis including this incident teachers suggested that perhaps the school had moved on from use of the phrase 'you mean you can't yet' without realising.

*4.3.2 Create Choice*

Within the theme of Challenge, the 'Create Choice' sub-theme focuses on aspects of the learning environment that support the development of decision-making skills in relation to challenge. Analysis suggests that one of the dominant strategies that children were taught was the skill of assessing levels of challenge in a task and being able to choose resources that increase or reduce the level of challenge.

A range of different strategies were observed across the school that provided learning choices, while some approaches appropriate to curriculum requirements, children's age and their stage in development were specific to individual classes. This was apparent across the data items where it was identified that children 'make choices', 'selecting tasks' or 'select resources' to challenge themselves or reduce the complexity and difficulty in a task. For example, in the initial teacher focus group the 'Chilli Challenge' was discussed as supporting the development of growth Mindset. This was a whole-school approach to providing choice using the metaphor of intensity of heat to describe different levels of difficulty in tasks:

> Sue: The Chilli Challenge – and things like that where you're setting three different levels and they pick and …
> Pam: …it gives them some ownership doesn't it?
> Sue: Yeah.
> Pam: So they might say 'well I'll do two in the first list and then I'll move up or I might just go straight to the harder ones'.
> Sue: Yeah I do those where they can all pick from three.
> Pete: It tells you so much about them as a learner as well as their learning.
>
> Initial Teacher Focus Group

I was interested to note that using this common metaphor, across the school, seemed to provide an anchor for discussion about the contribution that choice makes to children's learning and to teacher assessment opportunities. This example is also indicative of ways teachers explained the need to assess curriculum skill and knowledge, while also assessing children's skill and confidence to self-assess and challenge themselves. Offering a choice of tasks of varying difficulty required children to make decisions based on accurate self-

assessment. Pete explained that it could be difficult to ensure that children make appropriate choices:

> 'It doesn't just come automatically; they've got to practice that and trust the teacher I suppose and also trust themselves to make that decision and have that confidence to make that decision to 'well I think I'm ready now to go onto something else'.

Pete, Teacher KS1

This is illustrative of ways in which analysis identified teachers worked to mitigate against children's inappropriate choices of challenge. In observation, some children chose tasks that appeared to require little effort. Conversely, some children chose challenges that appeared to be far beyond their current capability. Inexperience makes assessment of a task or choice of the resource more difficult, which can lead to unintentionally inappropriate choices.

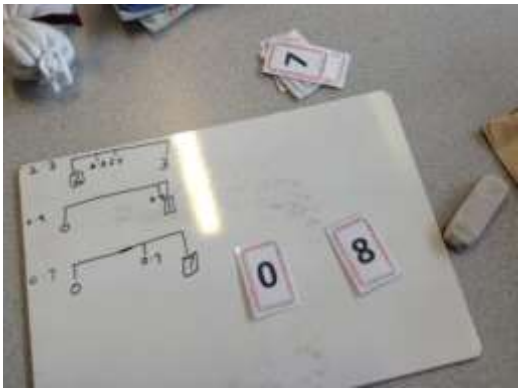
Shared analysis revealed that across the classes observed the teachers provided access to a range of resources. Teachers and children adapted every-day resources to create challenge. This became particularly apparent when using researcher field notes as a stimulus for interview. The field notes included photographs that I had taken of resources used by teachers and children to create challenges:

When teachers viewed the photographs, they were interested in the range of resources they contained such as number cards, Dienes apparatus, small-world play, rubber stamps of letters, cubes and multi-sided dice. What particularly stood out when viewing the images together during interviews and analysis was the 'every-day' nature of the artefacts in the photographs. Following their initial professional learning day, the school had particularly considered how existing resources could be used to develop their pedagogy informed by Mindset Theory. Creating opportunities for the children to access the resources, and make choices about what they used, was important in learning to assess and create challenge:

> 'It comes down to you can't buy a kit to do Mindset; there's a lot more to it than that because you make ideas stimulating and encouraging challenge. There are all sorts of different opportunities so that children can be interested and to maintain their interest through the day. It's how they think – so they make the challenge.'

Craig, Teacher EY

Initially this seemed quite straightforward, and analysis suggested that children in each age group observed had frequent opportunities to 'manage' their own learning and make choices about tasks, methods and strategies they use. However, as analysis developed it became apparent that this encouraged and taught children to adjust challenge for themselves through the choices that they make. This is an important aspect of this Create Choice sub-theme as part of the Challenge theme:




Sue: Which ones did you choose?
Child LKS2: These [points to pile] two because they will make the decimals tenths.
Sue: How do you think it would be best to record that?
Child LKS2: A blank number line? On a whiteboard [points over at mini whiteboards] then I can try it.
Sue: Why a *blank* number line?
Child LKS2: Because I can put on what I need.
Sue: Give it a go [child goes and collects board, pen and rubber].

Teacher and Child, LKS2

This example is illustrative of how questions that encourage self-regulation were used to help children to make decisions in their own learning and to reflect on their choices. Teachers used dialogue to monitor and help the children to understand how they were making decisions and whether the decisions were appropriate to support them in becoming self-directed drivers of their own learning.

*4.3.3 Model Behaviour*

Within the theme of Challenge, the 'Model Behaviour' sub-theme focuses on aspects of the learning environment where beliefs, skills and behaviours are modelled by teachers and children to influence learner responses to challenge. Congruent teaching became an important aspect in this sub-theme, with analysis initially identifying that this involved teachers explicitly trying to model skills and behaviours congruent with the beliefs that they espouse or explaining the value of this:

> 'It's important to pick up on if you really say something that isn't showing growth Mindset otherwise you know you just confuse everything. They have

> to know we're not perfect and we're honest and, well, make mistakes [laughs]. We're not trying to get to a product or an 'end goal' – we're trying to help them learn. Funny - but when it doesn't quite match it can be easier to assess understanding of Mindset in detail.'
>
> Sue, Teacher KS2

Sue explained in her interview, how analysis of explicit modelling during observations also involved deliberate action followed by some deconstruction or explanation. My analysis of observations also suggested that the teachers modelled expected behaviours and then explained how the behaviour supported their progress. On some occasions, they deconstructed this with the children, who helped them to unpick what had happened. During analysis, it became apparent that explicit modelling also involved teachers developing 'thinking scenarios' with the children; which included articulating and modelling the thinking process while making decisions about their choices of learning strategies. In these instances, they rehearsed, deconstructed, constructed and reconstructed thought processes behind behaviours together. This made thought processes more visible, provided concrete examples and made opportunities to directly challenge congruent and incongruent behaviours more playful.

In one interesting incident highlighted in analysis, a child seemed intentionally to use lack of congruence with growth Mindset as refusal. This was the second instance during data generation when I heard someone say 'can't yet':

> On the way to assembly, I observed a child refuse to stand in line when the other children were lining up at the classroom door. She walked away [from the teacher] and said '*I can't*. I have to get something to fiddle with because *I can't* sit still.' She put strong and deliberate emphasis on the words 'I can't' drawing them out and then stopping to wait for a response. She appeared to be trying to provoke a challenge by using the words deliberately to get a response.
>
> Field Notes, Day 7

This extract identifies an interesting manipulation through choice of behaviour; this deliberate use of the phrase words 'I can't...' with defiance seemed to demonstrate her will not to conform. In the observation debrief, the class teacher explained that she had chosen not to respond to the child's statement with direct discussion about the use of the term or a '...what you mean is you can't yet', recognising that it was possibly intended as a provocation. This explanation about choosing not to use the phrase was the second and final time I heard it used during my time in the field.

At first, my response to this incident was dominated by the consideration that the strategy could be manipulated to be used provocatively or even to create cultural disruption. However, as I reflected and became more familiar with this data through analysis, what I found particularly intriguing was the possibility that this use of the phrase to reinforce her

refusal, whether intentional or unintentional, might also demonstrate her understanding of its importance of it to both her peers and to her teacher. While there were many examples throughout data generation of behaviours reflecting espoused values and beliefs, this manipulation demonstrated embedded awareness of the values held by others relating to Mindset Theory in a different way.

During analysis, it became apparent that there was another form of teacher modelling in operation with 'implicit' modelling though teacher's ongoing every-day actions and talk. In these instances, the teachers' decisions and behaviours may have been deliberate or innate, but what distinguished them from explicit modelling in my analysis was that they were not deconstructed through shared talk. For example, in analysis of data across observation, interview and focus groups, instances were identified where teachers used 'positive intonation' when talking about difficulty.

> 'So there is a balance between using language to talk about difficulty in terms of challenge but then using language and talk that made challenge and choice sound exciting and like – and so the difficulty and the excitement kind of connect together. You just want – like I said, you want them to relish the challenge; you want them to want to strive; you want to give them that responsibility as well.'
>
> Pete, Teacher KS1

On a number of occasions in observation data, rather than explaining the benefit of challenge explicitly, teachers were observed to use anticipation in their voice to suggest that it was exciting. What emerged and surprised me, as these explicit and implicit modelling codes established across the data, was the ways in which teachers and children acknowledged both congruence and incongruence between characteristics of growth Mindset in their own behaviours. Rather than pushing or promoting an idealised goal or expectation of having growth Mindset all the time, teachers focused on how there might be fluctuations that include a natural and human incongruence when facing challenge.

*4.3.4 Challenge summary*

Through the range of resources available, opportunities for choice of resources and learning task teachers provide access to resources that encourage children to challenge themselves. They allow children to make choices about the resources that they use, and to select resources that increase or decrease the level of challenge in learning activities as appropriate to their own learning needs. They are taught to make and evaluate decisions that impact on their own learning and on the learning of others.

In this social learning context, teachers encourage children to not only to embrace challenge, but to seek it out and create it for themselves and for others. Teachers endeavour to model behaviours congruent with a belief in the malleability of intelligence and they encourage children to critically question behaviours that are both congruent and incongruent with characteristics of growth Mindset. My analysis suggests that problems with incongruent behaviour should not be allowed to overshadow the possibility that apparently congruent

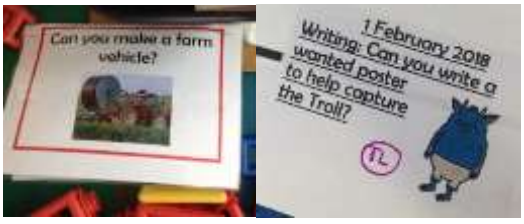
behaviours may be masking fixed Mindset beliefs. It also suggests the possible value of understanding incongruent behaviours as part of the cultural change process for the school and for individuals, and how they might be constructively challenged to develop greater understanding of the complexity of Mindset Theory. In the case study school, they also utilise this together as an opportunity to develop understanding of personal triggers for fixed Mindset beliefs.

## 4.4 Goals

The 'Goals' theme focuses on features of the social and physical learning environment that support learners in using feedback to set learning goals. These frequently occurring codes were in evidence across the data, and were particularly prominent in observations and teacher interviews. This theme describes three sub-themes that contribute to this within the classroom culture: Encourage Enquiry, Balance Feedback and Own Goals (Appendix D). They identify problems relating to balancing critical feedback about learning processes and outcomes to unpick some of the complexity of setting mastery-approach goals for individual and collaborative enquiry.

### *4.4.1 Encourage Enquiry*

An important aspect of the 'Encourage Enquiry' sub-theme, within the 'Goals' theme, is that learning goals are established with questions for enquiry. Learning goals were presented as mini 'challenges' using 'key challenge questions' from the Challenge Curriculum framework as learning goals. In the Early Years these questions were also positioned at bases or 'stations' to guide children's engagement with resources. As children progress through school, my analysis suggests they experience these questions in a range of contexts that introduce and focus learning goals. These questions were used in whole-class teaching on the whiteboard, as a stimulus for small-group activities and in books for individual tasks:




> Sample of many pictures of 'can' questions from across different age groups and different curriculum areas. Moving into the third class for observation, I noticed today a consistency in using questions to focus learning goals. Observed E[arly] Y[ears] - KS2 [upper primary]. In different age groups, the questions are used in lots of different ways. Looking back through the children's books this is consistent.
>
> Field Notes, Days 4 and 7

These photographs and accompanying annotations from my field notes, demonstrate ways in which these written challenge questions were used to frame goals in a wide range of contexts across the school. In the KS1 and KS2 classrooms, the teachers wrote 'Can I' questions to frame learning goals for each lesson. In one class I noticed that each time the teacher wrote a new learning goal on the whiteboard they rubbed the old question off but left the 'Can I…' at the beginning and re-wrote the second part of the question:

> 'I didn't even realise, it's just always there so it stays - but yeah just the learning objective is that they 'can' all, on some level, rise to that challenge that the objective is so it usually starts with 'Can I'..... So, whether they achieve it by the end, based on their learning journey that they can draw at the end ready for the next challenge, they're all having a 'can' go.'
>
> Pete, Teacher KS1

This focused my attention on the ways in which teachers encouraged children to set their own goals through questioning in individual and collaborative enquiry. Children had opportunities to pursue individual enquiry and to collaborate with peers and teachers to answer the enquiry questions that they generate. Further analysis suggested that this process of working things out together, through collaborative enquiry, encouraged the children to explore and share knowledge of different learning processes to set mastery-approach goals for their own enquiry that focused on the process of learning.

*4.4.2 Balance Feedback*

'Balance Feedback' is a sub-theme of the Goals theme that focuses on aspects of the learning environment where children and teachers give and receive critical feedback about learning processes and outcomes. An important aspect of this sub-theme was that teachers provided instructional feedback that focused on both learning processes and outcomes:

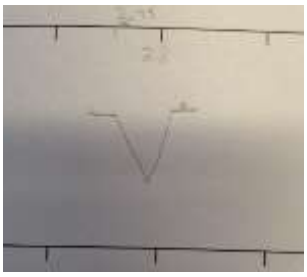
> '...Subject based, skills based or linked to an area of development and ongoing feedback about Mindset as well – about the process of the learning - so that's about the product and the process in good balance. It can be about product as well because the point of Mindset is that you link it to success [laughs]. It's not just effort – it's effort and success. Then they set goals that way too – not just what to learn but how to get there when it's hard.'
>
> Pam, Teacher KS1
> Final Teacher Focus Group

When explaining about the use of the electronic reward system, Pam's suggestion illustrates the importance teachers place on balancing these different types of feedback. Evidence from observation also suggested that teachers provided balance feedback that focused on both processes and outcomes of learning. My analysis suggests that the teachers view

feedback as part of a goal setting process and encourage children to link mastery-approach goal setting to success.

Having time to act on this balanced feedback provided opportunities for children to set learning goals that related to both learning processes and outcomes. A focus on performance goals initially seemed to contradict the established research literature relating to Mindset Theory, where the emphasis is on mastery-approach goals. As my analysis developed, what particularly interested me was the link made in my case study school between the need to set mastery approach goals and performance approach goals that related to each other. The balance of feedback being given for process and outcome encouraged mastery-approach goal setting that was also related to achievement of outcomes.

Analysis suggests that teachers were developing ways to engage children in a recording process focused feedback and mastery-approach goals. An example of this was where the children drew a visual 'learning journey' symbol in their books to review their learning and talk about the processes they are using to reach their goal:



> 'I can just look at the bottom of that and most of them are pretty honest with it as well and you can usually see if they've had a misconception there or a problem - and you can see it in their learning - their learning journey often reflects it. They're usually down in the 'Pit of Doom' when they've not got it and you can see what they do to get out – and it makes them aware that they should do something and we both know what they tried.'
>
> Pete, Teacher KS1

This is typical of how teachers across the school were observed using the same metaphor of a journey to help children identify and understand the relationship between processes and outcomes of learning. This is also illustrative of how examples in the data suggested that written or visual feedback tools helped to share this journey and provide a stimulus for talking about feedback and learning processes and outcomes. Using this strategy children identified practical strategies such as 'try a different way', 'look it up' or 'use the tree' for learning processes when they need to demonstrate perseverance, overcome challenge in a task and get them 'out of the pit'. Analysis of observation data suggested that together teachers and children established shared points of reference and used the metaphor of 'the

pit' to help them talk with familiarity and ease about their understanding of learning processes.

Another important aspect of the Balance Feedback sub-theme within the Goals theme is that children experienced constructive critical feedback during my observations. They had opportunities to evaluate their own experiences and respond positively to criticism in feedback from teachers and from each other:

> Child A: You have to tell them how to get better - and be honest - or you won't learn... and if you are not kind... you won't learn either.
> Child B: Then try to say in nicely – so you know what to do but don't get sad. 'Helping you - not hurting you' [said as if repeating a slogan]...
> Child A: You have to say 'That picture is good [points at image] because...' then say why. Then you can say 'What did you do when you were stuck?' or something...
> Child C: Yeah – that's it 'better next time'... Or 'have you thought of...' you know so they have some ideas. Then you know - know what you can do...
>
> Children, LKS2

In this example from the children's focus group, they were discussing what they do to make their learning better. One of the children introduced the idea of using feedback, although feedback was not specifically mentioned in the question, and the others were able to talk about critical feedback. Although they were from different class groups, they were able to recall together specific wording that they were familiar with for the process of giving critical feedback. What I found unusual in my analysis of observations was the emphasis on children 'giving' feedback to each other and the value teachers placed on the understanding that children develop though critical reflection on this experience.

*4.4.3 Own Goals*

Teachers and children talked about the purpose of feedback being to improve learning and that children can take an 'active' role in this process. This is an important aspect of this Own Goals sub-theme. This focused how children explained practical ways that they can take an active role and have agency in their learning by using feedback to set their own goals:

> Child A: That's my chart. You can make it harder for yourself. [Child's name] said I should make it longer so I can fit it all in. I couldn't fit it on the paper so I started again. Sometimes other people help you and sometimes you have to tell yourself how to make it better. It's called 'improve', getting better. It means you can [pauses and looks at drawing]...
> Child B: You 'can' better [emphasis on can].
>
> Children, UKS2

In their focus group, and in every-day classroom situations, children linked feedback with progress using examples from their own experience in their explanations. Analysis suggests that this was also reflected in aspects of teachers' talk that focused on improvement and progress. My analysis suggests that giving and receiving feedback was often a shared, public process. This made it a visible, normal and expected part of every-day learning. Analysis suggests that in my case study school this visibility of feedback in the learning environment helped children to understand its value and consider how engaging with constructive, critical feedback is useful to their leaning.

In the final teacher focus group, emphasis was placed on children's ownership of the goal setting process. They explained how they encouraged children to understand it as an individual and shared process and create goals for themselves as individuals and as members of a group, or set group goals with a shared focus:

> 'Did you have problems? Think about what you could do to make yours better. How could you improve it? Check the criteria [points at board] against your work. Now think about the way you are working together, what can you do to stretch and challenge yourselves – be more persuasive?'
>
> Sue, Teacher KS2

Teachers involved children in the setting of their own goals that focus on learning process and outcomes. Analysis suggests that sometimes this was through direction and sometimes, as in this example from Sue's English lesson, they provide support for children to respond to self-regulating feedback.

*4.4.4 Goals summary*

My analysis suggest that regular experience of feedback, which relates to learning processes, encourages children to set goals for themselves that are both challenging and focus on processes and outcomes that relate to each other. It identifies how teachers plan and assess using questions as a stimulus for curriculum enquiry. Through this, children learn to ask questions to lead their own learning and teachers develop a culture of enquiry, where learners set goals to seek out new knowledge and understanding together.

There is a particularly strong emphasis on the value of giving critical feedback, as well as receiving it, and children are able to evaluate their own experiences and respond positively

to criticism in feedback from teachers and from each other. Children understand that the purpose of feedback is to improve learning and so use it to set their own goals. They are involved in the setting of goals that focus on learning and process and have planned time to act on feedback and encourage them to set their own goals. However, teachers caution against over emphasis on process that does not link meaningfully to outcomes and explain how over time they have developed an emphasis on the relationship between these two types of goal.

## 4.5 Hybrid analysis and relationships between themes

### *4.5.1 Relationship between inductive themes*

The themes crafted during inductive analysis describe features of 'Community', 'Metacognition', 'Challenge' and 'Goals' within the school's social and physical learning environment. These four themes are presented separately in the previous section as distinctive and prominent features of the learning context; however, while they have distinctive purposes, they are woven together in practice. They are of equal importance and describe the context in which the school is developing a social model of pedagogy informed by Mindset Theory. These themes point to the importance of being resourceful as an individual and as a group to share knowledge, understanding and strategies for improvement supports development of a shared belief about capacity to influence their own Mindset and the Mindsets of others. They are planned synchronously within learning activities and happen in a variety of combinations.

An example of the interconnection between these themes is the 'penguin drama' activity discussed in my analysis (4.1.2). Within this activity, each pair's contribution to the final product was important. This activity is used in this chapter to illustrate how teachers and children value contributions within the theme of Community, and how structured paired work gave them an opportunity to monitor and control the quality of each other's contributions with encouragement, guidance and correction. They also valued each other's contributions through critical peer feedback and everyone was required to participate actively because the story was divided between the pairs and becoming accountable to one other as they reflected on learner characteristics in the feedback. In this way, teachers and children modelled behaviours associated with the Community, Goals and Metacognition themes. This is illustrative of how multiple aspects of the first four themes might typically be interwoven into a single activity.

### *4.5.2 Theoretical framework for Mindset and process of change*

Following the inductive approach to analysis, the theoretical framework for the change process in developing Mindsets across a school was introduced for deductive reasoning in my hybrid Thematic Analysis. This consisted of three themes of 'Mindset', 'Scaling Up' and 'Negotiate Meaning' (Table 3). The themes in the theoretical framework investigated the process of change through which the school is developing growth Mindset. Within the framework, Dweck's (2006) model of Mindset Theory is the pedagogical principle that is the focus of change, Scaling Up focuses on three aspects of the change process and Negotiate Meaning considers how social learning is important to this process.

#### Mindset theme

The 'Mindset' theme consists of two sub-themes: 'Talking About Beliefs' and 'Observable Characteristics'. This theme is adapted from Dweck's (2006) established framework of learner responses to difficulty, setbacks and challenge. It was included in the theoretical

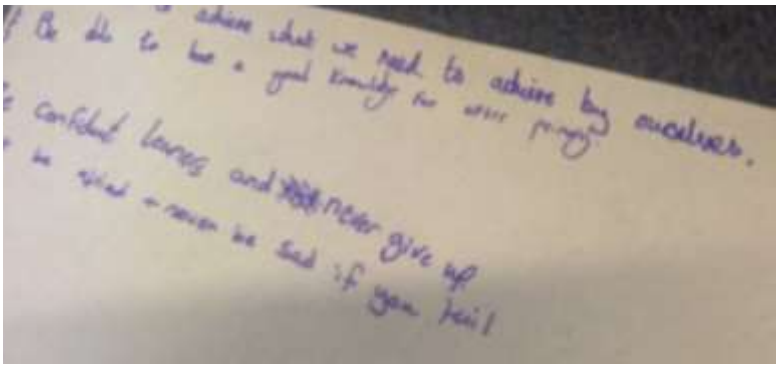
framework to clarify the relationship between what was happening in the social and physical learning environment identified through inductive reasoning and the established, published theoretical framework.

Within the theme of Mindset, the Talk About Beliefs sub-theme focuses on aspects of the change process within the school that related to teachers and children talking about knowledge and beliefs associated with Mindset Theory. In a case study of a school selected purposefully as an information rich case, it was not surprising that references to Mindset Theory and associated learner characteristics permeated discussions about learning across the data. Children's talk about their knowledge and understanding of how the brain works and taught each other about intelligence:

> 'We can change it [pauses]. It isn't easy, but we know we can help each other's intelligence. It isn't just that you can do anything you want to without trying [waves arms emphatically]. We have Mindset and we can work on it because it's changeable. We have things like the Chilli Challenge where we make a choice and we make the challenge for ourselves. I like it best when we make it, challenge, for each other. That's more fun. [child's name], he's really brilliant at it. But it can be changed.'
>
> Child, UKS2

This extract was from the children's focus group, in response to a question about what intelligence is (Appendix B). In this way, teachers and children made frequent reference to the ideas underpinning Mindset Theory relating it to the malleability of intelligence as malleable and practical experiences across all data items. They explained the malleability of intelligence as 'changeable' and referred directly to the learner characteristics that they considered associated with developing growth Mindset This particularly overlapped with the codes in the Metacognition theme form inductive analysis. The use of the term 'Mindset', as in this extract, linked ideas explicitly to the theory and the use of the term prevented the idea of Mindset from being dissociated from the underpinning science and psychology for both teachers and children. This provided regular explanations of the underpinning ideas and linked the detail of the theory with every-day learning.

Within the theme of Mindset the second 'Observable Characteristics' sub-theme focuses on aspects of the change process that relate to the specific learner characteristics associated with Dweck's (2006) model of Mindset Theory. On some occasions, analysis identified that they talked about characteristics associated with Mindset Theory without using the term 'Mindset' and just talked about the underpinning concepts. An example typical of this is when the children were asked to review the school's mission statement:

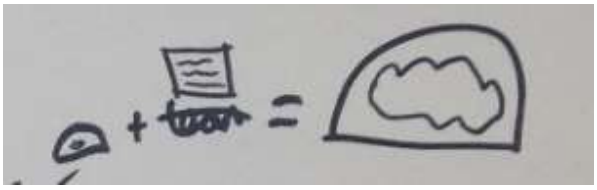


'Be able to achieve what we need to achieve by ourselves.
Be able to have good knowledge for after primary.
Be confident learners and never give up.
Don't be afraid + never be sad if you fail'

Children, LKS2

I was interested in some of the contradictions that analysis revealed in the data. For example in some instances children talked about '*managing emotions'* such as sadness when responding to mistakes or failure, whereas in this example the children use the expression 'never be sad if you fail'. What I found even more interesting was the discussion they had around these different ideas, using their different statements in the consultation to challenge their thinking.

The first specific aspect of Dweck's (2006) model within this sub-theme is observable learner characteristics associated with responses to challenge. In Dweck's (2006) model, this becomes evident when the learner anticipates that there will be an increased level of difficulty in part or all of a task and they respond by either embracing challenges or avoiding them:



Child A: You get your brain and you add learning...
Child B: No words! [look at each other] Cross it out.
Child A: ...add learning and better brain!
Child B: Then the harder the learning the better the brain. You can make your brain work better by using it.
Child A: Mindset – not giving up
Child B: Supporting others? You can make it harder for me...
Child A: If we don't give up when we make it harder – we can do even more difficult things.

Children, LKS2

My analysis identified many examples of children inferring connections between Mindset Theory and 'tackling challenge' or 'choosing difficult activities' as contributing to improving

their own outcomes. This particularly overlapped with codes in inductive analysis from the Challenge theme, with opportunities for children to engage in and reflect on challenges creating opportunities for children to develop understanding of this aspect of the model. Analysis suggested that building up experiences gradually through the curriculum helped children to understand the benefit of embracing challenge, using term 'rise to the challenge' and able to explain detailed examples from their own experiences. This suggested a strong and coherent relationship between practices in my case study school and this aspect of Dweck's (2006) model.

In a similar way, a strong relationship was clearly established in the data between the second aspect of this sub-theme and practices in the case study school. This was the aspect of Dweck's (2006) model concerned with learner characteristics associated with responses to obstacles such as mistakes or setbacks in their learning. This characteristic focuses on when the learner encounters a difficulty or makes a mistake with part or all of a task and they respond by either persisting and view mistakes as an opportunity to learn or getting defensive and giving up easily:

'It didn't work so I did it again. If you make a mistake, you should put it right. Ask someone or look at what is good... Try different ideas – that's what I did. This one is better [nods at second version of drawing]... I'm making my brain work! [...] That is my Mindset [pauses] making mistakes and making them work for me.'

Child, UKS2

This extract from the children's focus groups was illustrative of many examples in the data of children's talk about mistakes setbacks being linked directly to Mindset Theory and improving learning or intelligence. In this instance, the photograph illustrates the mistake the children is referring to but often they also recalled concrete examples from previous experience. Codes where teachers or children talked about their use of mistakes and connected this with Mindset Theory or intelligence proliferated across all data sources, with a particularly strong overlap with codes relating to the Community theme from inductive analysis. Again, analysis using the deductive reasoning approach suggested that there was a strong and visible relationship between developing practice in the case study school and the premise underpinning this aspect of Dweck's (2006) model.

However, the third aspect of this Observable Characteristics sub-theme was much less visible. This aspect of the Mindset theme was concerned with learner characteristics associated with responses to effort. In Dweck's (2006) model, this becomes evident when a learner finds a task is not easily achievable and they either see effort as the path to mastery and persist or view it as fruitless and give up. I noticed during analysis that coding relating to this sub-theme highlighted that on many occasions the concept of persistence and effort being conflated with embracing challenge. My analysis suggested that this related to the word 'effort' often being used in conjunction with tackling challenge.

Teachers and children were observed encouraging each other to sustain meaningful effort, but through analysis I realised that they were using different terms to explain this relationship. Rather than having one term, they also used a variety of explanations for effort such as 'keep trying even when it is hard' or 'try different things but keep going'. This variety in the use of vocabulary allowed for interpretations to be discussed and for nuances in these interpretations to surface, but it also made the relationship between this practice in the case study school and Dweck's (2006) model much less visible. I wondered if having an established phrase, like 'rise to the challenge' in the Challenge theme provided an anchor for negotiating different understandings.

The fourth aspect of this sub-theme in the Mindset theme was learner characteristics associated with responses to feedback. In Dweck's (2006) model, this becomes evident when the learner is given critical feedback and they respond by either seeking to learn from the criticism they receive or by ignoring the feedback. Having been a recent development planning focus, it was again unsurprising to see evidence of efforts to engage children positively and constructively with critical feedback from the outset of my data generation and across data items:

> Child A: You have to tell them how to get better - and be honest - or you won't learn... and if you are not kind... you won't learn either.
> Child B: Then try to say in nicely – so you know what to do but don't get sad. 'Helping you - not hurting you' [said as if repeating a slogan]...
> Child A: You have to say 'That picture is good [points at image] because...' then say why. Then you can say 'What did you do when you were stuck?' or something...
> Child C: Yeah – that's it 'better next time'... Or 'have you thought of...' you know so they have some ideas. Then you know - know what you can do...
>
> Children, LKS2

This example from the focus group reflects ways in which children are encouraged to talk about critical feedback as supportive. What was particularly helpful to me as a researcher was that, because they develop their understanding of Mindset Theory through talk, they were used to providing explanations. They were also interested in the researcher role and keen to help me to understand their experiences in school. Analysis indicated a strong relationship between this aspect of Dweck's (2006) model and the Goals theme developed

through inductive analysis when teachers and children talk about experiences of critical feedback they make links directly to the Mindset Theory.

The fifth and final aspect of this sub-theme of the Mindset theme was learner characteristics associated with responses to the success of others. In Dweck's (2006) model, this becomes evident when the learner is aware of the success of others and they either find lessons and inspiration in the success of others or feel threatened by their successes. Initially this aspect of Dweck's (2006) model seemed least evident, although I noticed that teachers avoided having higher attaining children providing 'exemplar' work for the class to learn from and wondered if this aspect of Dweck's model was achieved in the case study school through the avoidance of certain practices. However, through the deductive analysis, I began to see evidence in the data of a relationship between this aspect of Dweck's model and teachers encouraging children, as in this extract, to evaluate each other's work to inform their own learning:

> 'That's good – now talk to your partner and find out how they used the index. Explain what worked to each other so we can borrow ideas! Listen carefully so you can try them out. Use the atlas to show each other how you did it. Remember to get your growth Mindset into gear and see what you can learn from each other.'
>
> Pete, Teacher KS1

This is an example illustrative of where extracts coded 'share to learn' overlapped with 'success of others'. Teachers encouraged children to learn from the success of others and to engage with, evaluate and use each other's successes to inform their own learning but as with the concept of effort, using different terminology made it more challenging to identify the relationship with Dweck's (2006) model. This extract is also illustrative of how they connected this directly to Mindset Theory and present it as a strategy for improvement. The reciprocity in such learning is used to develop practical and useful strategies for the development and sharing of curriculum knowledge and skills.

Evidence for this area grew as sharing practical strategies became more obvious in my analysis. Teachers make explicit reference to 'borrowing' and 'magpieing' strategies and learning from other children's processes and children understand these terms as meaning they should check what strategies have been useful to other members of their group. This mirrored the way that teachers talked about learning from their own mistakes and the mistakes of other in interviews, focus groups and with children.

Scaling up theme

The 'Scaling Up' theme within the theoretical framework for analysis focuses on areas of research and development recommended in relation to the development of Mindsets at scale (Yaeger *et al.*, 2013). Previous research suggests three sub-themes for consideration in establishing a whole-school approach: 'Underpinning Principles', 'Every-day Practices' and 'Assessment'. This section provides an overview of the relationship between these areas and practice identified in my case study school through inductive analysis, identifying gaps in assessment processes highlighted in this second stage. This theme addresses concerns

expressed in previous research literature that, while it is useful to change children's Mindsets with brief interventions, there may also be value in researching every-day experiences that can then sustain and support development of growth Mindset.

Professional learning is an important link between the Scaling Up theme, suggested in Yeager *et al.* (2013) and used in deductive analysis and features identified through inductive analysis. This relationship highlights how collaborative professional learning, evaluated as part of the school development planning, contributed to accuracy of interpretation of Mindset Theory and underpinning principles. Analysis suggested that this relationship between the school's practice and Dweck's model was particularly strong where inductive codes focused on a productive professional environment supporting a school wide social learning culture of trust encouraged teachers to engage collaboratively with research, challenge existing thinking and develop their cultural norms:

> 'Being able to work on it together means we have lots of ideas about what to do and can share lots of ideas with the kids. It gives us our own resources, like we said about the photos just being every-day things but we can teach the children to use them together to develop growth Mindset. I think it was that day at the beginning where they helped us to adapt ideas and resources... Just like the children 'Magpie' – we can steal ideas from each other too!'
>
> Jem, Teacher UKS2

Embedding the development of growth Mindset into every-day activities through socially metacognitive learning was an important link between development of every-day practices in the Scaling Up theme and features identified in the school's environment through inductive analysis. This helped them to feel they had a greater repertoire of strategies that they can teach children to manage challenge and difficulty in learning and adapt existing resources.

Using a combination of self-report and observation of learner characteristics at first suggested a strong relationship between assessment in the Scaling Up theme and features identified in the school's social and physical learning environment through inductive analysis. This highlighted the ways in which the development of children's understanding of Mindset Theory, learner characteristics and learning processes were assessed. However, analysis suggested that despite the school's collaborative professional learning being linked to school development planning with a Mindset related themed outcome, there was a problematic absence of agreed criteria for this assessment of children's Mindsets. This aspect of the deductive analysis also highlighted the issue of the lack of specific criteria for the evaluation of teaching practices and the social and physical learning environment across the school.

Negotiate learning theme

The 'Negotiate Meaning' theme in the theoretical framework was adapted from part of the Community of Practice social theory of learning (Wenger 1999; Farnsworth, Kleanthous and Wenger-Trayner, 2016), to focus more closely on how practices relating to Mindset are being

developed and established across the school. This theme involved three sub-themes: Mutual Engagement, Joint Enterprise, Shared Repertoire. It was concerned with how negotiation can create change across a cohesive learning community to develop embedded and sustainable practice.

Perceptions of the school's overarching goal of effective learning as being synonymous with the development of growth Mindset characteristics is an important link between the Negotiate Meaning theme and features identified in the learning environment through inductive analysis. This identified where unifying language accountability to each other contributed to teachers and children understanding of Mindset Theory as central to the purpose of their work together. Analysis highlighted the roles of mutuality in teacher engagement and mutuality between teachers and children in my case study school as they work together to develop growth Mindset. It also emphasised the way children shared and negotiated ideas with teachers and with each other as they build strategy and give and receive critical feedback:

> 'They can challenge each other, or help each other to challenge themselves. That photo of the dice - what it reminded me of was their voices – like little teachers – I can hear them asking each other helpful questions as they make choices. They have learned to use the resources around them and have different Mindsets but help or challenge each other carefully.'
>
> Pam, Teacher KS1
> Final Teacher Focus Group

This extract from the final teacher focus group, where Pam reflects on how frequency of opportunities to negotiate meaning in a variety of fluid groupings, also connects these themes and illustrates the link made by teachers between the children's social interactions, Mindset Theory and agency. Valuing difference as useful is an important link between the joint enterprise element of the Negotiate Meaning theme and features identified in the school's social and physical learning environment through inductive analysis. Analysis suggested that children were engaged as partners to negotiate meaning in relation to understanding their own intelligence and learning. This approach is positive but not idealised; building trust means constructive disagreement and differences can be welcomed and teachers and children are interested in each other's ideas and perspectives. However, analysis also revealed a lack of active involvement of other stakeholders such as parents, carers and governors in this endeavour.

An overall focus on children's learning and progress provides a broad but coherent core to the development of growth Mindset beliefs and characteristics as a joint enterprise and this is something that teachers have chosen to engage with as a group. The development of Mindsets belongs to the teachers and children who share this enterprise. Analysis suggests a gap in the development of practice and possible advantages of considering fuller participation of these other stakeholders. Involving them might continue to strengthen the

conviction with which nested beliefs about capacity to develop growth Mindset are held within the school community.

My analysis suggest that collaborative learning and evaluation is an important link between the shared repertoire element of the Negotiate Meaning theme and features identified in the school's social and physical learning environment through inductive analysis. Shared negotiation and interpretation, where teachers and children go through processes of together, leads to deep understanding of the change processes for individuals and as a group. They are not trying to 'get to a product' but are nurturing the ongoing and complex process of development. Individuals and groups establish their own repertoire of strategies and practices for developing growth Mindset, while there is also a shared repertoire and the individual repertoires have unifying features and core principles. In this way, developing growth Mindset as a shared enterprise develops the community's repertoire. However, opportunities to extend this community membership and involve parents, carers and other stakeholders could create opportunities for greater collective agency.

*4.5.3 Themes, dialogue and regulation*

The themes are interconnected and interdependent with two common threads of dialogue and regulation binding them together. Across analysis, a distinctive combination of individual and social regulation involved the monitoring and control of teacher and child cognitive, emotional and social learning. This included evidence of three types of regulation; individuals self-regulating, individuals regulating for each other and members of the community regulating collectively for the group. These threads permeate extensively across findings and are important catalysts for the development of beliefs about collective agency in this real-world social learning context.

Through synthesis, it became clear that these two threads play a key role in developing opportunities for reciprocity in learning. At the heart of this social learning model is not only children's control over their own learning and beliefs, but also the contribution that they can make to develop the learning and beliefs of others. Teachers and children learn from each other and help each other to learn. In this way, their individual beliefs about intelligence are developed and strengthened.

My analysis challenged my initial concerns, to suggest that engaging constructively with the problematic aspects of pedagogy in a real-world social learning context might add something to the development of growth Mindset and related learner characteristics. This analysis countered my initial thinking to suggest that the case study school actually enhances opportunities for developing growth Mindsets by critically engaging with theory and practice, through shared experience and reflection on problematic social encounters to develop collective beliefs about capacity and agency.

My study suggests that the skills developed by individuals to tackle challenge and difficulty are enhanced by experiences of critical dialogue, challenging congruence and strategy building in socially metacognitive activity. In this way, classroom culture supports a shared belief in conjoint capacity to work together to develop growth Mindset through collective agency. For example, Table 4 outlines differences, identified during my analysis, between

learner characteristics of individuals with growth Mindset and those who also hold this shared belief about their collective agency when faced with challenge:

| | Concept | Individual Growth Mindsets | Growth Mindsets, Dialogue and Self-Social Regulation |
|---|---|---|---|
| **Belief about Intelligence** | Belief | Belief that intelligence is malleable | A shared belief that together teachers and children can take action to develop and extend intelligence and improve their own outcomes |
| **Talk about beliefs** | Talk | Talk about belief that intelligence is malleable | Talk about belief that intelligence is malleable<br>Share belief that together teachers and children are able to cultivate and sustain pedagogical practices that develop growth Mindset |
| | Understand | Knowledge and understanding of beliefs that relate to Mindset Theory | Explain knowledge and understanding of beliefs that relate to Mindset Theory.<br>Justify with examples from own experience and the experience of others |
| | Self-Regulation | Self-regulation through internal dialogue and personal strategies | Self and social regulation through shared critical dialogue and congruent modelling<br>Monitor and mitigate for misinterpretation together |
| **Observable Learner Characteristics** | Response to Challenge | Embrace challenge<br>Understand difficulty and failure as contributing to success<br>Manage emotional response to failure<br>Develop personal strategies | Embrace challenge<br>Understand difficulty and failure as contributing to success<br>Support and manage own and other's emotional response to failure<br>Create/seek out challenge for self and others<br>Teach each other practical strategies to respond to challenge for extended shared repertoire<br>Collaborate to meet individual and shared challenges<br>Encourage and support others to embrace challenge |

*Table. 4: Collective learner beliefs and characteristics in response to challenge*

This approach of engaging together with the problematic, rather than smoothing over complexity, enhances learning opportunities through greater visibility of Mindset Theory. It develops deeper understanding of psychology and practices relating to Mindset Theory and an increased repertoire of practical learning strategies. However, analysis suggests that this requires support for emotional management to help to ameliorate responses to mistakes and failure. This strengthens self and collective efficacy leading to increased teacher and learner motivation, while the skills used for working things out as an individual are enhanced by experiences of working things out together.

This increases the depth and detail of a nuanced understanding of Mindset Theory for both teachers and children. They are able to provide examples and explanations, based on their own experience, that acknowledge the complexity of developing beliefs about intelligence. Children adopt and adapt the ideas and develop their own terms so that they are able to explain their knowledge and understanding in their own words.

## 4.6 Findings and Analysis Conclusion

The themes presented within my analysis are interconnected and interdependent. Through synthesis, it becomes clear that dialogue and the regulation of cognitive, emotional and social learning play an important role within each of the themes and related practices. Individuals self-regulate and they regulate for each other as they negotiate meaning in pairs, groups or all together as a class. Weaving together information from different sources and data generation methods provides different perspectives on the role that this combination plays in developing opportunities for shared criticality and reciprocity in learning.

Analysis suggests that purposefully teaching children strategies to negotiate dialogue and to regulate for their own learning and beliefs, and the learning and beliefs of others, is also important in scaling up a social model of pedagogy informed by Mindset Theory. Through this reciprocal interaction, individual beliefs about intelligence are developed through a shared belief in a conjoint capacity to take action together to develop growth Mindset. This is a shared belief that teachers and children articulate about their capacity to execute the courses of action required to develop intelligence together; they believe that they have agency to cultivate and sustain practices that develop growth Mindset for themselves and for each other. Dialogue and the social regulation of cognitive, emotional and social learning permeate extensively across the findings and combine to create a socially metacognitive catalyst for the development of individual and collective beliefs about Mindset in this real-world learning context. The next chapter will extend discussion of the practices identified in my analysis, positioning them in relation to a selection of existing research and academic literature.

# 5 Discussion

This discussion develops my analysis into three main findings and positions then in relation to prior research and literature. It gives an overview of the main findings from this study and considers how these findings relate to other key, relevant research literature. My study began with an investigation of pedagogical approaches informed by Mindset Theory in a real-world primary school setting. The distinguishing characteristics of the model proposed in this thesis were constructed through the process of analysis during my research. This chapter returns to answer my research questions and it evaluates the contribution that introducing a new social model of pedagogy for development of Collective Mindset makes to the wider body of research about beliefs in the malleability of intelligence and Mindset Theory.

## 5.1 Overview of main findings

My overarching research question asked what the characteristics of a social model for developing growth Mindset are, and what the processes and conditions are for its development within my case study school. The first main finding from my case study analysis was the identification of six key pedagogical practices in the social and physical learning environment where:

- teachers and children seek together to accurately interpret and enact Mindset Theory using expert sources to co-construct their knowledge and understanding

- teachers and children understand that adopting a belief can be complex and how exploring congruence and ongoing maintenance play an important role in the process

- teachers and children build a trusting community where they can take risks in learning and explain mistakes and failure as part of shared learning processes

- teachers and children share and develop practical strategies to monitor and control cognitive, social and emotional responses to difficulty, failure and challenge

- teachers and children understand difficulty, failure and challenge through shared experience and reflection embedded in every-day learning activities

- teachers and children give and receive balanced critical feedback that links process to outcomes and use it to set process and outcome related goals

This combination of practices helps to develop and sustain Collective Mindset, which is a shared belief held by teachers and children in their conjoint capabilities to execute the courses of action required to develop and extend intelligence. This was identified through my analysis as a belief that together they are able to cultivate and sustain pedagogical practices that develop growth Mindset for themselves and for each other.

These six key practices are characteristics of the social model that provide conditions that create an environment that supports the development of growth Mindset. They create a context within which teachers and children develop Collective Mindset and have agency that supports their social development of growth Mindset and avoids development or reinforcement of false or fixed beliefs. These practices are interdependent in their creation of conditions conducive to the development of growth Mindset in the social learning context of a primary school.

A second main finding, constructed from analysis during my case study, was that threads of dialogue and self-social regulation are integral to the six practices. They bind them together to support the development of Collective Mindset within this real-world, social environment. These socially metacognitive threads are characteristics that provide visible cues that teachers and children use to construct and assess their understanding of intelligence as malleable. Critical questioning of ideas and challenging congruence are important features of these threads that contribute to social construction of understanding of theory and practical strategy. These pivotal and integrative threads of dialogue and self-social regulation help teachers and children to monitor, assess and adjust for themselves and for each other in terms of knowledge, understanding, application and development of practical strategies.

The third main finding from my study is the way in which development of the six key practices and socially metacognitive threads of dialogue and self-social regulation are underpinned by high quality, sustained professional learning processes. These processes embed the six key practices and their threads in school practices, routines and development priorities. Developing beliefs about the malleability of intelligence and associated learner characteristics, are a central shared purpose for the teaching team. A negotiated culture of professional learning supports quality of teacher knowledge and understanding, sustained development of aligned practices and assessment of progression.

## 5.2 Positioning findings in relation to prior research

These three main findings identify beliefs, practices, principles and processes that are central to the pedagogical culture in my case study school. They define the characteristics of the social model of pedagogy for the development of growth Mindset and the collective belief that gives support to the authenticity of this activity in this real-world, primary school setting. They are presented separately in this Chapter for clarity in defining their distinctive features. However, in the real-world of the primary school classroom it is important to acknowledge that they are inextricably interwoven. It is the specific combination of the practices in every-day teaching and learning that creates the distinctive model of pedagogy suggested in this thesis. While a substantial body of theory and research has since grown in this field (Good, Aronson and Inzlicht, 2003; Dweck, 2006; 2017; Blackwell, Trzesniewski and Dweck, 2007; Stevenson and Lochbaum, 2008; Haimovitz, Wormingon and Corpus, 2011), there is still comparatively little published empirical evidence of how growth Mindset is

operationalised effectively in a real-world, social primary school context (Dweck and Yeager, 2019). My study contributes to this emerging area of research.

Within this Discussion chapter, words and short phrases from my data extracts are presented in italics. They are included here to maintain and emphasise the direct connection between the theorised discussion and the empirical data and my analysis of every-day practices in the real-world context of my case study school (Mills and Morton, 2013). They are from extracts included and attributed to specific participants in the Findings and Analysis chapter of this thesis.

## 5.3 First Main finding: Six key pedagogical practices

This section discusses the first of the three main findings from my analysis, explaining six key pedagogical practices identified in the social and physical learning environment of my case study school. These six key practices involve teachers and children seeking together to accurately interpret and enact Mindset Theory and to acknowledge the complexity of developing beliefs, while they strive together to develop specific learner characteristics particularly associated with building trust, responding to failure, creating challenge and using feedback to set goals. This specific combination focuses on a balance of cognitive, social and emotional aspects of learning relating to Mindset Theory and the ways in which growth Mindset is developed in the real-world, social learning context of my case study school.

### 5.3.1 Accurately interpreting Mindset Theory

Teachers in my case study school identify that established research literature uncovers two key problems associated with the interpretation of Mindset Theory in classroom settings and explain how they focus on addressing these problems in their teaching and curriculum design. The first problem is accuracy of interpretation of the theory itself, where meaning is lost through oversimplification, misinformation or misinterpretation (Dweck, 2006; 2017; Dweck and Yeager, 2019), while the second problem is teachers not knowing how to operationalise Mindset Theory and sustain accuracy of interpretation of theory as it is translated into practice in the classroom (Haimovitz and Dweck, 2017). Analysis suggests that teachers and children in my case study school strive to reduce problems associated with implementation by constructively confronting possible misinterpretation and misuse of theory. Identification of these practices particularly helps to answer aspects of my research question that relate to the ways in which teachers and children develop understanding of intelligence and how they relate this to their every-day practices and experiences.

#### *5.3.1.1 Teachers' critical engagement with theory*

Previous research focusing on learning encounters has emphasised the value of reflecting on personal experiences (Beard and Wilson, 2006). More than two years before we met, the teachers in the case study school attended a face-to-face experiential professional learning day about Mindset Theory. Their various recollections focused in on two aspects of the day; these were reflection on their own experiences of challenge, difficulty and failure and critical engagement with aspects of Mindset Theory. They explained how it had involved them discussing how they could apply it into their own context using existing resources (Bell *et al*., 2010; Greaves and Moore, 2018, Walker *et al*., 2019). However, analysis particularly emphasised the impact they considered being introduced to the concept of 'false' growth Mindset (Dweck and Yeager, 2019), as part of this early experience in, had on encouraging their critical engagement with Mindset Theory. The consideration of the dangers of inaccurate interpretation heightened their awareness of the need to avoid oversimplification and uncritical application of the theory from the outset (Hodkinson and Hodkinson, 2005).

The sustained nature of the teachers' critical engagement with theory in their development planning process reflects their perceptions of their knowledge or skills as not being static. They talk about it as an ongoing process of what Hodkinson and Hodkinson (2005, p. 109) describe as learning through a combination of 'participation' and 'construction', where they refine practice together '*finding out, questioning and trying'* new approaches. Previous research literature suggests that the use of expert sources and published research (Coe *et al.,* 2014; Cordingley *et al.*, 2015) is powerful in the development of informed classroom practices. In my case study school, the teachers collaborate to combine knowledge from these resources with learning from observations of each other. This helps them to co-construct their knowledge and understanding through critical engagement in sustained and collaborative professional learning process (Cordingley, 2019). This provides opportunities for teachers to explore their understanding in context and in depth, while challenging and mediating each other's understanding. This creates conditions in the case study school for the development of a strong foundation of teacher theoretical knowledge about Mindset Theory.

*5.3.1.2 Sustained intervention for children*

In my case study school, the quality of the Mindset intervention with children is important to the accuracy and quality of their interpretation of theory. In previous studies, the approach taken with many interventions follows a simple pattern, where the science of brain malleability is taught and learners are given opportunities to reflect and apply this knowledge (Blackwell Trzesniewski and Dweck; 2007; Pornesku *et al*., 2015; Yeager *et al*., 2016; Dweck and Yeager, 2019). Building on the pattern of these pedagogical interventions, the case study school have developed their own sustained intervention with children. However, unlike many of the interventions in previous studies that have been delivered through a series of workshops or an online programme, the case study school have integrated their intervention into every-day learning experiences.

This sustained intervention involves the direct and explicit teaching of growth Mindset in a year-round programme of activities, including teaching about physical scientific processes in relation to the malleability of the brain, Implicit Theories of Intelligence and learner characteristics associated with Mindset Theory (Moser *et al*., 2011). The quality of knowledge content in this intervention is underpinned by the teachers' critical engagement with theory. Children teach each other about the brain, intelligence and learner characteristics and then use this knowledge as the focus of dialogue in reflection and evaluation of learning to build their own practical understanding (Flyvbjerg, Landman and Schram, 2012; Kinsella, 2012). Teachers scaffold the application of understanding into every-day learning activities to encourage children to apply the knowledge in a range of practical real-world contexts.

Children in the case study school explain intelligence as something that *'can change'* and something that they *'can grow'*. They do not use the term 'intelligence' often in their every-day talk, but are able to use and explain it when asked directly about improving learning. They translate it into practical explanations, such as *'how well I use my brain to solve new*

*problems'* and '*what my brain can do to make me think better'*, and they use synonyms such as '*improve'* or '*make work better*' to explain the change. Through practical and personal examples, they explain how they can influence this change. Using their own terms to explain this gives more nuanced and detailed explanations of their understanding that are connected to every-day experiences and highlight the realities of incongruent behaviours. While this integrates their learning about Mindset Theory and intelligence into the ongoing every-dayness of the classroom, it also supports accuracy of interpretation of theory and opportunities to evaluate the detail of children's explanations helps to identify where meaning is lost through oversimplification, misinformation or misinterpretation (Dweck, 2006; 2017; Dweck and Yeager, 2019).

*5.3.1.3 Critical engagement in practice*

Attention to quality of both theoretical and practical aspects of Mindset Theory means that teachers and children in the case study school question what they are trying to achieve, why and how. Previous research concerning teacher professional learning suggests that a process of double stimulation (Engeström, Sannino and Virkkunen, 2014), where an external stimulus is introduced and then teachers relate it to problems in their own practice, makes it meaningful to the context and generates a motivating sense of ownership. In my study, teachers evaluate the ways in which understanding of intelligence and Mindset Theory is operationalised together, to sustain accuracy of interpretation of theory as it is translated into practice in the classroom (Haimovitz and Dweck, 2017). What is distinctive about this process in my study is the strength of involving children in this process and encouraging them to relate theory to the context specific practices. This collaborative approach creates a catalyst for the development of teachers' local interpretation of theory, improves practice relevant to the setting and aligns activity to the needs of specific groups of children (Cordingley et al., 2015; Harris and Jones, 2019).

Previous literature has suggested the importance of not losing the essential psychological messages underpinning practice (Yeager *et al*., 2013; Rienzo, Rolfe and Wilkinson, 2015) when Mindset interventions are scaled up to whole-school level. It also suggests that more is required than for teachers to simply develop a growth Mindset, they need to learn how this can be operationalised practically in the classroom (Haimovitz and Dweck, 2017). Through collaborative enquiry, teachers in the case study school share and develop a wide repertoire of practical ways to develop beliefs about intelligence and associated learner characteristics. Their collaboration with colleagues within and beyond the school team, and their engagement with externally facilitated professional learning events, provide opportunities for them to share practice and critically question approaches with each other as they continue to develop and extend their practical repertoire (Cordingley *et al*., 2005; Cordingley *et al.,* 2015). The strong foundation of teacher theoretical knowledge supports this collaborative development of practical wisdom in the case study school (Flyvbjerg, Landman and Schram, 2012; Kinsella, 2012) and they create a social and physical environment for the cultivation of children's Mindsets.

In previous research that focused on Assessment for Learning practices, Marshall and Drummond (2006) suggest that avoiding sticking to the 'letter' of rigid tools and techniques and instead identifying practices that adhere to the 'spirit' of an approach will help to embed it authentically into a social learning context (Clarke, 2014). In this way, critical evaluation of practice in my case study school could be said to seek out evidence of pedagogy can go beyond superficial, formulaic instructional patterns to deeper understanding and embedded practices coherent with the 'spirit' of Mindset Theory. Collaborative evaluation looks for evidence of how beliefs are changed and how authentic practices avoid rhetoric and superficial approaches or confusion with other theories. The school has not previously audited the many ways in which they operationalise Mindset Theory in the classroom. They share practice but had not gathered and summarised their approaches and that task has been started as a result of participating in my research to some extent.

*5.3.1.4 Assessing beliefs and recognising triggers*

Teachers in the case study school explained the relationship between accuracy of interpretation of theory and problems with assessment arising from the complexity of attitudes, values and beliefs. These areas of learning are often internalised thought processes and are therefore difficult to assess. The teachers recognise that interpreting observable behaviours alone may not always provide accurate assessment of these internalised processes, particularly if espoused beliefs are not congruent with the beliefs that are actually held (Phipps and Borg, 2009; Farrell and Guz, 2019). Initially, teachers explained that they found it difficult to determine whether children understood or believed Mindset Theory. They said it was initially hard to know if they really held growth Mindset beliefs or if they were just giving socially desirable responses. As they critically evaluated their pedagogy informed by Mindset Theory, what they began to recognise was that it is often at the point when beliefs are challenged and strategies have to be actively sought to manage difficulties that children's responses to their beliefs become more visible.

My case study school does not assess intelligence with a standardised intelligence quotient test, or measure beliefs with a self-reporting survey. Previous academic literature has questioned whether the Dweck's (2006) self-reporting inventory, that is used in many Mindset research studies, is appropriate for an applied setting such as a school (Yeager *et al*., 2013). Instead, in the case study school they use ongoing observation of characteristics and behaviours with self-report evidenced in every-day talk. This does not ignore the value of self-report, but obtains it in a different way. These opportunities for ongoing contextualised assessments surface contradictions and provide naturally occurring opportunities for assessment.

Unusually, my case study school's sustained intervention does not just focus on growth Mindset and acknowledges that neither teachers nor children will have growth Mindsets all the time. Instead, my analysis suggests the value of metacognitive knowledge of self and task to identify different experiences that may trigger fixed Mindset beliefs. It advocates teaching children to identify, understand and help each other to address the triggers that elicit fixed responses (Dweck, 2006; 2017; Murphy and Dweck, 2010; Yeager and Dweck,

2012). This is a learning process for teachers and children that enhances the depth of knowledge and understanding about the realities of what it is they are trying to achieve together.

Teachers in the case study school work with children to identify and address triggers and barriers to learning head-on (Murphy and Dweck, 2010; Yeager and Dweck, 2012). They encourage children not to use triggers as an excuse for avoidance, but to build strategies to overcome them. However, they are also aware of how variable resilience can be from person to person and in different contexts. They assess children's emotional situation and are aware that they may not understand how external factors affect their skills of emotional management. One teacher described this as *'taking the temperature, on the day and in the moment'*. Dialogue and peer mentorship in the case study school not only provide opportunities for teachers to assess children's understanding and address misconceptions, it helps teachers and children to recognise their own and each other's triggers and seek strategies to pro-actively manage them to support cognitive development (Alexander, 2018).

*5.3.2 Developing beliefs is complex*

Teachers and children in my study explain that adopting a belief can be complex and how challenging congruence and ongoing maintenance can play important roles in the process. This is very closely linked to their accurate interpretation of Mindset Theory and is particularly distinctive to the model of pedagogy informed by Mindset Theory that is developed in my case study school. This section discusses ways in which my study puts emphasis on the influence that members of a group can have on each other's beliefs and the opportunity that children have to take an active role in helping each other to develop growth Mindset. It suggests the value of social action in the development of Mindsets, while also explaining ways in which social interactions can be problematic and support this development and a shared belief in the conjoint capacity of teachers and children in developing each other's Mindsets. Identification of this practice particularly helps to answer aspects of my research question that relate to the ways in which understanding of intelligence is developed with and between children.

*5.3.2.1 Developing nested beliefs*

The wider literature concerning the development of beliefs suggests that an individual holds a range of different beliefs within their belief system (Pajares, 1992). In previous literature that focuses on Mindset Theory, this system of beliefs is referred to as a 'meaning system' (Hong *et al*., 1999, p. 588; Molden and Dweck, 2006). My study suggests that the knowledge that teachers require to sustain their practice in developing growth Mindset includes understanding that this is managed within children's meaning systems and in the dynamic and complex context that their other social realities provide.

Previous research suggests that the strength with which a belief is held relates to how it coheres with other beliefs (Leatham, 2006). The process of integrating new knowledge with existing beliefs is considered to eliminate beliefs that are not strong or relevant and create a

strong anchor for beliefs that connect together (Kagan, 1992). My analysis points to the value of focusing on developing two nested beliefs; an individual's belief in the malleability of their intelligence and the belief that together teachers and children have the conjoint capacity to develop their intelligence.

Existing research explains the importance of personal experiences and external influences on the development of these beliefs and belief systems (Kulinna, Silverman and Keating, 2000). It also suggests that, within an individual's complex belief system, strongly held core beliefs are ingrained through experience, while peripheral beliefs that are held with less conviction may be adopted more theoretically (Phipps and Borg, 2009). My study suggests that developing complementary, nested beliefs through experience and reflection strengthens the conviction with which beliefs about growth Mindset are held within the children's meaning systems (Leatham, 2006). This is different from previous research findings relating to Mindset Theory because it puts emphasis on the importance of how an individual's beliefs act on each other.

Dweck and Yeager (2019) have suggested that future studies should consider the different ways in which the environment provides cues that that inform the development of children's beliefs about the malleability of intelligence and Mindset Theory. This is an important contribution made by my study, which focuses on the conditions and interactions within a social and physical environment that have been introduced to support the development of growth Mindset in a real-world context. It explains how specific characteristics of the physical environment, such as '*fluid*' and varied grouping, choice of resources, working displays and visual assessment tools, provide cues that support the development of children's beliefs about intelligence and capability. My study suggests the value of teachers understanding the complexity of these influences as they develop their practice.

5.3.2.2 *Explicit and implicit modelling*

In a recent meta-analysis it was suggested that teachers might be able to provide cues for children's growth through teacher modelling of responses to difficulty and setbacks and help children understand malleability intelligence in action (Haimovitz and Dweck, 2017). The value of teacher modelling is also suggested in established teacher professional guidance for the development of pedagogical practices that develop growth Mindset (Boaler, 2016). My study offers empirical evidence about how teachers have engaged with this specific area of practice. The teachers in the case study school explicitly model learning and thinking processes as they identify problems and resolve them. My analysis also suggests value in modelling some of the complexity and confusion caused by conflicting beliefs, or events that trigger fixed Mindset beliefs. This can provide opportunities to safely challenge behaviours and help children to understand that developing a belief is not always straightforward and how they might address this complexity.

It is also possible that, as children in the case study school adopt and adapt strategies and thought processes for themselves, they also model for each other. My analysis suggests that, as with teachers, sometimes this modelling is through conscious and deliberate action,

while sometimes it is implicit in their unconscious application. It also suggests that, rather than being a problem, it can be useful for children to purposefully adopt and rehearse related behavioural characteristics, making the links to Mindset Theory explicit (Kagan, 1992) as they begin to develop understanding of Implicit Theories of Intelligence and goal setting. This is different from 'false' growth Mindset, identified in previous research, which is specifically attributed to mistaken claims (Dweck, 2006; 2017; Yeager *et al*., 2013; Dweck and Yeager, 2019), whereas this is the deliberate exploring of the relationship between beliefs and behaviours.

*5.3.2.3 Challenging congruence*

Congruence and incongruence are important to the explicit and implicit modelling of learner characteristics and thought processes in my case study school. Existing research suggests that there are times when teachers' beliefs are congruent with their teaching practices, and that there are also times when belief systems and practices may be incongruent (Richardson *et al*., 1991; Kulinna, Silverman and Keating, 2000). There is extensive research in relation to congruence and teacher beliefs (Borg, 2003; Bastukman, 2012; Kamiya, 2016). My study suggests that teachers in my case study school also place value on exploring congruence of children's behaviours in relation to Mindset Theory and the influence of the social and physical learning environment. This involves challenging the congruence in explicit and implicit modelling by teachers and children in every-day activities, considering the differentials between '*what is said and what is done'.* This is made explicit in direct teaching activity, such as evaluation of children's use of language in relation to the characteristics of growth Mindset, or implicit in the ongoing and sometimes subconscious, habitual evaluation of congruence in everything they say and do.

My study suggests that constructively challenging incongruence between beliefs and behaviours is particularly valuable in minimising confusion that relates to the complexity of developing Mindsets. Teachers in the case study school use dialogue in professional learning to explore their beliefs about intelligence and the pedagogy that they are developing. Previous literature about teacher beliefs suggests that an individual's beliefs act as a filter when new knowledge is introduced, which impacts on conceptual change (Pajares, 1992). It suggests that this process is enhanced when implicit beliefs are made explicit, when contradictions and adequacy are confronted and where new knowledge is integrated with old knowledge (Kagan, 1992). Whole-class, group and paired activities in my study encourage children to explore and develop their beliefs, recognising and discussing their own congruence. Teachers explain the way in which a shared belief about their capacity to take action together to develop their own and each other's Mindsets, acts as a filter for the development of growth Mindset and vice versa.

This is not a naive position that assumes or expects constant congruence, but a position where teachers and children strive for congruence and if there is a lack of congruence they use as a point of evaluation and assessment and to inform teaching. In this way, in the case study school challenging incongruence becomes a resource for exploring the realities and complexities of beliefs and belief systems with children. What was distinctive in my analysis

was the way in which teachers and children in the case study school also challenge and critically question assumed or apparent congruence. This provides opportunities for examination of the fine-grained detail of the complexity of developing, sustaining and maintaining personal capability beliefs associated with Mindset Theory. It uncovers contradictions that are not obvious and reveals the sometimes incongruent thinking and beliefs behind apparently congruent behaviours. This highlights challenges in identifying the difference between espoused and actual beliefs and the importance of consideration of the congruence with practices when designing research and planning data generation. However, it also suggests the value of making implicit beliefs explicit through modelling, reflection and reconstruction (Kagan, 1992; Hattie, 2012).

*5.3.3 Build a trusting community*

Building a trusting community for the purpose of developing growth Mindset became a prominent theme in the analysis of my study. Key elements of this were practical approaches to providing mutual support, sharing responsibility for learning and developing children's perception of learning as a shared process. Identification of these practices helped to answer aspects of my research question that relate to the ways in which teachers strive to develop children's conception of intelligence as malleable in my case study school. It also challenged my initial thinking and raised the new question of whether the problematic aspects of real-world, social learning might actually add something to the development of growth Mindset and related learner characteristics. My analysis identifies ways in which teachers and children in my case study school strive to build a trusting community for the development of growth Mindset, where they can take risks in and explain mistakes and failure as part of critical engagement with beliefs and learning processes.

*5.3.3.1 Making mistakes and support structures*

In my study, children describe how they turn mistakes into learning *'with'* the teacher, and both teachers and children talk about '*failing*' and '*working through'* problems or difficulties together. Teachers explain how these opportunities to problem solve together are planned into every-day teaching, with the intention of developing learner characteristics associated with growth Mindset. Previous studies involving dialogue, suggest that building trust encourages children to take intellectual risks as they learn with the teacher and with each other (Mercer and Littleton, 2007). In the case study school, analysis suggests there is also a particular emphasis on the value of children using mistakes with each other and providing mutual support to improve learning and develop strategy together. Teachers in my case study school place emphasis on the value of teaching effective peer support processes by providing *'support structures'* for dialogue and questioning.

Informed by previous classroom studies that focus on building trust through talk, teachers in my case study recognise the need to provide structured approaches for interactions that help children to challenge their own and each other's thinking (Alexander, 2004; 2018; Mercer and Littleton, 2007). Children are given scaffolds for dialogue create structures that encourage them to actively seek help from each other and identify strategies to help each

other move forward in learning if they encounter a setback or difficulty. What is distinctive about this, from previous findings in the field of Mindset Theory, is the ways in which the children are taught skills to sensitively scaffold the support that they gave each other with dialogic structure. While being encouraged to think critically, as they talk about failure or making mistakes, they are also taught ways of talking that provide mutual support. These support structures particularly focus on mentoring skills, rather than encouraging children to simply *'give'* answers or provide solutions for each other.

My analysis identified that, although there is no written policy proscribing a formula for these support structures in my case study school, they usually involve a combination of three types of questions that the children are encouraged to ask each other. These were categorised during analysis as questions that focused on children (a) helping each other to identify the nature of problem they have encountered, (b) encouraging each other to consider the pros and cons of a number of possible solutions to a problem or (c) evaluating resources available for support. In this way, teachers strive to provide structures through which children can support each other to increase self-regulation, regulation for each other or regulation for a group (Järvelä and Järvenoja, 2011; McCaslin, 2004). Teachers explain how this structure is designed to build *'a sense of trust'* through mutually supportive dialogue that *'helps children to take action'* in the face of a setback, failure or difficulty.

*5.3.3.2 Reflecting on mistakes together*

In the case study school, teachers provide regular opportunities for discussion of real and personal, every-day experiences of mistakes and failure, with the intention of developing children's understanding of Mindset Theory and associated learner characteristics and behaviours. In this talk, teachers and children often draw on concrete examples from their own experience and from the experience of others to illustrate the ideas they share (Brush and Saye, 2017). Using real and contextualised experiences, to explain, justify and defend their use of specific mistakes, children discuss and critically evaluate the realities of whether their mistakes actually enhance learning outcomes, or not. Reflecting together on these events, which occur in their every-day learning, prevents '*learning from mistakes from becoming rhetoric*' and encourages children to support each other in taking intellectual risks (Mercer and Littleton, 2007). In this way, they also have opportunities to explain mistakes and failure in shared learning processes and to take responsibility for intellectual risks as they develop practical wisdom together.

Observing aspects of children's confusion as it unfolds, during children's reflections and evaluation of their experiences of failure and making mistakes, helps teachers in the case study school to provide timely, structured support for understanding of learning processes. What was particularly distinctive in these interactions was the role that the teachers' took as they withheld from directive intervention played in allowing groups to unpick and examine a problem themselves. While monitoring and mediating sensitively to ensure misunderstandings were addressed (Mercer, 2000), teachers explained that the '*step back'* was important to the mediation and scaffolding process because it allowed the children to challenge each other critically.

Teachers also explained the ways in which incorrect challenges sometimes allow more detailed exploration of understanding through justification and children's defence of ideas. Analysis identified occasions when teachers and children sometimes reverted to more simplistic examples of famous athletes or inventors to support their explanations of Mindset Theory. However, their use of real-world examples from their own experience required the children to explain some of the more complex and contradictory aspects of problems they had actually encountered, rather than being reliant on more abstract scenarios that are removed from their personal experience. In this way they can use theory to reflect on their own experiences to develop practical wisdom relating to Mindset Theory (Flyvbjerg, Landman and Schram, 2012; Kinsella, 2012).

*5.3.3.3 Avoidance and accountability*

In my study analysis revealed that teachers and children reflect their shared responsibility in a powerfully unifying use of language, with the very frequent use of plural personal pronouns, such as '*we'* and *'our'* (Mercer, 2000). In my analysis *'We'* is used by teachers to describe the teaching team, and by teachers and children to describe the teacher and class or children working together and children working with other adults. Teachers also often answered questions at interview with a collective response or used plural pronouns when giving instructions in observations. They had been unaware of this pattern of language and were surprised when they identified it in interview transcripts and observation field notes during shared analysis. While this use of language proliferated, it was not a deliberative practice but a reflection of an embedded value. This unifying use of language consolidates shared responsibility; developing a sense of togetherness and implicitly suggesting an accountability to each other as a community through talk (Resnick, Asterhan and Clarke, 2018).

Analysis of my initial observations raised a concern about the possibility of this shared responsibility for learning creating opportunities for children to abdicate or relinquish responsibility without detection. Existing research suggests that learning design should involve sustained and deliberative teaching of cooperative approaches to support these processes, building in appropriate opportunities for individual accountability (Iyer, 2013; Johnson and Johnson, 2013; Gillies, 2014). In this way, a variety of approaches within a structured framework of cooperative learning may further enhance positive outcomes for individuals and the group (Johnson and Johnson, 2013).

As my study progressed, further observations uncovered a pattern across age groups of individual accountability being developed through an expectation of shared critical evaluation of learning process and outcomes. They combine collective assessment of a shared product with individual assessment opportunities is thought to enhance outcomes for individuals (Gillies 2014; Slavin, 2014). Accountability through critical evaluation prevents children from masking abdication of responsibility to their peers, or the teacher.

*5.3.4 Practical strategies and responses to failure*

This chapter has already mentioned previous research that emphasises the importance of avoiding the development of false growth Mindset, where an individual mistakenly claims to use practices that develop growth Mindset (Dweck, 2006; 2017; Dweck and Yeager, 2019; Yeager *et al*., 2013). This section discusses the role that grouping and developing practical strategies for responding to mistakes play in creating agency for group members to establish authentic practices informed by Mindset Theory. Familiarity with processes for emotional management, developed through regular opportunities to collaborate with different members of the class, equips children to help each other and to share strategies that they can later use as individuals or in groups.

*5.3.4.1 Making positive and active use of mistakes*

In recent research, the suggestion that adults' beliefs about failure as motivating or demotivating may be influential in the development of children's Mindsets (Haimovitz and Dweck, 2016; Haimovitz and Dweck, 2017; Park *et al.*, 2016), has encouraged teachers in my case study school to positively orientate dialogue towards what can practically be learned from mistakes and failure. Teachers in the case study school are aware of the influence that their response to mistakes and failure may have on children's beliefs about their own capabilities and their goal setting behaviours. They talk with children positively about how their mistakes can actually be used to improve. My analysis suggests that in their pedagogy, they also consider how the children's responses to failure might influence the beliefs of their peers; suggesting that children's actions and reactions also impact on the beliefs of their peers and exacerbate or ameliorate each other's responses to failure.

Previous research in the field of dialogic teaching suggests that being aware of practical strategies that they can use, can help children to manage their responses to learning outcomes if they are not successful (Alexander, 2004; Mercer and Littleton, 2007). Teachers in my case study school explained that children need to be actively taught '*what to do when they make mistakes'*; how to engage with mistakes to create '*productive*' learning experiences and how to manage their own and each other's emotional responses to mistakes and failure. Children in my study use verbs such as '*take*' and '*make*' in every-day talk to describe how they use mistakes actively. This illustrates the active role they perceive mistakes can be given in the learning process.

During my study, teachers talked with children about the relationship between success and failure, not as dichotomous, but as part of '*one process'*. This association encouraged them in observations to make active use of mistakes in pursuit of their learning goals. During my data generation, children often explained making mistakes and failure as part of their 'learning journey', using a visual assessment tool to support and develop the metaphor of entering a learning 'pit' if the make a mistake or encounter a setback (Nottingham, 2017). There are many different, large visual representations of this metaphor displayed around the school and children are encouraged to record self and group assessments of their progress representing the learning journey using a small and simple symbol that they draw next to

their work. They are encouraged to discuss practical ways '*out of the pit'*, including helping each other and generating solutions to '*get out of the pit together'*.

In my study, using visual metaphors like the '*pit*' and '*journey*' collaboratively provides opportunities for children to critically explore the connection between failure and success constructively to help ameliorate their emotional responses. This also makes them accountable to themselves and to the group (Resnick, Asterhan and Clarke, 2018). During lessons, teachers directly relate this to Mindset Theory and to children's practical capacity to help each other to use mistakes to improve learning and help their '*brain to do more'* or as a group to do '*better thinking'*. Shared responsibility in interactions and scaffolds, provided by teachers and children, contribute in this way to developing a belief that together they have the capacity and resource to cultivate growth Mindset.

*5.3.4.2 Self-concept and fluid grouping structures*

In my case study school within-class grouping by attainment, often referred to as 'ability' grouping, is used in some lessons. During the initial stages of my analysis, I was troubled by the relationship suggested in previously published research between within-class grouping by attainment and limitations on children's perceptions of their own capability, potential and on their identity as a learner (Hart, *et al*., 2004; Yarker, 2011; Marks, 2013; Boylan and Povey, 2014). This practice in my case study school initially seemed contradictory to Mindset Theory, with extensive established research and academic literature discussing the potentially problematic issues in relation to personal capability beliefs associated with grouping in this way (Gillies 2014; Capar and Tarim, 2015; Francis *et al*., 2017; Alexander, 2018).

During analysis I became aware that in my case study school children move between groups, even during the course of a lesson. In previous research Boaler (2005, p. 1) refers to 'ability' grouping as creating 'psychological prisons' with no escape. She suggests that it is a lack of movement between groups that impacts on children's self-concept and creates limiting self-fulfilling prophesies. In other studies Hart *et al.* (2004) and Swann *et al*. (2012) also advocate careful consideration of the use of a variety of grouping structures to communicate an individual's potential as not being predetermined. Tereshchenko *et al*.'s (2018) research on 'mixed-ability' grouping further problematises this area. It suggests that whether children are grouped homogenously, with children assessed as being of similar attainment, or grouped heterogeneously, with children of different perceived abilities, the influencing factor on limiting outcomes is the emphasis on the concept of 'ability' underpinning the grouping structure.

It became apparent during observation and analysis that, each class in my case study school uses a variety of '*fluid*' grouping structures. These include within-class grouping, self-selected groups and whole-class teaching. Previous research has suggested that limitations of classroom furniture, layout and management can be problematic in the organisation of grouping arrangements (Baines, Blatchford and Kutnick, 2017). However, children in my case study school are adaptable and are used to re-organising furniture into a number of

different arrangements to accommodate changes in grouping arrangements. While analysis suggests that this requires a significant investment in time to establish it creates a social and physical environment where critical questioning of learner characteristics associated with Mindset theory can be developed.

Hart *et al.*'s (2004) and Swann *et al.*'s (2012) studies, also focus on the potentially restrictive influence that communicating predetermined beliefs about capability might have on children's learning. However, it became clear during my study that while that there were some interesting similarities in practices between the schools involved in the earlier studies and the practices in my case study school, there were also distinctive differences. My analysis focuses on how the frequency with which grouping arrangements change impacts on children's perceptions of group membership and of themselves in my case study school. Rather than having *'set groups'* that the children belong to, and therefore identify themselves with, they have fluid seating arrangements that are different in each lesson. In this way, my analysis suggests that children's self-concept might be built around being members of the class group. Even when grouped by prior attainment they are not in fixed groupings. The particularly significant difference between this practice and the previous studies is that in my case study school judgements of current capability are used very visibly to inform grouping. However, rather than suggesting a limiting predetermination of potential, these judgements are made by teachers and children to inform fluid, context specific grouping arrangements.

*5.3.4.3 Understanding purpose of grouping*

My analysis suggests that it is important to the development of a pedagogy informed by Mindset Theory, that the structure of grouping is explained as contextual. Teachers place emphasis on the structure and movement between groups being appropriate to resourcing a specific learning context and activity (Brophy, 2006). What is distinctive in my case study school's approach to this contextualized grouping is the value placed on children's understanding of the different purposes of grouping. The contextual element of grouping is more visible when teachers explaining the relevance of grouping arrangements to children. Rather than children focusing on the group that they are allocated to as being a judgement of their potential, this shifts the focus onto how the grouping is relevant to the context.

In relation to debates in academic literature about 'ability-thinking' and predetermined potential, it is interesting to note that Attainment Levels were eventually removed from the English National Curriculum and a new culture of assessment beyond levelling was encouraged and supported by Government (Lilly *et al*., 2014). However, since the introduction of a new National Curriculum without levels (Department for Education, 2014a) a new language of assessment also has evolved where teachers are required to determine whether children are progressing towards 'end of key stage expectations' (Department for Education, 2014b) and meeting 'expected' age related standards (Department for Education, 2014b). This had raised challenges for teachers in my case study school, in relation to communication of assumptions about predetermined potential. This recent change in the landscape of assessment culture, and in the language of assessment within the English

education system, provoked questions for teachers in my study about how a new language of assessment that focuses on expectation influences children's capability beliefs and learner identities in new and different ways.

*5.3.4.4 Using problems to deepen understanding*

My analysis challenged my thinking and suggested that within these practices, it is the active engagement of teachers and children with problematic issues arising in implementation of a pedagogy informed by Mindset Theory, that develops a more nuanced and deeper understanding of the application of theory in a real-world, social settings. I had anticipated in my research purpose (1.2) that this could be problematic, but not that the problems that arise out of social complexity might help to build trust, strategy and agency. Teachers and children solve problems together and consolidate learning through personal experiences of dealing with genuine difficulty and failure to view them as part of a learning process and respond to them constructively.

In my case study school, teachers strive to develop children's conception of intelligence as malleable through shared reflection, evaluation, responsibility and accountability. Rather than removing problems that children might encounter, practices within the case study school reduce their negative impact by using them to help children to build practical management strategies and agency. My analysis suggests that encountering difficulties in social aspects of learning, challenging incongruence and addressing misunderstandings together helps teachers and children to develop relevant strategies that support their learning. Unpicking problems and making them more visible through social aspects of the school's pedagogy adds to the development of understanding about growth Mindset and related learner characteristics.

Sharing practical strategies helps children in the case study school to actively use mistakes to contribute to the quality of their learning. One child encapsulated this concept, describing it as how they '*make mistakes into learning together'*. However, this does not prevent it from sometimes being an uncomfortable or challenging process and there are still occasions where children are upset, disappointed or even distressed by their lack of success as part of the process such as the child who drew the ballerina with the permanent marker on the mini-whiteboard (4.1.1). Analysis suggests that, while in my case study school a culture is actively developed where children explain how they manage experiences of making mistakes and failure together, they are caring and supportive recognising that beliefs are still sometimes '*fragile*' and teachers explain how they require constant care, cultivation, repair and renewal.

5.3.5 Experience difficulty, failure and challenge

Teachers design learning so that children have regular experiences of difficulty, failure and challenge to reflect on and critically evaluate together. These opportunities to experience challenge and difficulty are embedded in every-day curricular learning, through contextually relevant scenarios and real-life challenges as part of the 'Challenge Curriculum' framework.

Previous research in the field of experiential education has suggested that this combination of intentional participatory experience and reflection may increase consciousness and understanding of beliefs (Beard and Wilson, 2006; Brush and Saye, 2017). My analysis suggests that teachers and children in my case study school strive to understand difficulty, failure and challenge through shared experiences and reflection embedded in every-day learning activities. Reflecting together during and after these activities, not only helps teachers and children to manage their emotional responses to these situations, it helps them to co-construct their understanding of challenge and the effort required to complete a task and to manage and adjust levels of challenge. Identification of these practices particularly helps to answer aspects of my research question that relate to the ways in which teachers in my case study school strive to develop children's conception of intelligence as malleable, how the children understand intelligence and relate this to their experiences.

*5.3.5.1 Develop a shared language of difficulty*

Unlike previous studies (Efklides and Valchopoulos, 2012), rather than experiencing ease or fluency, it is overcoming difficulty that is associated with positive self-concept in my case study school. Structured reflection on experiences of difficulty, failure and challenge provide opportunities for teachers and children to discuss, understand and develop their beliefs about challenge, ease and difficulty. Through their reflections, teachers and children develop a positive language of difficulty and use this to help children to evaluate, analyse and understand their experiences. This shared language reflects the culture of the classroom community (Mercer, 2000), with terms such as '*mistake*', '*hard*' and '*wrong*' being positively associated with pride in persistence and effort.

Through dialogic sorting activities, the case study school identified that some words associated with difficulty, such as '*mistake'* and '*wrong*' held particularly negative latent meanings for children and teachers, while others had more positive associations such as '*challenge*' or '*mastery*'. Exploring these concepts to re-framing the use of words that held negative associations creates ongoing opportunities to develop conceptual understanding. Through experience and reflection, using the language of difficulty, they increase awareness and visibility of their beliefs about difficulty, failure and challenge. This encourages critical thinking and provides opportunities for teachers and children to challenge their assumptions together (Kolb, 2015, Brush and Saye, 2017).

At the outset of my study, I was concerned that the social interactions in real-world classrooms would be problematic in the development of children's beliefs about failure and challenging learning situations. What I began to realise, towards the end of the initial inductive stage of analysis, was that having a shared language of difficulty to constructively reflecting together on experiences of more troublesome social aspects of difficulty, failure and challenge, provides an opportunity for richer and contextualised interpretation of theory for teachers and children (Brush and Saye, 2017; Flyvbjerg, Landman and Schram, 2012).

Teachers and children in my study use this language of difficulty enthusiastically to '*relish'* the process of overcoming difficulty and make the relationship between effort and success

more visible and exciting. Knowledge generation through co-construction of understanding of these experiences using the language of difficulty provides effective opportunities for learning (Watkins, Carnell and Lodge, 2007). In their talk, they relate experiencing and successfully overcoming difficulty directly to Mindset Theory and improving *'the way a brain works.'* Drawing on their experiences, and the experience of others, children in the case study school use this language to help them explain their learning processes and how intelligence '*can grow'*.

*5.3.5.2 Choice and adjusting levels of challenge*

My study also suggests that understanding real challenge through experience helps children to make appropriate choices in their learning and to adjust the level of difficulty within a task. Previous studies have suggested that choice and appropriate degrees of challenge are important to motivation and optimal learning (Deci and Ryan, 1992; Beamon, 1997; Gagné and Deci, 2005). In the case study school, teachers encourage children to challenge themselves by offering a choice of task, opportunities to change resources, extending a question or choosing different contexts to apply subject skills and knowledge. For example, they might add a variable to a question that would make that a more difficult to answer, or apply recently acquired curriculum knowledge into a new or different situation.

Reflection helps to transform children's experiences into conceptual understanding and working together increases this resource and encourages them to apply this understanding into different contexts (Kolb, 2015, Brush and Saye, 2017). In the case study school, this conceptual understanding means that children have begun to adjust levels of challenge for themselves. This increases opportunities for children to have self-determined experiences of autonomy and competence in their learning (Ryan and Deci, 2000; Gagné and Deci, 2005). Making the detail of learning processes more visible through critical dialogue about '*what works and what doesn't'* provides extended opportunities for children to understand self-assessment, peer and teacher assessment (Clarke, 2014; Sun, 2015). Co-constructing their understanding through structured reflective dialogue helps them to understand how challenge is increased and decreased and suggests practical resources that they can draw on to deliberately adjust levels of challenge for themselves.

*5.3.5.3 Misjudging challenge and using avoidance*

There are times when children in the case study school avoid challenge or when they misjudge the level of challenge that is personally required for them to successfully complete a task. Research has established that an individual's responses to difficulty, failure and challenge can be affected by their Mindsets. An individual with a predominantly Fixed Mindset would be more likely to avoid challenge, see effort as undermining and give up easily in the face of a setback (Blackwell, Trzesniewski and Dweck; 2007; Cury *et al*., 2006; Haimovitz, Wormington and Corpus, 2011; Hong *et al*., 1999). When children are given choice of task in the case study school, sometimes reflections are scaffolded with a planned and structured activity to evaluate decision-making processes and reduce misjudgement or

avoidance, while at other times they are scaffolded with responsive questioning to coach a decision-making process (Brush and Saye, 2017).

Scaffolded reflection on misjudgment or avoidance of challenge includes dialogue that helps children to deconstruct and build understanding based on their experiences of challenge. This helps them to understand what makes a task challenging and provides opportunities for teachers and children to consider their own and each other's beliefs about challenge, confronting conflicting beliefs and making implicit beliefs explicit through critical dialogue. Analysis suggests that this supports conceptual change (Kagan, 1992) and encourages teachers and children to confront established, strongly held beliefs about intelligence, capability and agency. Teachers explain how mistakes or defiance can be as informing as affirming behaviours, and that misapplication or misunderstanding of Mindset Theory informs assessment. It points to the potential advantages that collective agency bring to the development of beliefs about intelligence, where children can deliberately respond to the problem with practical strategies.

*5.3.5.4 Using cues to develop strategy*

Previous research suggests that individuals formulate beliefs about their present and future capabilities through their experience of and interaction with their environment (Bandura, 1997, 2000; Eccles and Wigfield, 2002). The learning environment in my case study school therefore provides an important context for the examination of cues that support the development of beliefs (Usher, 2015). My analysis suggests that two forms of cues have developed; *'alert'* cues that help children to know when action is needed and '*practical strategy*' cues that suggest specific actions and strategies that are appropriate to the context.

In a synthesis of meta-analysis relating to self-concept, Hattie (2009) suggests that, while the effect size of is low it is perhaps self-strategy that is important to impacting on learner outcomes in the area of self-concept. Mindset Theory could be considered as a specific form of capability belief that suggests individuals are capable of improvement and able to affect their own outcomes by developing specific learner behaviours. In a review of literature relating to capability beliefs, Usher (2015) also suggests that to be successful learners it is important to be able to plan and implement appropriate strategies for learning. My study suggests that in the case of a social model of pedagogy informed by Mindset Theory, self-concept should be combined with agency and strategy. Teachers explain the importance of not '*just teaching about a belief*', but providing quality of strategies and support that can lead to efficacy and agency. They teach children about the theory intelligence as being changeable and equip them with practical strategies to be able to take action and affect change for themselves and for each other.

*5.3.6 Give and receive balanced feedback*

My analysis suggests that teachers and children in my case study school strive to give and receive balanced critical feedback that links process to outcomes and use it to set process

and outcome related goals. From the early stages of research development about Mindsets, there has been a focus on the importance of the type of feedback children receive (Mueller and Dweck, 1998). Studies suggest that when children receive praise for the learning processes they apply to achieve a task, they understand intelligence as something that can be developed (Dweck, 2006, 2017).

They show greater perseverance with the task. However, the research also indicated that when given person focused praise for their intelligence, children understand intelligence as being something that is fixed and is inferred from performance. Extensive research in education settings also suggested that when children receive praise for their learning process form of feedback it could also help children to understand what to do when learning becomes difficult and provide a recipe for improvement (Brummelman *et al*., 2014b; Cimpian *et al*., 2007; Elliott and Dweck, 1988; Haimovitz, Wormington and Corpus, 2011; Skipper and Douglas, 2012; Zentall and Morris, 2010).

*5.3.6.1 Feedback and rewards construct understanding*

Findings from the case study school are similar to other studies that explain how teachers encourage children to develop learner characteristics associated with growth Mindset strategies through praise for learning processes as feedback (Haimovitz and Henderlong Corpus, 2011). My study points to the value of having a core set of learner characteristics that can be referred to and link processes and behaviours to feedback. Central to this in the case study school is a system referred to in the school as a '*reward*' system. This has been developed by adapting an electronic system called a '*Dojo*' to include specific learner characteristics associated with growth Mindset and collaborative working, such as rising to the challenge, helping others, not giving up, learning from mistakes and taking responsibility.

The use of a reward system in my case study school was surprising because in previous research about motivation, it is suggested that finding the activity itself rewarding develops intrinsic motivation, while physical rewards create extrinsic motivation (Ryan and Deci, 2000). In my study, the reward is the identification, praising and recording of a learner characteristic that a child has exhibited associated with Mindset Theory. While the system is electronic, so no actual physical reward is given, each child has an avatar in the system that collects a virtual reward labelled with the characteristic and displayed on the large, class interactive whiteboard. This supports construction of understanding when the teacher explains specific processes or behaviours that the child has exhibited. This reward system therefore creates a framework for consistency, helps teachers and children to learn to identify and explain thinking, learning processes and characteristics and appropriate.

The 'Dojo' provides an assessment tool for teachers to focus their attention and the children's attention on the characteristics they are aiming to develop and what they look like in practical contexts of their every-day classroom. Teachers also encourage children to self-assess, choosing an appropriate characteristic, awarding themselves a point and explaining the process or behaviour they have exhibited. Talking about what the reward was for makes learner characteristics more visible (Chiu and Kuo, 2010) and draws children's attention to

how Mindset Theory relates to their own personal experiences and the real-world experiences of others.

*5.3.6.2 Children give critical feedback*

In other research, it is suggested that beliefs about the malleability of intelligence provoke different responses to feedback that is critical. It suggests that an individual who has predominantly growth beliefs will use critical feedback as an opportunity to learn, while an individual with predominantly fixed beliefs may view it as invalid, ignore it, or interpret it as personal criticism (Dweck, 2006, 2017). This is aligned to the findings of my study, where planned opportunities to respond to critical feedback help children to understand how it can lead to improvement. Additionally, my study suggests that it is important that these experiences are carefully scaffolded by teachers, so that children learn to give and receive feedback that is constructive, positive and critical.

What is distinctive in my study is the role that learning to give critical feedback plays in children's understanding of the process of using feedback to set goals. Teachers intervene sensitively and contingently to provide support and where children are attempting to give feedback and need support with accuracy or alignment (Mercer, 2000; van de Pol, Mercer and Volman, 2019). Providing feedback for each other requires evaluation, which increases understanding of both the task and of the learning processes. Teachers and children value criticism as useful to learning and their shared experiences build a repertoire of strategies that help them to manage and ameliorate emotional responses to criticism.

Using critical feedback to set shared goals is also emphasised as an important experience informing children's understanding of how to use feedback in my case study school. Previous research in this area of shared goal setting found that the children involved were less likely to attribute lack of success to their own personal lack of intelligence and were more willing to examine problems again, with a view to solving them together with the teacher (Hooper, 2016 cited in Haimovitz and Dweck, 2017). The findings of my study extend this idea to suggest that when children perceive responsibility as shared between them for goal setting processes it can also help to ameliorate their responses to failure and mistakes. Accountability to each other and shared responsibility making them more willing to examine problems again, with a view to solving them with each other (Resnick, 2015). The children in my study explained how reflecting on their needs together and sharing goals setting helps them to '*know what to do*' and gives them strategies to which they attribute '*power'* to improve.

*5.3.6.3 Balance of process and outcomes*

Children in the case study school are encouraged to '*talk their thought process aloud*' as they reflect on action to evaluate effective and ineffective decisions and choices. Wider research relating to dialogic teaching approaches advocates the verbalising of thinking process while recent research regarding Mindset Theory also emphasizes the value of teachers getting children to explain their thinking process, regardless of whether the outcome is successful

(Sun, 2015). As in this previous study, shared evaluation of the learning process, between the teacher and children, promotes talk about both effective and ineffective learning processes in my case study school. However, my study also suggests that this critical dialogue between children provides increased opportunities for children to co-construct understanding of learning processes. Talking through their thought process as they happen makes detail more visible to the individual involved and to others, which helps them to identify and evaluate the reasons why some processes are ineffective. Making the detail of learning processes more visible in this way provides extended opportunities for children's self-assessment, peer and teacher assessment (Clarke, 2014; Sun, 2015).

A recent school based study suggests that in addition to providing feedback that focuses on processes of learning and thinking, evaluation of movement towards learning goals is important to the development of growth Mindset (Sun, 2015). Existing research also cautions that when children give each other feedback it is important to ensure it is accurate and aligned to learning goals (Brophy, 2006; Nuthall, 2004; Hattie, 2012). My study suggests monitoring and mediating accuracy of feedback, in addition to using feedback to improve, when children use it as the foundation for a goal setting process. In the case study school giving and receiving regular critical feedback from each other, through dialogue and self-social regulatory activities, provides opportunities for teachers to assess and mediate or correct inaccurate feedback. It also provides experience and scaffolded opportunities for children to hone their feedback and goal setting skills.

Research also suggests that Mindsets impact on an individual's goal orientation leading them to set performative goals to validate their intelligence if they have a predominantly fixed Mindset beliefs, or mastery orientated if they hold predominantly growth Mindset beliefs (Dweck and Leggett, 1988; Haimovitz, Wormington and Corpus, 2011; Stevenson and Lochbaum, 2008). My study suggests that it is important in this process that children develop understanding of the value of both process and outcome focused feedback and use them to their own goals that relate processes to outcomes. Children set goals for themselves that are challenging and focus on process and outcomes; they set their own goals, and own the goals that they set.

## 5.4 Second main finding: Binding threads of dialogue and self-social regulation

This section discusses the second main finding constructed through my analysis, which is the pivotal and integrative role that threads of 'dialogue' and 'self-social regulation' play in the model of pedagogy developed in my case study school. In my case study school, one of the distinctive characteristics of the social model of pedagogy informed by Mindset Theory is the particular way in which dialogue is combined with self and social regulatory practices to create socially metacognitive processes. This combination is pivotal because it creates processes for social and critical engagement with theory and practice. Following my analysis, the term 'dialogue' is used in this context to refer specifically ways in which talk is incorporated into the model of pedagogy informed by Mindset Theory developed across the school. This section also explains the distinctive combination of self and social regulation that is referred to in my study as 'self-social regulation'. These threads are integral to the six key practices identified in the first main finding of this study.

This second main finding particularly addresses aspects of my research question that focus on how the teachers in my case study school strive to develop children's conception of intelligence as malleable and how social aspects of pedagogical approaches add to the development of Mindsets and related learner characteristics. It also explains ways in which my analysis suggests engagement with the possibly problematic influences of social learning that precipitated this study, such as the influence of social and academic power on the development of an individual's beliefs, might actually contribute to knowledge and understanding through these threads.

### *5.4.1 Encouraging exploratory dialogue*

Analysis during my study suggests a strong relationship between dialogue and the development of beliefs and learning processes that are associated with the malleability of intelligence. Research in the field of dialogic teaching has previously suggested that there may be an association between socialising intelligence through talk and beliefs about the malleability of intelligence (Resnick, 2015; Alexander, 2018). Dialogue is a distinctive characteristic of all six of the key practices identified in the first of my main findings.

In much of the research literature in the field of dialogic teaching, it is the surface features and structure of the talk that is the focus of attention. However, it is also suggested that it is focusing on the function of the dialogue that is important and that teachers should focus on the purpose of dialogue, rather than the tools, strategies and structure (Boyd and Markarian, 2015). In my study, the approach to using dialogue focuses on its functions, which analysis suggests are to create shared purpose, build supportive relationships, critically evaluate experiences through reflection, make contributions to knowledge and to set goals. In my case study, there is also an additional emphasis on sharing this alignment between the functions of dialogue and pedagogical tools and strategies selected with children. It suggests that understanding this alignment is important to the effectiveness of the function of critical dialogue as it informs children's selection and application of appropriate strategies.

Previous research literature has identified differences between three specific types of classroom talk; cumulative, disputational and exploratory talk (Mercer, 2000; Nottingham, Nottingham and Renton, 2017). Earlier studies (Wegerif *et al*., 2004) suggest that children have a natural tendency to engage in cumulative or disputational talk. These are characterised respectively as either tending towards affirmation and reluctance for children to challenge each other, or towards personal criticism and lack of constructive interaction. However, analysis of dialogue in my case study school suggests that children engage in collaborative, critical and constructive talk. These characteristics are associated with what is referred to in previous studies as exploratory talk (Mercer, 2000). This exploratory talk is defined as dialogue where children provide extended explanations, offer reasons, ask questions and speculate together. As in previous literature (Nottingham, Nottingham and Renton, 2017), my analysis suggests that explicitly teaching skills associated with exploratory talk to primary school children improves the variety and quality of vocabulary. This encourages children in my study to take a critical stance as they discuss Mindset Theory and relate it to their every-day experiences.

My study suggests that this critical dialogue, between teachers, between teachers and children and between children, can make a strong contribution to the development of shared beliefs about the conjoint capacity of teachers and children to develop intelligence through assessment. There is a clear relationship between pedagogies that incorporate dialogue and opportunities for effective formative assessment through talk (Black *et al*., 2003; Clarke, 2014). Assessment of beliefs and values comes from this combination over sustained period. An area that teachers in my study had encountered as problematic was associated with the complexity of assessing beliefs. Through focused exploratory dialogue and observation, analysis suggests they now identify frequent opportunities for self-assessment, peer assessment and teacher assessment of children's understanding of Mindset Theory and related learner characteristics.

This dialogue makes internal thought processes and beliefs more visible and allows opportunities for teachers and children to monitor accuracy of their interpretation of Mindset Theory. However, analysis in my study also suggests that this is not as straightforward as just identifying and correcting mistakes and misunderstandings. Assessment and challenging congruence Identifies, reduces and avoids misinterpretation. The findings of my study also suggest that, while these aspects of learning can be problematic, mistakes, misunderstandings and miscues can be useful in the learning process to inform assessment and action.

### *5.4.2 Combining dialogue and self-social regulation*

In the case study school, beliefs about the malleability of intelligence help children to acquire the adaptive behaviours of self-regulation. These adaptive behaviours help them to develop accuracy of interpretation and nuanced understanding required to operationalise beliefs about intelligence in a social learning context. Monitoring and control of cognitive, social and emotional aspects of their own and each other's learning helps them to develop a greater depth of understanding together. Existing established research suggests that children

who believe their intelligence is malleable are more inclined to set mastery-approach goals (Dweck and Leggett, 1988; Haimovitz, Wormington and Corpus, 2011; Stevenson and Lochbaum, 2008). While other research suggests that learners who set mastery-approach gaols are more likely to report self-regulatory behaviours in their learning (Pintrich, 2000; Schunk, 2005). Bringing together these two areas of research, my study indicates a dynamic connection between developing beliefs about intelligence, goal setting and social regulatory activities.

Analysis suggests that in my study school, teaching and sharing practical strategies for self-regulation allows metacognitive knowledge and skill to combine with personal agency (Zimmerman, Schunk and DiBenedetto, 2015). This translates metacognition into useful, practical strategies to monitor and control cognition (Efklides and Vlachopoulos, 2012; Veenman and Elshout, 1999). However, established research literature in this field also points to the value of also considering socially situated regulatory behaviours referred to as social, shared or co-regulation (Järvelä and Järvenoja, 2011; McCaslin, 2004). As in previous studies, my analysis identified different forms of regulation including self-regulation of individuals within a group and a group functioning as an entity that regulates for itself and for its members (Grau and Whitebread, 2012; Hadwin *et al*., 2010; Järvelä and Järvenoja, 2011). In the context of my case study, analysis suggests this creates opportunities to monitor and control cognition through a balance of individual and collaborative regulation.

As teachers and children strive to develop beliefs about the malleability of intelligence and Mindset Theory; individuals self-regulate, individuals regulate for each other and group members collectively regulate for the group. This distinct combination of individual and collective regulation is referred to in this discussion as 'self-social regulation'. My analysis suggests that this self-social regulation supports accuracy of information and interpretation as teachers and children develop their beliefs about intelligence and Mindset. Through peer mentorship, children teach each other to embed their learning and develop their own knowledge and understanding of their beliefs to advance the understanding of others (Dweck and Yeager, 2019). This interaction between dialogue and self-social regulation is identified as a distinctive characteristic in the school's social model of pedagogy informed by Mindset Theory.

*5.4.3 Socially metacognitive activity increases agency*

Previous research literature in this field has suggested that regulation requires more than metacognitive knowledge and skill; it also requires agency (Zimmerman, Schunk and DiBenedetto, 2015). Self-regulation requires children to be active regulators of their own learning processes (Zimmerman, Schunk and DiBenedetto, 2015) while self-social regulation requires them to also develop strategies to actively regulate for each other as individuals and as a group. The model of pedagogy in my study builds on previous research relating to social metacognition (Chiu and Kuo, 2010) and self-regulation (Gascoine, Higgins and Wall, 2017) and suggests that combining individual action with interactions through social learning creates enriched opportunities. Within my case study school, children are taught strategies that create a repertoire of practical learning tools that they can draw on to support

regulation of themselves, each other and their group. Some of these strategies occur responsively during group interactions, while other are taught and evaluated as part of structured curriculum planning.

Existing research identifies pedagogical strategies that help children to self-regulate as being; providing choice in tasks, methods and grouping, use of self-assessment to identify mistakes to learn from, a focus on children's beliefs about learning and giving appropriate encouragement (Zimmerman, Schunk and DiBenedetto, 2015). My analysis identified that teachers sometimes specify strategies, such as '*note taking'* or '*help seeking'*, in the instructions for an activity to encourage children develop their use of a range of tools. This is pivotal in the six key practices developed in the case study school because this combination of dialogue and self-social regulation creates conditions where children can critically and practically engage with Mindset Theory. Having practical strategies for regulation that the children can call upon helps them to feel well equipped and creates agency for learning and engaging in learning together. Teachers assess and sensitively support the development of these interactions with interventions that help children to apply them effectively (Mercer and Hodgkinson, 2008). When children see each other struggle, they offer scaffolds and are taught that this should be judged carefully to be just enough support to help the individual or group to improve (Staarman and Mercer, 2010).

*5.4.4 Critical questioning and challenge*

Initially my investigation anticipated that the real-world social learning context might create barriers to the development of growth Mindset. What I had not anticipated was the role that critical questioning and challenging apparently congruent and incongruent behaviours might play in deepening theoretical understanding and strengthening beliefs. My analysis suggests that encountering problems and engaging in exploratory talk that to unpick the realities of the complexity of beliefs. A balance of individual and shared critical thinking, through the threads of dialogue and self-social regulation, offers opportunities for teachers and children to identify and explore misconceptions and to maintain quality of information for interpretation of Mindset Theory.

This feature of my analysis added a new dimension when answering the aspect of my research question that focuses on children's understanding of intelligence and the way they relate it to their experience in school. The combination of the threads of dialogue and self-social regulation help not only to make children's understandings more visible, it offers an insight into their multiple explanations and their critical consideration of what it is, how it works, its importance and the role it plays in their own learning. They help each other to recognise blind spots and use this learning to support each other in developing beliefs, characteristics and behaviours (English, 2016). Through these social interactions, teachers and children in my study activate metacognitive knowledge and skill in combination with efficacy and personal agency (Zimmerman, Schunk and DiBenedetto, 2015) to turn their metacognitive thinking processes into practical strategies for the management and control of cognitive, social and emotional aspects of learning (Veenman and Elshout, 1999; Efklides and Vlachopoulos, 2012).

Research literature also suggests that problems may arise from social complexity where children may defer to the support of others who they judge to have higher status (Chiu and Kuo, 2010). Deferring to the wrong person, because of perceived social or academic status, might have a significant and negative impact on learning and co-construction of understanding about intelligence and Mindset Theory. Teachers in my study explain that these issues are important to mitigate against because they can affect children's acceptance of feedback, their valuing of ideas and information and their decision-making when given choices. Another concern raised in previous studies about using dialogue in the classroom, relates to the need to pay attention to whose voices are not heard, and how some voices may be silenced (English, 2016).

In my case study school, interactions develop a reciprocity that enriches opportunities for development knowledge and understanding of Mindset Theory, associated learner characteristics and each other as learners. Established literature suggests that it is the teacher's responsibility to address the needs of the group and particularly those children who may not have a voice (English, 2016). These interactions are monitored and mediated by teachers to support the co-construction understanding through critical and evaluative dialogue. The responsibility for ensuring '*voices are heard*' is shared with children by combining the use of '*talk tools'* and adopting specific roles in group work to invite and value contributions. Children are aware that hearing different voices is *'not just about allowing everyone to say something'*, but demonstrating that they have listened and value what has been said.

Previous research has suggested the importance of teacher's capacity to build community when developing pedagogy that involves dialogue and that as children become self-critical and self-reflective they can become aware of their own fallibility and gain empathetic recognition (English, 2016). In other research literature, the importance of the development of a culture of augmentation is emphasised, where a safe space is created for students to develop their thinking and reasoning is valued over correct forms of expression (Resnick, 2015; Alexander, 2018). Within the case study school, building trust and providing mutual support is about addressing social complexity to allow children to think critically and take risks in their learning. This happens through an iterative process in which critical dialogue contributes to the creation of a safe space where they can share thinking and talk about difficulty and challenge.

As they scale up practice to a whole-school level, teachers and children share and develop practical strategies to monitor and control cognitive, social and emotional responses to difficulty, failure and challenge through these threads. Teachers and children recognise the development of growth Mindset together is an ongoing process of maintenance and negotiation. My study suggests that dialogue and self-social regulation are catalysts for change in the social and physical learning environment that supports critical engagement with Mindset Theory for teachers and children. This is central to the collective concept of this social model for developing growth Mindset. Teachers and children learn from each

other and help each other to learn.  In this way, their individual beliefs about intelligence are developed through a shared belief in their conjoint capacity to develop growth Mindset.

## 5.5 Third main finding: Sustained professional learning processes

The third main finding from my study focuses on sustained professional learning processes that underpin development of the six key practices and threads of dialogue and self-social regulation to embed Mindset Theory in school routines and development priorities. In the case study school collaborative, sustained professional learning is a process of change through which teachers strive to develop an embedded social model of pedagogy (Cordingley *et al.,* 2015, Cordingley, 2019). Teachers suggest the importance of examining and re-examining the development of their model of pedagogy and evaluating how the social and physical learning environment creates cues that help children to develop growth Mindset (Yeager and Dweck, 2019). With help from external facilitation and expert resources the teachers sustain and develop their own understanding of individual and shared beliefs.

### *5.5.1 Collaboration and decision-making*

The body of literature relating to the quality and effectiveness of teachers' professional learning has grown to the extent that it has been possible to conduct a meta-analysis of meta-analysis (Cordingley *et al*., 2015, Cordingley, 2019). Combining findings of reviews identifies particular characteristics common to effective professional learning for teachers (Buckler, Cordingley and Temperley, 2009; Bell *et al*., 2010; Cordingley *et al.*, 2015). These characteristics include collaboration and involving teachers in drawing on specialist expertise, relating theory and practice to inform decision-making, adopting an enquiry based approach, actively seeking out learning opportunities in their every-day practice, using teacher peer support and dialogue, being driven by aspiration for pupils, exploring evidence of pupil outcomes and support from leadership (Cordingley *et al.,* 2015; Cordingley, 2019).

Teachers in my case study school collaborate with each other and draw on specialist expertise (Cordingley *et al*., 2015, Cordingley, 2019). In each period of their development planning cycle, teachers begin with a '*broad idea or concept'* relates to both Mindset Theory and other whole-school priorities. Individual teachers read around the concept, share practice with colleagues in other schools and attend externally facilitated training. Information is fed back into the schools' development planning evaluative cycle. In this way, through socially metacognitive professional learning processes the teachers in my study engage in acquisition, participation and construction (Hodkinson and Hodkinson, 2005) for knowledge creation that is relevant to their own context (Bell *et al.*, 2010; Cordingley *et al*., 2015; Graves and Moore, 2018). Analysis suggests that their initial professional learning day heightened their sensitivity to the complex and sometimes problematic issues in implementing pedagogical practice that relates to beliefs about intelligence and personal capability. My analysis suggests that external knowledge broker collaboration and their encouragement for teachers to engage critically with theory and practice is valuable to the quality of the process of change in the case study school.

An interesting aspect of this collaborative knowledge creation within my study was the acknowledgement in the process of the influence of local strategic partnership and national

Government agendas, with explicit connections made to national and local strategy in written development planning. Teacher's critical engagement with theory extends to the influence and role of these external agendas on their decision-making processes. Previous literature argues that this can be restrictive in their influence on the development of practice (Becher and Trowler, 2001; Biesta, 2015; Aldridge *et al*., 2018) and at the time of my data generation, the school were anticipating a Government inspection. However, teachers in my case study school position external strategy and inspection schedules as enabling and supporting factors in their development planning. Teachers' critical reflexivity in the development of knowledge and skills (Nichol and Turner-Bisset, 2006) within this process acknowledges a concern that when they are '*connecting it all together*' that there is a danger of '*filtering what fits'* so teachers deliberately critically question and challenge ideas with this in mind before applying practical strategies in the classroom.

Teachers in the school are involved in decision-making about the focus of the school's development planning and take an active role in researching, applying and evaluating pedagogical approaches as individuals and as a group influences pedagogical developments and planning for future professional learning (Nelson *et al.,* 2017). They critically question the knowledge gained from expert sources and relate theory to practice to inform collaborative processes of decision-making (Cordingley *et al*., 2015, Cordingley, 2019). Throughout their development of pedagogy informed by Mindset Theory, teachers in the case study school have drawn on expert support in the development of each area that they focus on. My study suggests that this involvement in decision-making process generates a sense of ownership for teachers that impacts on the strength and conviction with which they hold beliefs about their conjoint capacity to develop growth Mindset.

*5.5.2 Establishing a shared purpose*

Teachers use the school's overarching goal of '*achieving effective learning*' synonymously with the development of growth Mindset characteristics. Development of their pedagogy is driven by their aspiration for the children in the school (Cordingley, *et al*., 2015). There is mutuality in teacher engagement, between teachers and children and between children, as they work together towards the development of growth Mindset. This involves consultation and encourages children to share and negotiate ideas with teachers and with each other. The frequency of opportunities to negotiate meaning in '*fluid*' groupings during every-day learning, using a unifying language, enables them to collaborate and think critically together. The central purpose of being at school is identified and articulated as being '*to learn'*; developing growth Mindset is part of this purpose.

This overall focus on children's learning and progress provides a broad but coherent core to the development of growth Mindset beliefs and characteristics as a joint enterprise and analysis suggests that this is something that teachers have chosen to engage with as a group. The development of Mindsets belongs to the teachers and children who share this enterprise. What is meaningful is negotiated through actions and discussions that involve teachers and children. However, the school's intention perhaps reflects a longer term ambition for the children's educational development and achievement, balanced with the

shorter term focus on national test results that might become the primary focus for many primary schools in the same context (Biesta, 2015).

*5.5.3 Negotiate meaning for practical wisdom*

Teachers acknowledge the complexity of developing growth Mindset as a belief. They seek to understand the psychologies of Mindsets and how practices and changes can optimise outcomes for their children. Teachers critically engage with theory (Cordingley *et al.,* 2015, Cordingley, 2019), considering the problems and complexity of implementing a social model of pedagogy informed by Mindset Theory. They explain intelligence as something that '*can be changed*', acknowledging environmental and genetic influences but focusing their emphasis on malleability where they can create agency to influence change in school (Dweck 2006; 2017; Sauce and Matzel, 2018). Evidence rich professional learning, evaluated as part of the school development planning process, contributes to the development of theoretical and practical understanding of Mindset Theory. While teachers are not engaged in a formal process of action research, they engage in a cyclical and collaborative process of experience, reflection and enquiry to co-construct their understanding of Mindset Theory and develop practice.

Teachers and children reflect on the strategies and resources they develop and how the meaning, role and significance of them changes over time. Negotiation of meaning is given sustained attention and allows for continual readjustment; reflecting on, refining, rejecting or renewing practices and established meanings through negotiation (Lave and Wenger, 1991; Farnsworth, Kleanthous and Wenger-Trayner, 2016). Teachers explain the development of professional practice in relation to developing Mindsets as an iterative and ongoing process. They are not trying to '*get to a product*' but are nurturing the ongoing process of development. In this way, developing growth Mindset through the six key practices is a collective, shared enterprise that develops the community's repertoire (Lave and Wenger, 1991).

Difficulties in identifying teacher beliefs may be reduced by socially metacognitive professional learning opportunities (Chiu, 2008; Chiu and Kuo, 2010), making teachers' decision-making processes and beliefs more visible as they engage in peer support and dialogue. This was important to consider in the context of my study, where the nature of the teachers' interactions with each other and their attitudes towards professional learning were central to answering my research question. Metacognitive and socially metacognitive ways of working make a teacher's decision-making and beliefs more visible, but related self-regulatory activity may then also translate future orientated beliefs of intention and expectation into action and lead to increased agency (Meirink, *et al*., 2009; Biesta, Priestley and Robinson, 2015).

It is not that the teachers in my case study school do not encounter problems or difficulties in their development of a social model of pedagogy informed by Mindset Theory. They value difference, which contributes a range of experiences and perspectives to understanding of Mindset Theory for both teachers and children. The collaborative and metacognitive

professional learning process of change is situated in an ongoing problem solving culture. Dialogue and self-social regulation between teachers enables critical questioning and provides a shared intellectual resource. Critical questioning is viewed as a useful risk assessment to minimise risk of uncritical acceptance of ideas in theory or for practice. The combination of six key practices and threads provide opportunities for teachers and children to monitor and mediate these challenges. A negotiated culture of professional learning, addresses quality of teacher knowledge and understanding. Through formal processes, such as class consultation or the School Council meetings, and through every-day interactions this is extended beyond the teaching team to include children in this professional learning and collaborative enquiry.

*5.5.4 Roles within the community*

Teachers can become members of a number of Communities within and beyond their own school (Boyd, Hymer and Lockney, 2015). A Community of Practice can also extend beyond the teachers' professional community to include other stakeholders such as children, parents, carers and support staff (Timperley, Kaser and Halbert, 2014). In the case study school, a shift from student voice to learner agency is created where children are included and become members of a Community of Practice. Previous research has suggested the importance of teachers' capacity to build community when developing pedagogies for social learning (English, 2016). This research also suggests that as children become self-critical and more self-reflective, they become aware of their own fallibility and gain empathetic recognition. While in other research literature, the importance of the development of a culture of augmentation is emphasised; where a safe space is created for students to develop their thinking and the standard of reasoning is valued over correct forms of expression (Resnick, 2015; Alexander, 2018). Communities of Practice, as a situated learning theory, provides a real-world perspective on the agency of different members of the community and the power and influence that individuals can hold as they learn together (Lave and Wenger 1991, Wenger, 1999; Farnsworth, Kleanthous and Wenger-Trayner, 2016).

In the case study school, as children and teachers co-construct knowledge and understanding they maintain their distinct roles within their community; there is an emphasis on a learner role for teachers and a teaching role for children. The emphasis on this in the findings created a shift in the focus of my study during the research process. I had started with a model based on the collective beliefs of the teachers, but during analysis is became apparent that in this context the collective beliefs are shared between teachers and children was important. Teachers can be understood to be learners who evaluate and develop their practice based on feedback from children's learning and achievement (Hattie and Zierer, 2017). In the case study school, teachers perceive themselves to be learners and children perceive their role to include teaching; they learn from each other and help each other to learn. Children do not replace adult teachers, but the role of learner is extended to include teaching through dialogue (Mercer, 2000). While the focus of research was still on teacher pedagogies, and the research question and sub-questions remained the same, the findings informed a shift in the focus of the research to be about a pedagogy that develops a collective belief shared between teachers and children. Individual beliefs about intelligence

are developed through a shared belief in their conjoint capacity to develop Mindsets together.

Leadership is important to the development of conditions, where teacher professional learning supports quality, impact and sustained effect of the case study school's intervention. In the case study school, leaders support teachers to consider their improvement and individual effectiveness and develop efficacy and motivation to engage with further learning within a sustained intervention for teachers and children. This helps to maintain the centrality of developing beliefs about intelligence, Mindset Theory and associated learner characteristics as a shared purpose for the teaching team. Previous research suggests the value of developing shaping professional learning through attention to needs and interests of individual teachers (Cordingley *et al*., 2005) and individual interpretation of theory is welcomed as a catalyst for development and innovation.

A collaborative culture and supportive leadership sustains personal, professional interests that are mediated and developed through socially metacognitive collaboration (Kraft and Papay, 2014). My analysis suggests that this is supported and led by the leadership team but is driven by the teachers. Leaders provide time, a positive professional learning environment and coaching to motivation and focus enquiry. Collective leadership of this culture supports consistency and teachers' individual interpretation in an iterative and ongoing process. This engagement with the enquiry school wide culture of improvement deliberate and systematic (Kraft and Papay, 2014; Cordingley *et al*., 2015). A school wide culture of trust encourages teachers to engage collaboratively with research and to be able to challenge existing thinking to develop their cultural norms. A commitment to participation in this research also sees the school to engage in research to inform practice as they continue to review their development of a social model of pedagogy informed by Mindset Theory.

*5.5.5 Every-day opportunities for development*

Teachers in the case study school seek out opportunities for professional learning in their every-day practice (Cordingley *et al.,* 2015, Cordingley, 2019). Teachers and children are confident when they talk about their own beliefs and their shared practices. This approach is positive but not idealised; disagreement and differences are welcomed and teachers are interested in each other's ideas and perspectives. Using a combination of self-report and observation to assess learner characteristics is important in the professional learning change process in my case study school. This contributes to the assessment of the development of children's understanding of Mindset Theory, learner characteristics and learning processes. It also supports the evaluation of teaching practices and the social and physical learning environment across the school. Continued support and facilitation from experts and specialists, combined with the day-to-day frequency of experience and evaluation of children's Mindsets and achievement, gives teachers concrete feedback on how their interactions with children impact on the development of the children's Mindsets.

As suggested in previous studies focusing on dialogue in learning (Matusov, 2009; Teo, 2019) teachers in the case study school strive to re-imagine their role as co-learners. Engaging in

enquiry to investigate pedagogical approaches and techniques that are linked to the development of the existing social and physical learning environment, their co-enquiry also focuses on re-imagine the every-day resources that they already have. They focus on how a resource is utilised and involve children in creative decision-making processes. These approaches and techniques focus on adapting their every-day teaching and use of resources to develop growth Mindset through collaborative development of the six key practices identified in this study.

## 5.6 Combining practices, threads and professional learning for Mindset

The practices identified in my analysis create an environment where teachers and children seek together to accurately interpret and enact Mindset Theory and to understand that adopting a belief can be complex. They also place emphasis on understanding difficulty, failure and challenge through shared experience, reflection and helping children to learn to give balanced, critical feedback that links processes to outcomes. In the social and emotional domain, they support the building of a trusting community where children can take risks in learning and explain mistakes and failure as part of shared learning processes. They encourage teachers and children to share and develop practical strategies to monitor and control cognitive, social and emotional responses to difficulty, failure and challenge.

Rather than assembling a 'tool kit' of activities, this Chapter identifies the value that the case study school place on the principles underpinning their six key practices as they have evolved. They explain how they can draw on them to support and evaluate their planning. Analysis suggests that the combining of these agentic practices supports teachers and children in believing that they have capacity together to develop growth Mindset. Negotiating meaning through critical dialogue provides opportunities for teachers and children to unpick complexity, unravel their own understandings and contribute to each other's understanding. This does not create a clean and uncomplicated solution, but explores the complexity of varied interpretations of language.

This chapter has discussed the problems that the case study school has encountered associated with assessing beliefs, the complexity of social effects on the development of beliefs and confusion caused by conflicting cultural messages. It asserts the need for critical questioning of theory and practice in the development of a social model of pedagogy informed by Mindset Theory and suggests that while challenging incongruence is valuable, challenging congruence is also valuable. While these aspects of learning can be problematic, mistakes, misunderstandings and miscues can be used constructively in the learning process to effectively inform assessment and action. They are opportunities for developing authentic understanding where theory and practice are connected through experience and reflection to create practical wisdom.

These problems, identified as common to different aspects of the development of growth Mindset in the social content of the case study school, are presented in this section together (Table 5). Awareness of these problems, and the ways in which teachers and children mitigate against them, are pivotal in the development of the case study school's model of pedagogy for the development of growth Mindset in their real-world social learning context.

| Problem | Opportunities Presented |
|---|---|
| Complexity of assessing internal thought processes | Structure regular opportunities for internal processes to be expressed and explored through dialogue<br>Combine observation of dialogue and activity with self-report |
| Oversimplification or misinterpretation of theory | Observe, assess and mediate knowledge and understanding during direct teaching of theory<br>Co-construct understanding through experience and reflective dialogue in every-day activity |
| Confusion created by conflicting cultural messages | Create and develop together a strong core of consistent messages communicated within school<br>Talk about the relationship between beliefs and behaviours and challenge congruence |
| Assuring quality of peer support | Monitor and mediate with questions, information, examples, prompts and related process and outcome goals<br>Vary grouping and provide practical tools and strategies to structure dialogue |
| Making appropriate choices | Teach tools and strategies for decision making and monitor choice of tasks, resources and grouping<br>Evaluate together individual and group decision making processes and choices |
| Avoidance and emotional context | Assess emotional context and teach practical strategies for emotion management<br>Recognise and address events of experiences that trigger positive and negative beliefs for individuals |

*Table. 5: Problems in a social model of pedagogy informed by Mindset Theory*

Table 5 summarises problems identified as specific to the introduction of pedagogical approaches informed by Mindset Theory through analysis in my case study school. In a social model of pedagogy, teachers and children learn from criticism and seek out critical feedback from each other. They experience critical feedback and learn to provide effective critical feedback for themselves and others, and plan opportunities to utilise this feedback to inform future learning. They share strategies for managing cognitive and emotional responses to critical feedback and encourage each other to learn from criticism. This is not an easy journey, and they have built a repertoire of support strategies which include ways to help children to manage emotional responses to the success of others, and help them to work together to regulate each other's responses to failure.

Collective Mindset is defined in the context of my study as shared belief held by teachers and children in their conjoint capacity to execute the courses of action required to develop and extend intelligence. The belief that they can achieve this goal supports and enhances development of individual growth Mindset. Teachers and children talk about having an active role and have agency in the development of their own beliefs, and in developing and sustaining understanding of beliefs for others, through critical engagement with theory and practice. In this way, the problematic influences of social learning on the development of beliefs are not just ameliorated; they are used actively to enhance opportunities for the development of growth Mindset.

*5.6.1 Contribution to theory development*

Collective Mindset is a shared belief held by teachers and children in their conjoint capacity to execute the courses of action required to develop and extend intelligence. This was identified through my analysis as a belief that together they are able to cultivate and sustain pedagogical practices that develop growth Mindset for themselves and for each other. This study proposes a social model of pedagogy for the development of Collective Mindset constructed through analysis of teaching and learning in a real-world primary school setting over a sustained period.

This study contributes to the body of research around Mindset Theory. It extends this line of research in a number of ways. Its key contributions include:

- The study proposes a model of pedagogy and suggests a theory of Collective Mindset that together support the development of growth Mindset in a real-world, social learning context. It provides a definition derived from researching theory and practice, explains how this can enhance the development of growth Mindset in a social context and offers a framework for the identification of learner beliefs and characteristics associated with Collective Mindset.

- The study identifies conditions in the social and physical learning environment of a primary school classroom that provide context and cues to help develop and sustain Collective Mindset and growth Mindset. It provides a new theoretical framework that identifies the key features of this environment and how cues can practically be embedded in the real-world, social context of the primary school.

- The study provides empirical evidence that explains how dialogue and self-social regulation are important to the assessment and development of beliefs about intelligence in a social primary school context, and identifies the interplay between these threads and the development of beliefs about intelligence as malleable. It also highlights how combining observation and self-report in the assessment of Mindsets can create cues that support development of congruent behaviours.

- The study points to the value of a sustained intervention being embedded in curriculum planning and the school development focus, and being underpinned by high quality teacher professional learning with a focus on accurate and informed interpretation of Mindset Theory.

- The study gives an holistic overview of pedagogical practice that aims to cultivate growth Mindset in a real-world, social primary school context and provides a foundation to stimulate future research in the case study school and in other contexts.

Collective Mindset is not suggested as an alternative to Mindset Theory, but offers a new, social dimension to previous work. It creates a new social model of pedagogy and suggests a

theory about the value of a shared belief about having capacity and agency to develop their intelligence together. While growth Mindset is the belief of an individual that their intelligence is malleable, Collective Mindset is a shared belief held by teachers and children together about the conjoint capacity to develop their own and each other's Mindsets.

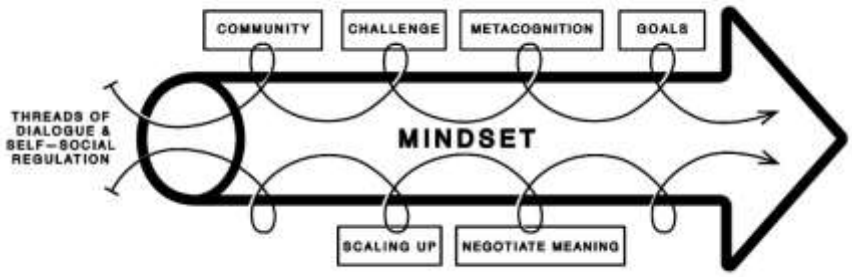



*Fig. 3: Social model of pedagogy for Collective Mindset*

Figure 3 illustrates how the dynamic development of Mindset, nested within the large arrow, is at the core of the social model of pedagogy for Collective Mindset. Collective Mindset supports the development of growth Mindset through six key practices within a real-world social learning environment. This visual representation illustrates how these six practices are bound together by integrative and socially metacognitive threads of dialogue and self-social regulation.

Within this model, the socially metacognitive threads of dialogue and self-social regulation to bind the six key practices together as illustrated in Figure 3. This supports teachers and children as they develop a shared belief about their collective capacity and helps them to avoid uncritical acceptance of related theory or practice. Teachers and children actively engage with problematic issues arising in implementation of a pedagogy informed by Mindset Theory, to develop more nuanced and deeper understandings of the application of theory in a real-world, social setting. Shared reflection and critical evaluation, in response to the tensions and contradictions that they encounter, builds trust and strategy through an ongoing dialogic process that supports the development of a shared belief about collective agency. Together these interdependent practices create a social and physical learning environment where the shared belief referred to in this thesis as Collective Mindset can be developed and acted upon with agency.

### *5.6.2 Chapter summary*

This chapter has drawn together analysis, synthesis and interpretation in relation to prior research and literature to critically consider the six key practices identified as conducive to the development of shared beliefs about developing growth Mindset. It identifies a pivotal role of social metacognition within these practices and the ways in which sharing and developing practical strategies helps children monitor and control cognitive, social and emotional responses to difficulty, failure and challenge.

The pedagogy for developing Collective Mindset that is suggested in this Chapter identifies six socially metacognitive practices that have developed over time through high quality collaborative enquiry. Rather than assembling a 'tool kit' of activities, in the case study school it suggests that value is placed on the principles underpinning these six key practices. The specific combination of practices focuses on a balance of cognitive, social and emotional aspects of learning in relation to Mindset Theory. Teachers explain how they draw on them to support and evaluate their planning.

This chapter suggests the importance of developing a unifying sense of trust through language and action. It also points to the importance of peer interaction and the value that scaffolded interactions have in developing this belief that together the teachers and children have the capacity and resource to cultivate growth Mindset. It suggests that, while these aspects of learning can be problematic, mistakes, misunderstandings and miscues can be used constructively in the learning process to effectively inform assessment and action.

# 6 Conclusion

This final chapter summarises the contribution to knowledge made by this study, considers implications for practice, identifies limitations of the study design and suggests directions for future study. Key implications for practice within the case study setting are discussed and suggestions are made about how the main findings might be relatable and transferable, to inform practice in contexts beyond my case study school.

## 6.1 Contribution to knowledge summary

Taken together the findings of my study make several contributions to knowledge. They contribute to Mindset Theory as a body of research in the following seven areas:

1. The study has identified conditions of the social and physical learning environment that support a social model of pedagogy informed by Mindset Theory.
2. The study has produced an holistic overview of six key pedagogical practices that together form the basis of the social model as a foundation to stimulate future research (Figure 4).
3. The study's findings have resulted in a social model of pedagogy for teachers to use critically in the development of practice and has suggested a substantive theory of Collective Mindset to explain the relationship between the practices, principles and beliefs that underpin this model.
4. The study has provided empirical evidence of the pivotal and integrative roles of socially metacognitive activity within the model through dialogue and self-social regulation.
5. The study has highlighted how principles of critical questioning and challenging incongruence through socially metacognitive activity supports the development of Mindsets in a real-world social setting.
6. The study has provided an evaluative framework (Appendix C) to support high quality, sustained and collaborative teacher professional learning appropriate to the development of a pedagogy informed by Mindset Theory in a real-world social setting.
7. The study has added to the growing body of literature on beliefs about the malleability of intelligence and personal capability with empirical research from a UK primary school.

In this context, 'Collective Mindset' is used to refer specifically to a shared belief held by teachers and children in their capacity to take action together to develop growth Mindset. This is a shared belief in their conjoint capabilities to execute the courses of action required to develop intelligence; they believe that together they have agency to cultivate and sustain practices that develop growth Mindset for themselves and for each other.

This study contributes to knowledge by building on Mindset Theory to establish how Collective Mindset develops through shared understanding and implementation of social, embedded and sustainable practices that nurture growth Mindset. It identifies a critically evaluative model of pedagogy for Collective Mindset, consisting of six socially metacognitive

practices that the school combines to achieve a social and physical learning environment where this shared belief can be developed and acted upon with agency (Figure 4).

| | | |
|---|---|---|
| Community<br>Build a trusting community where children can take risks in learning and explain mistakes and failure as part of shared learning processes | **Metacognition**<br>**Seek together to accurately interpret and enact Mindset Theory using expert sources to co-construct their knowledge and understanding** | Challenge<br>Understanding difficulty, failure and challenge through shared experience and reflection embedded in every-day learning activities |
| Scale Up<br>Share and develop practical strategies to monitor and control cognitive, social and emotional responses to difficulty, failure and challenge | **Negotiate Meaning**<br>**Understand that adopting a belief can be complex and how exploring congruence and ongoing maintenance play an important role in the process** | Goals<br>Give and receive balanced critical feedback that links processes to outcomes and use it to set process and outcome related goals |

*Fig. 4: Six key practices for development of Collective Mindset*

These six key practices presented in Figure 4 are characteristics of the social and physical environment that are conducive to developing collective beliefs and action that support the development of growth Mindset. When combined, they create a learning environment where teachers and children can develop Collective Mindset together, have agency that supports their social development of growth Mindset and avoid misuse or misinterpretation of theory. The focus of the six key practices is on developing different aspects of Mindset through social action. The interdependent nature of these practices is important to the structure of this social model of pedagogy, with the combination of the two practices that are emboldened at the centre of Figure 4 making this model particularly distinctive. They focus on teachers and children seeking together to accurately interpret and enact Mindset Theory, while acknowledging the complexity of developing beliefs together.

Dialogue and self-social regulation are distinctive, socially metacognitive threads that that bind the six key practices together (Figure 3). These threads are important to the pedagogical practices within the model of Collective Mindset because they support teachers and children as they develop shared beliefs about their collective capabilities and avoid uncritical acceptance of theory or practice. They encourage co-construction of informed interpretations of theory and a shared repertoire of critically evaluated, practical strategies to support the development of growth Mindset. These integrative threads of dialogue and self-social regulation, within the six key practices, encourage teachers and children to challenge each other's understanding of Mindset Theory. Teachers also help children to critically question the teaching and learning strategies that they adopt in response to their knowledge of this theory. These threads help individuals and groups to negotiate meaning and to co-construct their understanding of why, when and how to take effective action to reduce the potentially negative effects of fixed or false Mindsets.

This study supports and benefits the individuals and community involved by providing a structure for co-constructing and contributing to their knowledge. It contributes to understanding of how methodology can be important to unravelling some of the complexity of researching and teaching about the development of beliefs. Combining multiple methods of data generation within this methodology, through self-report and observation, provides an opportunity to explore congruence and alignment between behaviours and espoused beliefs. The hybrid analysis within my study particularly adds value to understanding how learner beliefs and characteristics associated with Mindset Theory are developed and sustained in this social context. It helps to identify the ways in which what was happening in the case study school relates to specific frameworks from established literature identified as relevant to the research question and the school's context.

This study set out to investigate the characteristics of the learning environment for developing growth Mindset in the real-world, social setting of a primary school. It focused on every-day practices and analysis highlighted how principles of critical questioning and challenging incongruence, through structured socially metacognitive activity, underpin the authentic development of Mindsets in the case study school. As it evolved, analysis also uncovered a shared belief about collective action and agency in relation to Mindset Theory that underpinned this model of pedagogy.

## 6.2 Implications for future practice development

This study has investigated a school's efforts to develop shared beliefs and practices informed by Mindset Theory in a real-world, social setting. It has captured a combination of characteristics, that have enabled this school to implement a learning environment and social practices that sustain the nurturing of growth Mindset between teachers and children. Building this theory in a real-world, social and applied context has allowed the construction of a model and practical, evaluative tools that will support further understanding and development of practice (Appendix C). This provides opportunities for informed, critical evaluation and development of the model within and beyond the case study school. Building on the identification of the six key practices and the threads of dialogue and self-social regulation, this section identifies four implications for future practice development within the case study school. It then extends this discussion to consider opportunities for transfer of learning to relatable contexts beyond this setting.

### *6.2.1 Implications within the case study school*

The first key implication for future practice within the case study school is the need to sustain and develop the six practices identified by this study as important to Collective Mindset and extend this to greater involvement of parents and carers. Analysis suggests that the six key practices combine to contribute to the development of Collective Mindset and create a theoretical framework that provides a useful, practical tool to support the school in continuing to develop their pedagogical approach. During the research process teachers identified the lack of an evaluation tool to assess and monitor progress as a gap in the change process. As an output of the research process, a detailed evaluative rubric has been developed for the social and physical learning environment and six key practices,

reflecting the new model of Collective Mindset (Appendix C). Using the rubric together can reinforce the development of a central, shared purpose for the teaching team, inform development planning and feed forward into school strategic planning. Extending this rubric in work with parents and carers would offer opportunities for participation and to develop understanding with them.

A second key implication for practice in the case study school is how assessment of internal thinking and beliefs associated with Collective Mindset and growth Mindset continue to be developed. The framework in Table 4 (4.5.3) sets out an individual's growth Mindset learner characteristics and then positions them in relation to Collective Mindset. They can use this tool in future, when observing or reflecting on teaching and learning, to monitor and assess the development of learner characteristics associated with Collective Mindset. This outcome from my research process will help the case study school to monitor progress of individuals and of groups of learners. It will support their social development of growth Mindset through Collective Mindset and reduce risk of teachers or children developing or reinforcing false or fixed beliefs.

A third key implication for practice in the case study school relates to developing a practical repertoire for the development of the socially metacognitive threads of dialogue and self-social regulation in the classroom. This social model of pedagogy informed by Mindset Theory allows beliefs about intelligence to become more visible through dialogue, which provides greater opportunities for modelling, moderation and mediation. This study has recorded tools and strategies for developing growth Mindset through dialogue and self-social regulation, which could now be distilled into a practical policy guide to include examples, illustrations, resources and sources and provide a shared resource for teachers within the school.

*6.2.2 Implications relatable to other contexts*

One of the central purposes of this study has been to find out how to avoid oversimplification or misinterpretation of Mindset Theory as teachers and leaders tackle the complexity of the processes involved in developing growth Mindset in a real-world, social learning environment. The Collective Mindset model, developed through analysis of practice in my case study school, helps to unpick some of these complexities and offers them for consideration in the development of practices and policy in other contexts. Although formal generalisability is not expected in qualitative case study, some of the insights derived from the context and setting of this study may be relatable or transferable into other similar settings and systems (Flyvbjerg, 2006; Rutterford, 2012). Findings may be particularly relevant in primary school settings where policy decisions are being made and processes of change are being developed that cultivate beliefs about the malleability of intelligence.

My research process and the outcomes of my study may be useful in part, or as a whole, to the development of practice and understanding of this real-world problem in other settings. Validity in this qualitative study was sought through clear, systematic and rigorous research design and processes, to create new, trustworthy (Nowell *et al*., 2017) and transferable (Malterud, 2001) knowledge. An iterative process of data generation and analysis made it possible to use initial interpretation to inform decisions during the research process about

what directions would be most fruitful for investigation (Thorne, 2016). Being a teacher and leader, I was familiar with the educational context and some of the potential dilemmas that the teachers and leaders might be experiencing (Thorne, 2016). However, consulting with participants and critical friends, combined with the use of established frameworks to support reflection, also helped to prevent blind spots and to challenge my researcher assumptions.

Structures to support self-reflexivity that were built into the research design helped the process of understanding and developing my own perspective (Ellis and Berger, 2003; Stutchbury and Fox, 2009; Pezalla, Petigrew and Miller-Day, 2012). Developing understanding of my role of the researcher as instrument and my positionality was important to minimising limitations relating to bias (Chenail, 2011; Pezalla, Pettigrew and Miller-Day, 2012). A focus on understanding participant perspectives on beliefs and practices also helped to mediate bias, in order to increase the validity of the study and the transparency of the study's findings (Malterud, 2001; Cohen, Manion and Morrison, 2018). There were three key elements that were central to this process; making it collaborative, recording my reflections and learning to enjoy uncertainty. This helped me to use my experience of pedagogical practices and the development of my own beliefs as an active part of the research process.

Sensitively and constructively reporting critical analysis of collaborative practice, without masking troublesome and sometimes contradictory aspects, was also important to the trustworthiness of the study. Teachers, leaders and other practitioners or policy makers are invited to appraise the characteristics of the study and its findings to consider how they may be relevant or applicable to their own every-day settings. There may be transferable and relatable practices and processes, or the study may form a stimulus that informs decision-making about what might be different in other contexts. The frameworks might form the basis for planning a professional learning approach, for evaluation of practice or for the identification of learner characteristics associated with Collective Mindset.

## 6.3 Limitations and strengths of this study

### *6.3.1 Study limitations*

One of the limitations of this study is that a context had been selected where teachers identified themselves from the outset as positively engaging with the tenets of Mindsets. This was intentional and selecting an information rich single case that identified itself as having engaged in the development process over a sustained period was valuable to answering the research question. However, while this purposeful sample increased opportunities for examining the finer grained detail of problems and practices associated with teachers' positive engagement, it also reduced the opportunity to consider important questions about how teachers who have not engaged might be usefully supported. Other studies of curriculum reform have suggested the importance of addressing this reluctance and influence of teachers who reject reform (Cotton, 2006). It would therefore be useful in a future study to focus on how the beliefs and practices of teachers who actively reject Mindset Theory are ameliorated within a school adopting a proactive approach to developing Collective Mindset (Wallace and Priestley, 2011).

Another limitation of my study is its reliance on high quality teacher professional knowledge and skills being developed within a culture that values professional learning (Cordingley *et al*., 2005). This requires investment of resources, including finance and leadership that promotes a strong culture of professional learning, and the value of working collaboratively towards long term gains (Coe *et al*., 2014; Cordingley *et al,* 2015). It would be interesting to research further how small groups of teachers in less supportive environments might still work collaboratively to develop Collective Mindset (Wallace and Priestley, 2011).

While the multiple data generation methods chosen created a rich and thick description, providing different lenses through which the research questions could be investigated, this could also be seen as a strength of the study. The very detailed description of the systematic and practical analysis process, provided transparency and ensured that a rigorous method was adopted (Braun and Clarke, 2006; 2013). However, the combination of five qualitative methods that included extensive participant observation field-notes made data generation, transcription and analysis a very intensive process that was time consuming for an individual researcher (Stige, Malterud and Midtgarden, 2009).

*6.3.2 Study strengths*

A key strength of this study is my engagement and continuous interaction with the school across a year (Walsh, 2012; Walsh and Seale, 2018). Visiting regularly, in preparation for the data generation, meant that I could become more familiar with the school setting and could fit in with the norms of school life. It also meant that members of the wider school community could become familiar with my presence, not just those participating in data generation, but other staff, children and parents. Opportunities for sustained participant observation over a term were enhanced by less formal opportunities to be in the classroom and staffroom. This helped me to develop understanding of the way that the school worked, and to build trusting relationships that could increase the quality and candour of shared critical evaluations of practice during my study.

Another strength of the study is that it is situated in real-world classroom contexts. A school is a complex setting to study, and the qualitative approach that I adopted helped to deconstruct these complexities (Thorne, 2016). The choice of ethnographic approaches in fieldwork, including participant observation and semi-structured interview, allowed the production of new knowledge (Brewer, 2000). While many other studies of pedagogical practices relating to Mindset Theory rely on teachers' self-reporting (Yeager and Dweck, 2019), my study combined self-reporting of classroom practices with observations of practice. This use of multiple methods informed the study's findings by providing different perspectives and experiences to support the trustworthiness of the data (Nowell *et al*., 2017).

My ethnographic approach, travelling with participants to find out about their journey, contributed to the overall understanding of the findings (Kvale and Brinkmann, 2009). This was particularly important during fieldwork and Thematic Analysis of data. The chronology of the hybrid approach to analysis, with the inductive reasoning stage being completed before my theoretical framework was imposed, helped me to do justice to the multiple and interesting meanings that were at play. It allowed me to compare the findings from data

generation in the case study school with very specific and detailed aspects of existing published literature. However, I had to set careful boundaries in terms of data generation and analysis, keeping it focused, meaningful and useful to answering the research question (Bryman, 2007). This was a challenging discipline, but as an early career researcher looking beyond these boundaries now provides extensive scope for future research.

Learning to enjoy uncertainty and being on a genuine voyage of discovery, rather than seeking out to prove or disprove established assumptions, was central to my role of researcher as instrument and important in reducing potential for bias (Chenail, 2011; Pezalla, Pettigrew and Miller-Day, 2012). Initially, I found the uncertainty of the evolving situation unsettling and challenging; particularly at such a significant point in my development as a researcher. However, keeping my thinking open and eventually enjoying uncertainty provided me with a real adventure in thinking and key lessons for my learning and development as a researcher.

Complex problems have complex solutions and this study provides settings with a greater understanding of the degree of complexity, and required investment of time, for the development of growth Mindset in a social, real-world setting. In a political context, this study may also provide encouragement for settings who are keen to commit time to the development of authentic practices, but feel pressured by their policy context into a quick fix agenda. It might provide confidence for those concerned about potential conflicts with other wider, political issues such as curriculum coverage and national testing.

Finally, and perhaps most importantly, a key strength of this study was the practical application of its findings by participants (Bryman, 2015). Teacher participants have benefited from increased awareness of strategies for their own professional development and for the development of the organisation in which they are situated. Identifying practices together, as we constructed the social model of pedagogy from analysis of their practice, has provided a framework and tools through which they can continue to develop practice. Child participants have also benefited from the development of understanding of the social and physical learning environment in ways that are designed to support their progress over time. This study has avoided mechanistic thinking and oversimplification to maintain authenticity; investigating existing practice to offer practical tools to support future development.

### 6.4 Directions for further study

In addition to considering the value of Collective Mindset in contexts where individual teachers reject Mindset Theory, where they may be unsupported or where children are taking external examinations, this study could be extended to investigate ways in which parents, carers and other local community members can be more actively involved in Collective Mindset. Participatory action research, or teacher practitioner enquiry, could support the development of effective and succinct ways to communicate with these other stakeholders about the malleability of intelligence and the action they can take to support their children. This was identified by teachers in the case study school as an area of particular interest and a priority for practice development. Involving other stakeholders as part of developing Collective Mindset would help to develop the consistency of messages about intelligence that are communicated across the wider school and local community.

A more detailed investigation of specific areas of dialogue and self-social regulation, in the context of developing Collective Mindset, could also usefully extend the existing framework to provide greater detail about the ways in which scaffolds for these threads are implemented with different age groups. This could consider details of the introduction of new scaffolds, developmentally appropriate structures to support progression in critical questioning and how the scaffolds might be reduced over time to gradually increase learner autonomy (Mercer, 2000). Exploring barriers to children's engagement with these threads of dialogue and self-social regulation might also be a feature of this further study; particularly in relation to language and communication barriers and the possible constraints of cognitive load on dialogue, regulation and social metacognition (Boekaerts and Niemivirta, 2000; Boekaerts and Corno, 2005).

## 6.5 Collective Mindset

This thesis builds on the existing research and academic literature relating to Mindset Theory, to suggest a new social model of 'Collective Mindset' constructed through analysis. The main findings of this study focus on six key practices that are central to this model and that share distinctive, socially metacognitive characteristics of dialogue and self-social regulation.

Combining these practices creates a physical and social environment where teachers and children develop a shared belief that they have capacity to take action together to develop growth Mindset, for themselves and with each other. These socially metacognitive characteristics encourage teachers and children to engage critically with theory and every-day practice, assess congruence between espoused beliefs and behaviours and share strategies to support individuals and the community.

The findings have demonstrated that Collective Mindset is a shared belief held by teachers and children in their conjoint capabilities to execute the courses of action required to develop and extend intelligence. They believe that together they are able to cultivate and sustain practices that develop growth Mindset for themselves and for each other. This study explains the roles of culture, community and metacognition in the development of shared beliefs about intelligence and agency for the cultivation of growth Mindset in real-world, social settings. The next step is to consider scope for applying this model, and related theoretical framework, to teaching in different contexts to make further contribution to development of theory. This study is significant because it provides a foundation for a number of opportunities for future research and publication about social models for the development of growth Mindset in real-world primary school settings.

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**Appendix A:** Ethical Procedure Documentation and Example Information for Participants

University of Cumbria

# Research Ethics Application

## for University Staff and Post Graduate Research (PgR) students

## Application for study involving Human Participants

**All fields will expand as required.**

| |
|---|
| 1. Title of Project:<br>Collective Mindset in school: Investigating cultural change relating to beliefs about intelligence |
| 2. If this is a PgR student project, please indicate what type of project by ticking the relevant box:<br>X PhD Thesis □ PhD by Published Works □ MPhil |
| 3. Type of study<br>X Involves direct involvement by human subjects<br>□ Involves existing documents/anonymised data only. Contact the Chair of Ethics before continuing via research office, Sonia.barnes@cumbria.ac.uk |
| 4. Peer Review<br>It is expected that all research is peer reviewed before applying for ethical consideration. Please indicate who your proposal has been discussed with (Mentor, Supervisor (s), Expert in field).<br>Professor Pete Boyd (Supervisor and Research Mentor)<br>Dr Sally Elton-Chalcraft (Supervisor) |

| **Applicant information** |
|---|
| 5. Name of applicant/researcher:<br>Philippa Leslie |
| 6. Appointment/position held by applicant<br>Senior Lecturer at the University of Cumbria |
| 7. Contact information for applicant:<br>E-mail: pippa.leslie@cumbria.ac.uk Telephone: [number]<br>Address: [address] |
| 8. Project supervisor(s)/mentor, if different (or applicable) from applicant:<br>Name: Professor Pete Boyd (Supervisor)<br>E-mail: pete.boyd@cumbria.ac.uk<br>Name: Dr Sally Elton-Chalcraft (Supervisor)<br>Email: sally.elton-chalcraft@cumbria.c.uk |
| 9. Appointment held by supervisor(s) and institution(s) where based (if applicable):<br>Pete Boyd<br>Professor of Professional Learning<br>University of Cumbria<br>Sally Elton-Chalcraft<br>Reader in Education<br>University of Cumbria |

10. Names and appointments of all members of the research team (including degree where applicable)

Philippa Leslie, Senior Lecturer, University of Cumbria

**The Project**

**NOTE**: In addition to completing this form you must submit all supporting materials such as participant information sheet (PIS) and consent form.

11. Summary of research project in lay terms (maximum length 150 words).

The purpose of the study is to establish how a school can develop a Collective Mindset. Mindset is an established theory of motivation concerning individual learner beliefs about the malleability of their own intelligence and the impact that their beliefs can have on their goal orientation, achievement and progress. Through critical analysis it will focus on characteristics of the school community and consider the role that interactions and communications play in the development of a Collective Mindset. It will contribute to a critical understanding of every-day teaching practices and principles that support the authentic, embedded and sustained scaling this up of this approach. It provides an individual, intensive case study design that aims to explore how the individuals and their environment interact and influence each other. It aims to contribute to an understanding of how a theory of collective mindset might be effectively mobilised in a school context.

12. Anticipated project dates

Start date: April 2018 End date: Dec 2018

13. Please describe the sample of participants to be studied (including number, age, gender):

8 primary school teachers and 7 primary school children (R-Y6).

14. How will participants be recruited and from where? Be as specific as possible.

A single school has been selected purposefully as an information rich case. It is a smaller than the average-sized primary school in a rural setting. Most of the children come from the village itself, the surrounding area and outlying farms. There are currently 192 children on roll and eight members of teaching staff. The school has undertaken whole staff Continuing Professional Development about mindset and the malleable nature of intelligence and ability.

The seven children taking part in the participatory mapping data generation will be from the school council, which is comprised of elected members from each year group. These children are used to working in a cross phase group to share views and ideas about practices in school. This non-probability purposeful selection is suited to a small scale study and is intended to create a context where familiarity allows for more confident and extended responses to questions.

15. What procedure is proposed for obtaining consent?

A consent form and information sheet for teachers (attached) will be used when obtaining consent and to ensure that participants are aware of their right to withdraw. Consent will outline the forms of data collection, including the use of audio recordings

and photographs. This form will also be used if other adults are present when teacher observations take place (other adults/volunteer helpers).

A letter will be sent by the head teacher to the parents/carers of all children at the school so that they are aware of the research activity. The children in the school council who take part in the participatory mapping activity will have permission and consent forms, which will be countersigned by the head teacher and a parent/carer. All parents and carers will have the opportunity to meet with the researcher or ask any questions or queries about their child's involvement in the project.

16. What discomfort (including psychological), inconvenience or danger could be caused by participation in the project? Please indicate plans to address these potential risks.

It is unlikely that the adults invited to participate lack the capacity to provide informed consent due to the nature of the study. However, everyone invited to participate will be made fully aware in writing of the right not to consent or to withdraw at any time without explanation.

Adult participants in the study will be given accessible information outlining: a) the general purpose of the study, b) what participants will be expected to do c) individuals' right to refuse or withdraw at any time through the consent form and information sheet. Participants will also have an opportunity to ask questions during a face-to-face briefing session, prior to agreeing to participate. Appropriate authorities will also have given their permission for participants to be recruited from or data collected (headteacher/senior leadership team).

In this study the inclusion of children's voices in research about their beliefs and experiences is important to answering the research questions fully. Guidelines from the British Education Research Association (BERA) for working with children in research will be adhered to rigorously to minimise risk of harm or discomfort for child participants.

For children involved in the participatory mapping activity, initial permissions to seek consent will be gained from gatekeepers with a duty of care for the child. The head-teacher and the child's parents/carer will countersign a permission form allowing the researcher to seek consent from the child. Active consent will then be sought from the individual children.

This study starts from a position of assuming competence, but recognises the need to adapt methods for seeking consent to accommodate the children's level of understanding, reasoning and language acquisition. The researcher is an experienced early years and primary school teacher and has previous experience of qualitative research involving children. Information will be given in writing and verbally and the children will have the option to ask questions about the study and the research activities and processes. The right to withdraw will be explained clearly and option to withdraw will be confidential, so that the influence of power relations and coercion is minimised.

It is not anticipated that any aspects of the study will pose a possible risk to participants' physical well-being. It is also not anticipated that any aspects of the study that participants might find embarrassing or be emotionally upsetting. Signposting to support where participant's exceptional circumstances lead to the possibility of risk has been integrated into the research design.

There are not likely to be culturally sensitive issues (e.g. age, gender, ethnicity) and the study does not require access to confidential sources of information. There might be

discomfort in challenging some established 'truths', or in the surfacing of previously unconsidered beliefs and troublesome knowledge about practice and principles, so support will be offered at each stage of the study.

An anti discriminatory stance supports sensitivity to political, cultural and religious differences. During the process of the research participants will have opportunities to identify the different influences that their own cultural histories may have on their position in relation to the conceptual frameworks employed. An example of this would be the influence that a teacher's own childhood experiences of learning might have on their Mindset as an adult. Different perspectives will be welcomed as opportunities to open up questions that could enrich understanding of the complexity of the approaches and theories. The value of diversity in developing understanding of the organisation will be highlighted.

The study does not involve covert methods or the use of deception, either in the form of withholding essential information about the study or intentionally misinforming participants about aspects of the study.

All planned procedures include an opportunity for participants to ask questions and/or obtain general feedback about the study after they have concluded their part in it.

17. What potential risks may exist for the researcher(s)? Please indicate plans to address such risks (for example, details of a lone worker plan).

It is not anticipated that conducting the study will expose the researcher to any risks, such as collecting data in potentially dangerous environments.

18. Whilst we do not generally expect direct benefits to participants as a result of this research, please state here any that result from completion of the study.

Teacher participants may benefit from increased awareness of strategies for their own professional development and from the development of the organisation in which they are situated.

Pupils of the school may also have the potential to benefit from the development of approaches that support self-regulatory learning and engaging with learning challenges in ways that support their progress over time.

19. Details of any incentives/payments (including out-of-pocket expenses) made to participants:

It is not anticipated that any incentives or payments will be made to participants.

20. Briefly describe your data collection and analysis methods and the rationale for their use

The study is framed within a naturalistic and interpretative paradigm, adopting an ethnographical case study methodology. **This approach has the potential to provide** understanding of how the culture of a school as an organisation relates to the shared wisdom of the community. Within this methodology legitimate peripheral participation will be adopted as an approach to support my understanding of the interpersonal dynamics.

The study combines five methods of data generation appropriate to a case study: 1) whole school teacher process mapping, 2) researcher peripheral participant observation,

3) children's participatory mapping, 4) individual teacher interviews and 5) whole school teacher focus group. The combination of approaches will seek to offer the best opportunities for answering the research questions and generating the type of knowledge that will most effectively meet the research aims. Using more than one procedure is also intended to provide multiple perspectives that can contribute to the validity of the study's findings.

During data generation, the hybrid Thematic Analysis approach will be an ongoing and iterative process. It will be conducted on transcribed textual data that includes audio recordings of dialogue from process and participatory mapping activities, interviews and the focus group. It will also include analysis of field notes and images generated during the process mapping and participatory mapping methods. Field notes may contain photographic images of artefacts identified as useful to the observation process. For example, they might contain examples of written feedback or systems for recording rewards important to the observation, but respect for anonymity will be maintained and they will not include any images of participants.

From the outset the data analysis process will be used to inform the following method of data generation and participants will be given the opportunity to discuss researcher interpretations during the interview, participatory mapping and focus group methods. To support the validity of claims made in interpretation and to maintain the integrity of the data, analysis will be collaborative and involve both the researcher and participants.

21. Describe the involvement of users/service users in the design and conduct of your research (where applicable). If you have not involved users/service users in developing your research protocol, please indicate this and provide a brief rationale/explanation.

Consultation with service users to inform the design and conduct of this research has taken place with service users in in three key forums: a teacher researcher group (6 teachers including 2 senior leadership team members), presentations at conference (University of Cumbria RIPLE Conference) to teachers and teacher educators and meetings with 2 primary school headteachers where the development of Mindset approaches is identified in their School Impact/Development Plan.

22. What plan is in place for the storage of data (electronic, digital, paper, etc.)? Please ensure that your plans comply with the Data Protection Act 1998 and University of Cumbria Data Storage Guidelines such as consideration of data archiving, password protection and data encryption.

All data will be stored on password protected devices which are inaccessible to people other than the researcher. Advice and guidance will be sought from the University's Data Protection Advisor during the collection, analysis and distribution processes. Where participants' identities are being recorded, data will be coded before computer data entry.

The school context and the participants will not be named in research documentation. Where specific criteria may make them easily identifiable, such as location or gender, anonymity will be maintained. Specific information will be removed and replaced with generic information in brackets. For example [subject]. Any quotations used will be carefully checked to ensure that they do not unintentionally breach confidentiality.

23. Will audio or video recording take place? Yes audio

If yes, what arrangements have been made for audio/video data storage? At what point in the research will tapes/digital recordings/files be destroyed?

Digital recordings/files will be made using University of Cumbria digital recording devices. They will be stored by the researcher on an encrypted device and destroyed three years after the study has been completed.

24. What are the plans for dissemination of findings from the research (reports, transcripts, summaries, publication, conferences)? Please give detail of how you plan to provide a summary of research findings in lay terms to participants.

Report and presentation to participants/stakeholders. Summary documents written for adult and child stakeholder audiences. Completion of the researcher's PhD thesis. Findings are intended to inform further research and will be disseminated through publication and conference presentations.

25. What particular ethical problems, not previously noted on this application, do you think there are in the proposed study?

The research activity will place within the school setting so it is particularly important to be sensitive to differences in social power within the organisation.

It will also be important to consider the ethics of reciprocity. Where the participants might feel that they could open up, having built a trusting relationship and assessments about relevance to study would need to be made.

The realities of being critical in a political context also needed to be recognised. Where participants will be invited critically engaged with and questioned policy and practice it is acknowledged that they are operating in a political context. In the context of a school assumed autonomy must be balanced with the consideration of accountabilities. There are limitations within education to the flexibility that teachers have to exercise their will and agency in the context of established policy frameworks and legislative issues. With potential for new knowledge to contradict established thinking it will be important to present change as an exciting discovery in examination of practice rather than as criticism.

Signatures: Applicant: …… [Signatute]

Date: .....06 04 18...

Project Supervisor (if applicable): [Signature]

Date...8th April 2018

## **Appendix B:** Data Generation Schedule Information

**Data Generation Method Schedule Key Prompts Overview**
Exploratory sub-questions were planned, but the intention was to use key prompts and questions with extracts from data to generate conversation and only to use sub-questions as prompts if required (Kvale and Brinkmann, 2009; Cohen, Manion and Morrison, 2018).

**Initial Teacher Focus Group**

- What do you do in your everyday classroom practice that supports the development of growth Mindset (one on each post-it)?
- Together please sort and categorise the practices that you have identified
- Please explain your categories and the practices within them.
- Together please agree where each practice should be on the chart (impact v frequency).
- Please justify your positioning of each practice to the group.

**Participatory Observation**
Research question and ongoing literature review.

**Teacher Individual Interview**

- Can you tell me about the different ways that you help children to understand their own learning?
- What is important to you as a teacher when you plan learning for the children that you teach?

Photographs from observation filed notes were provided.
Extracts from observation data (in their class).

**Children's Focus Group**
They were invited to create a shared image in response to questions focusing on their understanding of intelligence (Dweck, 2006, 2017).

- What is intelligence?
- Are people born intelligent?
- What is learning?
- What makes learning better?

They added to the image each time a question was asked and were invited to discuss their ideas as they recorded them.

**Final Teacher Focus Group**
Response to interim report of finding including research questions, data extracts and analysis research as prompt.

**Appendix C:** Evaluative Rubric - Example Page

***Teacher Self Audit Rubric - Interpretation of Mindset Theory***

| | *Teachers* | *Intention Implementation Impact* | *Children* | *Intention Implementation Impact* |
|---|---|---|---|---|
| *Talk About Mindset Theory* | *Teach children about Mindset Theory and learner characteristics.*<br><br>*Articulate underpinning psychology of Mindset Theory in everyday classroom dialogue.*<br><br>*Plan regular opportunities for children to reflect on their own experiences of challenge and share examples in context.* | | *Explain Mindset Theory relating beliefs about intelligence to goal setting and reflecting on examples from their own experience.*<br><br>*Critically question their own and each other's understanding of beliefs about intelligence as malleable (or 'changeable').*<br><br>*Talk about specific learner characteristics associated with growth Mindset as a way of improving their learning and are able to give practical examples (see Appendix C).* | |
| *Construct meaning* | *Provide opportunities for children to reflect on and discuss their own experiences learner characteristics and Mindset Theory.*<br><br>*Teacher discuss meaning and develop a shared vocabulary of difficulty with children to understand Mindset Theory.* | | *Use their own experiences to construct understanding of Mindset characteristics through dialogue.*<br><br>*Articulate their understanding as it develops using their own choice of words.* | |
| *Identify triggers* | *Teach children about how experiences can trigger different Mindset characteristics and possible conflicts in their beliefs.*<br><br>*Help children to identify their own fixed Mindset triggers, recognise their context and adopt personal strategies to manage them.* | | *Identify when triggers impact on their learner behaviours.*<br><br>*Recognise their own triggers and use practical strategies to prevent them from impacting negatively on their learning processes and outcomes.*<br><br>*Help each other to manage fixed Mindset Triggers.* | |

## **Appendix D:** Coding Frame for Inductive Reasoning in Analysis

| Community: Work together, develop skills of collaboration and establish relationships that support learning. Learn to interact with each other in ways that contribute to effective and productive working relationships. | |
|---|---|
| Build Trust | Mutual Support<br>Use Mistakes<br>Maintain Relationships |
| Value Contributions | Flexible Grouping<br>Critical dialogue<br>Meaningful and valued |
| Share Responsibility | Shared purpose<br>Accountable to each other<br>Unifying language |
| Problems addressed with Community: assessing attitudes, values and beliefs, quality of peer support, conflicting cultural messages, impact of relationships from beyond the classroom, appropriate choice of grouping, communication difficulties, avoidance, direction v efficacy, induction | |

| Metacognition: Monitor and control knowledge, emotions and actions. Co-construct understanding of factors that improve learning, support progress and impact on achievement. | |
|---|---|
| Teach Learning | A learning curriculum<br>Specific learner beliefs and characteristics<br>Quality and professional learning |
| Construct Meaning | Co-construct understanding<br>Understand through experience<br>Use personal examples |
| Recognise Complexity | Experience<br>Talk about conflicts<br>Meet triggers head on |
| Problems addressed with Metacognition: difficulty with assessing thought processes, socially acceptable responses, communication difficulties, cognitive complexity, deferring to others, over simplification of concepts | |

| Challenge: Experience, understand and welcome challenge. Learn to engage with challenge to influence individual and collective academic efficacy. | |
|---|---|
| Plan Challenge | Whole school challenge framework<br>Practical strategies for real challenge<br>Self-challenge |
| Create Choice | Range of resources<br>Opportunities for choice<br>Choice of activities |
| Model Behaviour | Congruent teaching<br>Children model<br>Lack of congruence |
| Problems addressed with Challenge: accurate assessment of degree of challenge, conflicting cultural messages, appropriate choice of resource/task, avoidance, communication difficulties, establishing boundaries, emotional context and management | |

| Goals: Use feedback to set learning goals. Give and receive feedback about learning processes and outcomes and set goals for individuals and collaborative enquiry. | |
|---|---|
| Encourage Enquiry | Curriculum through enquiry<br>Answer and ask questions<br>Collaborative enquiry |
| Balance Feedback | Balance of process and outcomes<br>Experience critical feedback<br>Learn to give and receive feedback |
| Own Goals | Understand feedback is for progress<br>Have time to use feedback<br>Use feedback to set goals |
| Problems addressed with Goals: accuracy of peer feedback, deferring to others, clarity between process and outcome, communication difficulties, curriculum constraints and time | |